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Educational Support and the Choice of Metacognitive Reading Strategies Under Exam Stress Among Students With and Without Dyslexia

(pp. 455–475)

Abstract

The aim of the study was to identify the determinants of dyslexic and non-dyslexic students' choice of reading strategies for exams, as well as the mediating factors – in this case, exam stress – in the relationship between perceived educational support and the use of specific reading strategies. The study groups consisted of students diagnosed with dyslexia (N=540) and students without dyslexia (N=540), aged 14 to 15 years.

The tools used in the study were the *Metacognitive Awareness of Reading Strategies Inventory*, developed by Mokhtari and Reichard, the *Students' Perceived Sources of Test Anxiety*, developed by Bonaccio and Reeve, and the *Educational Support Questionnaire*, developed by Gindrich. The study followed a correlational design. Descriptive statistics, Pearson's *r* correlations, and regression analysis were used to analyze the results using model templates for PROCESS for SPSS and SAS (Hayes, 2018).

The study established relationships between perceived educational support and the declared use of particular reading strategies (global, support, and reading problem-solving strategies) and stressors in exam situations.

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The results of the study indicate that only among dyslexic students was there a moderating role of exam stress in the relationship between perceived educational support and the declared choice of global reading strategies.

Keywords: exam stress, metacognitive reading strategies, educational support, dyslexia

Dyslexia is currently one of the most prevalent specific learning disorders, affecting between 9% and 12% of European citizens (Snowling et al., 2020; European Dyslexia Association, 2021) and perhaps as much as 15%–20% of the general population (International Dyslexia Association, 2021). There is no doubt that its consequences determine the school functioning of affected students at every stage of education (Ganschow et al., 1995; Crombie, 1997, 2000; Kamińska-Ostęp & Gulińska, 2008; Snowling & Hulme, 2011). Many studies provide evidence of a link between the reading difficulties experienced by dyslexic students and both their cognitive abilities (Capin et al., 2021; Lauterbach et al., 2017; Wong et al., 2017) and school achievement (Adlof, 2020; Snowling et al., 2000).

The result of these learning difficulties, in many cases, is an anxiety reaction (Lufi et al., 2004; Peleg, 2009; Wang et al., 2021). One of the key symptoms of anxiety is a preoccupation with personal thoughts or emotions, which can result in mind-wandering (Unsworth & McMillan, 2013) and, during an exam, may interfere with reading comprehension performance, including making appropriate inferences from the text (Blicher et al., 2017; Martinez-Lincoln et al., 2021).

The relationship between exam anxiety and the cognitive/emotional and social functioning of students with low reading skills, including dyslexia, and reading and learning styles and achievement has been confirmed by numerous studies (Francis et al., 2021; Livingston et al., 2018; Ogundokun, 2011; Peleg, 2009). A number of papers also highlight the important links between exam stress and self-regulation (Ramli et al., 2018; Oaten & Cheng, 2005).

Although exam stress from being assessed in various test situations that require reading and writing skills can also affect students without specific learning difficulties and is a prominent element of school life,

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the research so far seems to indicate that students with dyslexia are more vulnerable to its destructive impact, especially during exams. Given these consequences, it seems important to recognize the sources of exam anxiety experienced by students, which may arise from both internal resources, such as self-efficacy or self-esteem, and external factors, related to the exam's unpredictability or difficulty or the form of its tasks. In this situation, it is reasonable to draw attention to the need to activate metacognitive strategies in students as an outcome of therapeutic interventions aimed at increasing reading performance – one of the determinants of learning success (Dimmitt & McCormick, 2012; Kanani et al., 2017; Moojen et al., 2020). The activation of metacognitive mechanisms (Flavell, 1971, as cited in Lajoie, 2008; Flavell et al., 2000; Garner, 1994; Jacobs & Paris, 1987) allows the individual to control and regulate their own activity and to choose specific learning strategies in order to increase learning efficiency (Świeży, 2008). While reading a text, students may be directed to apply different strategies, such as global strategies, problem-solving strategies, or support reading strategies. The first of these uses a general analysis of the text, in terms of both its content (metatextual strategies) and organization. The second relates to the actions students take when the text becomes difficult and they encounter problems that prevent them from understanding the content. The last group of strategies involves the use of additional aids, such as note-taking, paraphrasing, summarizing, or discussing the text (see Mokhtari & Reichard, 2002).

Researchers' efforts in this area have focused on the search for two types of relationships, the first between metacognitive awareness – resulting in the activation of strategies for working with a text – and reading and learning performance (Campos, 2012; Czerniawska, 1999; Eilers & Pinkley, 2006; Keskin, 2013; Kolić-Vehovec & Bajšanski, 2006; Li, 2010), and the second between learning support activities and students' formation of metacognitive skills (Antoniou & Souvignier, 2007; Camahalan, 2006; Denton et al., 2021; Stevens et al., 2020; Stevens & Vaughn, 2020; Williams & Vaughn, 2020). The results of a study by Burden and Burdett (2005) showed that appropriately structured environmental support can

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positively influence dyslexic students' beliefs about self-efficacy, goal orientation, and sense of control.

The above-mentioned reports therefore prompt further research into identifying the metacognitive mechanisms activated by dyslexic students when working with a text. In a study (Furnes & Norman, 2015) conducted on a group of 44 students aged 18–23 years (22 with dyslexia and 22 without reading difficulties), the students with dyslexia scored lower in reading skills, metacognitive knowledge, and associated stated use of reading strategies than students who did not exhibit reading difficulties. In addition, the former group reported lower learning efficacy (see Humphrey & Mullins, 2002) and poorer grades. They showed similar sensitivity to metacognitive experiences and comparable insight into their own difficulties, suggesting that interventions to increase the level of procedural metacognitive knowledge (Jacobs & Paris, 1987) and the use of problem-appropriate reading strategies in dyslexic students should increase their effectiveness in working with texts. Activities of this kind should be seen in the perspective of social support in the broadest sense, including educational support, which can be considered in two dimensions: objective and subjective. The objective dimension refers to both organized institutional psychological/educational support and informal support from teachers, therapists, parents, and peers. The subjective dimension, on the other hand, is understood in terms of how students perceive, evaluate, and value learning support activities (Gindrich, 2014).

There have been inconclusive results from research on the effectiveness of interventions, whether in the form of instruction on specific reading strategies (Camahalan, 2006; Stevens et al., 2019) or multifaceted, multi-component interventions for improving reading comprehension in students with reading difficulties (Fogarty et al., 2014). While some studies support the effectiveness of using an intervention targeting the selection and use of reading strategies (Camahalan, 2006; Stevens et al., 2019), others unfortunately do not provide such optimistic evidence (Fogarty et al., 2014). The theoretical discourse and research reports on the importance of support in improving reading skills in students with reading difficulties, including dyslexia, therefore guide the research toward

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establishing the moderating role of exam stress in the relationship between educational support and reading strategy choice.

Methods

The research presented herein is part of a wider project on metacognitive awareness and the motivational mechanisms of reading under exam stress. The aim of the ongoing research project was to identify differences between groups of dyslexic and non-dyslexic students in terms of perceived educational support, declared use of reading strategies, and perceived sources of exam stress; to determine the relationships between perceived educational support, declared use of metacognitive reading strategies, and sources of exam stress among students with and without dyslexia; and to determine how sources of exam stress moderate the relationship between perceived educational support and declared use of global and support reading strategies and reading problem-solving strategies.

These research objectives are represented by the following questions and hypotheses:

1. Are there differences in the level of educational support experienced, the declared use of reading strategies, and the exam stress experienced by dyslexic versus non-dyslexic students? In view of the fact that dyslexic students receive specialized psychological/educational care aimed at minimizing learning difficulties – including reading and writing – we hypothesized that they report higher levels of perceived educational support and in consequence more often use particular reading strategies. In contrast, negative educational experiences and the associated understated sense of efficacy (Furnes & Norman, 2015; Humphrey & Mullins, 2002) may increase vulnerability to stressors; therefore, dyslexic students will experience higher levels of exam stress.
2. Are there relationships between educational support declared by dyslexic students in the use of reading strategies (global, support,

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and problem-solving reading strategies) and the sources of exam stress in dyslexic versus non-dyslexic students? The psychological and pedagogical support provided to dyslexic students led us to hypothesize a stronger positive relationship between educational support and declared use of reading strategies among this group.

3. How and why do different sources of exam stress condition the relationship between educational support and the choice of specific reading strategies in dyslexic and non-dyslexic students? Considering both the research-supported destructive effect of exam stress on emotional/cognitive functioning (e.g., Blicher et al., 2017; Martinez-Lincoln et al., 2021) and the importance of educational support for enhancing learning performance, including reading and writing (Camahalan, 2006; Stevens et al., 2019), we hypothesized that sources of stress will act as moderators of the relationship between educational support and reading strategy choice in both groups of students.

Data

In this study, the research group consisted of a total of 1,080 students (540 with dyslexia and 540 without dyslexia) attending randomly selected Polish schools across the country. The dyslexic students had diagnoses documented by reports from psychological/educational counselling centers. The age of the students was between 14 and 15 years (M=14.40; SD=0.55). All dyslexic pupils participating in the study were receiving psychological/educational support at school and/or a counselling center and had participated in remedial classes and possibly other specialized classes.

Research tools

In this study, three psychometric tools were used. The self-reporting tool *Metacognitive Awareness of Reading Strategies Inventory*, developed by Mokhtari and Reichard (2002), was used to measure students' declared

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use of reading strategies. The tool uses a 5-point Likert scale (1 – "I never or almost never do it"; 5 – "I always or almost always do it"). The authors recommend interpreting scores of 3.5 and above as high, from 2.5 to 3.4 as medium, and scores below 2.4 as low (Mokhtari & Reichard, 2002).

In the study sample, the reliability coefficients for the individual subscales were comparable to those of the original version: Global Reading Strategies – 0.88 (original version – 0.92), Problem-Solving Strategies – 0.86 (original version – 0.79), and Support Reading Strategies – 0.86 (original version – 0.87).

The *Students' Perceived Sources of Test Anxiety* questionnaire, developed by Bonaccio and Reeve (2010), was used to identify the sources of exam stress experienced by students. The tool consists of 22 items assigned to three factors: Perceptions of the Test, whose Cronbach's alpha value for the study sample was 0.82; Perceptions of the Self, whose reliability was 0.89; and Perceptions of the Situation, whose reliability was 0.70. The tool uses a 5-point Likert-type scale (ranging from 1 – "not at all" to 5 – "very strongly"), on which the subjects rate the extent to which each item reflects their emotions and thoughts before taking an exam.

The Educational Support Questionnaire, developed by Gindrich (2014), was used to assess students' perceived educational support. The tool consists of a total of 30 items forming three subscales of educational support: from teachers, parents, and schoolmates. Each subscale contains eight items. In the additional part of the questionnaire, there are six statements concerning educational support provided by specialists from the psychological/educational counselling center or school in the form of additional specialized classes. The tool uses a 5-point Likert scale (1 – "completely false"; 5 – "completely true").

The validation study of the questionnaire showed that the split-half reliability coefficients ranged from 0.79 to 0.91. The reliability of this tool's scales for the study sample were as follows: Global Educational Support – 0.91, Educational Support from Teachers – 0.88, Educational Support from Parents – 0.85, and Educational Support from School Classmates – 0.91.

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Results

In order to answer the first research question, concerning the existence of differences between the level of educational support, declared use of reading strategies, and perceived exam stress in dyslexic versus non-dyslexic students, the mean scores that the two groups obtained for each variable were analyzed and compared (Table 1). This made it possible to establish that for the three potential sources of exam stress – Perception of the Test, Perception of the Self, and Perception of the Situation – the students in both study groups prioritized Perception of the Self, which can be influenced by previous positive or negative test-taking experiences, anxiety about any type of test, setting high expectations for oneself, and the pressure to perform well in examinations, and Perception of the Test, its form, the type and amount of material, and the rank that the student ascribes to it in relation to their educational achievement. Perception of the Situation, understood as the occurrence of unforeseen events that could potentially affect the course of the exam and the results, was perceived less frequently as a source of exam stress. It should be added that the averages obtained for each of the sources of exam stress did not indicate any statistically significant differences between students with dyslexia and their peers without dyslexia.

In the case of metacognitive reading strategies, students in both groups most often declared using problem-solving strategies aimed at attentively reading the text, monitoring attention, adjusting the reading pace to the difficulty of the text, and visualizing the content being read, among other things, and least often using support reading strategies, consisting of taking notes while reading, summarizing or paraphrasing content, underlining information in the text, or returning to a previously read passage in order to link the content into a logical whole, for example. The frequency of use of each reading strategy, as declared by the students, fell within the range of mean scores. The analysis with Student's t-test for independent samples showed that the mean scores for the use of each type of strategy by students with dyslexia were statistically significantly higher than the mean scores for this variable for students without dyslexia.

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Turning to the results concerning educational support, it appears that students with dyslexia scored significantly higher in terms of perceived Global Educational Support than their peers without dyslexia. A more detailed analysis indicates that these scores were not differentiated by the sources of support either: Support from Teachers, Support from Parents, and Support from Peers. It is noteworthy that students in both groups were least likely to declare educational support from their classmates, while they were most likely to report support from their parents.

Table 1. Differences in mean scores obtained by respondents for individual variables

Variable	Students with dyslexia		Students without dyslexia		Student's t-test		
	M	SD	M	SD	t	df	p
Perception of the Test	2.92	0.72	2.86	0.93	1.186	1015.94	0.236
Perception of the Self	2.98	0.88	2.99	0.96	-0.093	1070.98	0.926
Perception of the Situation	2.45	1.06	2.37	1.18	1.168	1065.09	0.243
Global Reading Strategies (GLOB)	3.09	0.81	2.89	0.88	3.850	1078	**0.000**
Support Reading Strategies (SUP)	2.75	0.95	2.61	0.91	2.461	1073	**0.014**
Problem-Solving Strategies (PROB)	3.45	0.84	3.15	0.99	5.451	1078	**0.000**
Global Educational Support	76.51	16.90	71.80	17.31	4.529	1078	**0.000**
Educational Support from Teachers	24.14	6.99	22.81	7.35	-3.035	1078	**0.002**
Educational Support from Parents	28.83	6.91	26.41	7.31	-5.584	1078	**0.000**
Educational Support from Peers	23.55	8.41	22.57	6.91	-2.076	1078	**0.038**

M – arithmetic mean; SD – standard deviation; p – significance level;
bold – statistical significance (<0.05); df – degrees of freedom.

Based on SPSS 27.0.

Pearson's *r* correlations were used to address the second research question, concerning the determination of relationships between exam stressors, reading strategies (global, supportive, and problem-solving strategies in reading), and the evaluation of the global educational support received.

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Table 2. Pearson's r correlations of the study variables among the students with dyslexia (N=540) and without dyslexia (N=540)

		1	2	3	4	5	6
1. Perception of the Test							
2. Perception of the Self	D	.746**					
	WD	.780**					
3. Perception of the Situation	D	.474**	.361**				
	WD	.621**	.560**				
4. Global Reading Strategies	D	.575**	.429**	.265**			
	WD	.392**	.341**	.233**			
5. Support Reading Strategies	D	.437**	.374**	.309**	.768**		
	WD	.267**	.222**	.170**	.773**		
6. Problem-Solving Strategies	D	.419**	.388**	.196**	.723**	.727**	
	WD	.371**	.308**	.066	.780**	.610**	
7. Global Educational Support	D	.211**	.068	.017	.439**	.450**	.437**
	WD	.109*	.054	-.027	.400**	.377**	.307**

D – students with dyslexia; WD – students without dyslexia
** correlation was significant at p<0.01 * correlation was significant at p< 0.05
Based on SPSS 27.0.

As Table 2 shows, the analysis showed weak to moderate positive correlations for both study groups between test perception and individual reading strategies and between self-perception and individual reading strategies. It should be noted that in the group of students with dyslexia, the correlation coefficients between global reading strategies and both sources of exam stress were at a moderate level, while in the group of students without dyslexia, they were at a weak level. Perception of the situation as a source of exam stress, on the other hand, appeared to correlate positively but weakly with all metacognitive reading strategies among the dyslexic students. In contrast, in the students without dyslexia, the perception of the situation as a source of stress correlated weakly only with global and support reading strategies.

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Both groups also showed weak positive correlations between global educational support and test perception, though statistically significant relationships were not found between self-perception and perceived educational support and between situation perception and perceived educational support in either group.

The analysis suggests that global educational support is significantly related, positively and at a weak to moderate level, to the global and supportive reading strategies and reading problem-solving strategies declared by students with and without dyslexia. Furthermore, moderate to high positive correlations between individual metacognitive reading strategies and between individual sources of exam stress were revealed in both study groups.

Seeking to answer the third research question on the moderating role of the source of exam stress in the relationship between educational support and the choice of specific reading strategies, a linear regression analysis was conducted (Table 3).

Table 3. Statistics indicating the percentage of variance explained by R2 of both models with the moderators Perceptions of the Test and Perceptions of the Self

Model	R	R^2	Standard error	F	df1	df2	p	Change statistics				
								R^2	F	df1	df2	p
1	0.670	0.449	0.360	145.61	3	536	<0.001	0.013	12.422	1	536	0.001
2	0.625	0.392	0.397	115.017	3	536	<0.001	0.040	33.665	1	536	<0.001

Predictors in models 1,2: Global support, Dependent variable: Global strategies

Based on SPSS 27.0 (Process v3.4 by Andrew F. Hayes, Model 1).

After entering the data into Model 1 (Hayes, 2018), the results showed that a statistically significant $F(3, 536) = 145.67$, $p < 0.001$ (Table 3, Model 1) is the model in which the relationship between global support and choice of global reading strategies is conditioned by the stress source of test perception. This model explains about 45% of the variance in the dependent

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variable ($R^2 = 0.45$); the change in R^2 after introducing a moderator into the model was statistically significant ($R^2 = 0.013$; $p = 0.001$). The second model tested $F(3, 536) = 115.017$, $p < 0.001$ (Table 3, Model 2), which included the moderating role of perceiving the self as a source of stress, explains about 40% of the variance in the dependent variable ($R^2 = 0.37$). In this case as well, the change in R^2 after introducing a moderator into the model was statistically significant ($R^2 = 0.04$; $p < 0.001$).

The statistically significant predictors of reading strategy choice in Model 1 were the variables Global Support Without Counselling ($B = 0.032$, $p < 0.001$; 95% CI [0.023, 0.042]), Perceiving a Test as a Source of Stress ($B = 0.981$, $p < 0.001$; 95% CI [0.737, 1.225]), and the interaction variable Global Support and Perceiving a Test as a Source of Stress ($B = -0.006$, $p = 0.001$; 95% CI [-0.009, -0.003]). In Model 2, the statistically significant predictors of reading strategy choice were the variables Global Support ($B = 0.045$, $p < 0.001$; 95% CI [0.036, 0.054]), Perception of Self as a Source of Stress ($B = 1.052$, $p < 0.001$; 95% CI [0.812, 1.292]), and the interaction variable Global Support and Perception of Self as a Source of Stress ($B = -0.009$, $p < 0.001$; 95% CI [-0.124, -0.006]).

In the two models, in a situation of exam stress – which is either a test or self-perception – the declared frequency of using reading strategies decreased as the sense of educational support increased. The conditional effect values obtained in both cases indicate that the relationship between global support and choice of global reading strategies was statistically significant for all levels of perceived stress (Table 4).

Table 4. Estimation of conditional predictor effects for moderator values

Model		Effect	Standard error	t	p	Confidence interval	
						Lower limit	Upper limit
1 Variable PT	2.222	0.019	0.002	10.482	<0.001	0.016	0.023
	2.889	0.015	0.002	9.837	<0.001	0.012	0.019
	3.556	0.012	0.002	5.810	<0.001	0.008	0.016

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2 Variable PS	2.091	0.026	0.002	3.381	<0.001	0.022	0.030
	3.091	0.017	0.002	9.798	<0.001	0.012	0.020
	3.818	0.010	0.002	4.244	<0.001	0.008	0.015

The predictor in both models was Global Support. Moderating variables: Model 1 – Perception of the Test (PT); Model 2 – Perception of the Self (PS)

Based on SPSS 27.0 (Process v3.4 by Andrew F. Hayes, Model 1).

Discussion

The aim of the study was to identify the determinants of dyslexic and non-dyslexic students' choice of reading strategies and the mediating factors (exam stress) in the relationship between perceived educational support and the use of specific reading strategies by these two groups of students.

Referring to the first research question, which addressed differences between dyslexic and non-dyslexic students in the level of educational support received, the use of reading strategies declared, and the exam stress perceived, the results indicate that dyslexic students scored statistically significantly higher on perceived educational support and declared use of specific reading strategies than their non-dyslexic peers. The results relating to strategy use do not support those obtained by Furnes and Norman (2015). This may be due to the fact that including dyslexic students in psycho-educational care raises their level of metacognitive awareness and allows them to use reading strategies more reflectively. In contrast, no statistically significant differences were observed in the level of exam stress reported, which can be attributed to perceptions of the test, the self, and the situation. These results may seem surprising in light of previous research reports (Humphrey & Mullins, 2002), in which students with dyslexia showed lower self-esteem and self-efficacy than students without dyslexia, which could suggest that they would perceive themselves to a greater extent as a potential source of exam stress. Thus, the results

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only partially support the hypothesis and indicate that exam stress, regardless of its source, should be considered a potential factor that may affect the school achievement of both dyslexic and non-dyslexic students.

This fact is also reflected in the results of the correlational analysis to answer the second research question, which show that sources of exam stress related to test perception and self-perception have statistically significant relationships with individual reading strategies in both dyslexic and non-dyslexic students; situation perception is related to all types of reading strategies only in dyslexic students, while in non-dyslexic students it correlates weakly and positively with two types of strategies: global, including activities focused on familiarizing oneself with the structure of the text, establishing the purpose of reading, using the context of the text, or being supported by typographical clues, tables, diagrams, and illustrations in the text, and support reading strategies such as taking notes, underlining selected passages, summarizing, using dictionaries, re-reading the text, or talking to the teacher (therapist) to check reading comprehension. Therefore, in students without dyslexia, self-perception does not correlate with problem-solving strategies, which include adjusting the reading pace to the difficulty of the text, visualizing the text to improve recall, taking breaks while reading to analyze passages, re-reading the text, and using the context of the text to determine the meaning of unfamiliar words and expressions.

The analysis of the relationships between sources of exam stress and global educational support revealed weak positive correlations in both groups of students only between global educational support and perceiving a test as a source of exam stress. This suggests that for both dyslexic and non-dyslexic students, as perceived educational support increases, so does the level of stress related to the perception of test structure. This seemingly surprising relationship can be explained by students' sense of responsibility and fear of disappointing those who support their efforts to succeed in their education.

No statistically significant relationships were found between perceived educational support and perception of the self or the situation as sources of exam stress in either of the study groups. It cannot be ruled out

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that this is due to both the students' low self-confidence and the belief that they have no real influence over unpredictable factors, the occurrence of which cannot be prepared for in advance. These results do not correspond with those reported in the study by Burden and Burdett (2005), who found a positive relationship between adequate environmental support and the beliefs of dyslexic students concerning self-efficacy, among other things. Indeed, in this case one would expect negative correlations between the assessment of educational support and the perception of the self as a source of stress.

In contrast, the study showed that global educational support was significantly positively related to the global and support reading strategies and reading problem-solving strategies declared by students with and without dyslexia. The strength of the relationships (from weak to moderate) revealed in the analysis allows us to confirm the hypothesis that stronger positive relationships exist between educational support and declared use of particular reading strategies among dyslexic students. This may be due to the fact that they are more prepared to activate specific strategies due to the coverage of specialized psychological/educational support.

Concerning the third research question, the regression analysis identified the moderating role of stress in the relationship between educational support and the declared use of specific reading strategies. The results indicate that sources of stress only play a moderating role in the relationship between educational support and the choice of specific reading strategies in the group of dyslexic students and only in two cases. Both involve the relationship between educational support and the choice of global reading strategies, regardless of their level, with the moderator of this relationship being two sources of stress, the test or the self. This finding is in line with previous research findings on the destructive role of stress on cognitive functioning (Ogundokun, 2011; Peleg, 2009). It seems that this may be due to the strong link that exists between these two sources of stress, resulting in dyslexic students perceiving a test in terms of their reading comprehension problems and having low self-efficacy (Burden & Burdett, 2005), perceiving themselves as the source of difficulty (Francis et al., 2021; Livingston et al., 2018).

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It is noteworthy that in both cases, the declared frequency of using global reading strategies in a stressful situation decreased as the sense of educational support increased. This makes it possible to conclude that, on the one hand, the educational support received by dyslexic students has little to do with equipping them with effective strategies for working with texts and that, on the other hand, the stress of having to face the unknown of the test and the lack of self-confidence in their own abilities means that – even with an increasing sense of support – students are unable to activate metacognitive strategies for working with texts (see Ramli et al., 2018; Oaten & Cheng, 2005). The fact that both sources only moderate the relationship between educational support and global reading strategies may indicate that exam stress causes dyslexic students to activate primarily general strategies for working with texts. It therefore cannot be ruled out that the instruction for working with texts that they receive in therapeutic/educational support refers only to general guidance and does not include more advanced strategies, or that students themselves – without specific help from teachers, therapists, and parents – try to intuitively use certain strategies which they feel are the most effective at coping with the challenges of reading in an exam stress situation.

For students without dyslexia, none of the sources of stress acted as a moderator of the relationship between educational support and declared use of reading strategies. Thus, our third hypothesis was only partially confirmed. With regard to students without dyslexia, it is necessary to look for models based on assumptions other than those made in this study in order to explain the relationship between the three variables.

The research carried out under this project points to the need to provide educational support for dyslexic students, focusing on developing skills such as recognizing sources of exam stress, understanding their own cognitive and psychosocial resources, and selecting effective coping strategies, as well as on familiarizing and implementing problem-appropriate strategies for working with texts. These elements should be part of permanent rather than ad hoc multifaceted systemic solutions in the form of intervention programs aimed at improving the learning and presentation performance of dyslexic students.

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References

Adlof, S. M. (2020). Promoting reading achievement in children with developmental language disorders: What can we learn from research on specific language impairment and dyslexia?. *Journal of Speech, Language, and Hearing Research*, *63*(10), 3277–3292. https://doi.org/10.1044/2020_JSLHR-20-00118.

Antoniou, F., & Souvignier, E. (2007). Strategy instruction in reading comprehension: An intervention study for students with learning disabilities. *Learning Disabilities: A Contemporary Journal*, 5(1), 41–57.

Blicher, S., Feingold, L., & Shany, M. (2017). The role of trait anxiety and preoccupation with reading disabilities of children and their mothers in predicting children's reading comprehension. *Journal of Learning Disabilities*, *50*(3), 309–321. https://doi.org/10.1177/0022219415624101

Bonaccio, S., & Reeve, C. L. (2010). The nature and relative importance of students' perceptions of the sources of test anxiety. *Learning and Individual Differences*, *20*(6), 617–625. https://dx.doi.org/10.1016/j.lindif.2010.09.007

Burden, R., & Burdett, J. (2005). Factors associated with successful learning in pupils with dyslexia: A motivational analysis. *British Journal of Special Education*, *32*(2), 100–104.

Camahalan, F. M. G. (2006). Effects of a metacognitive reading program on the reading achievement and metacognitive strategies of students with cases of dyslexia. *Reading Improvement*, *43*(2), 77ff.

Campos, C. S. (2012). The use of metacognitive strategies in L2 reading. *Lenguas Modernas,* 40, 125–147.

Capin, P., Cho, E., Miciak, J., Roberts, G., & Vaughn, S. (2021). Examining the reading and cognitive profiles of students with significant reading comprehension difficulties. *Learning Disability Quarterly*, *44*(3), 183–196. https://doi.org/10.1177/0731948721989973

Crombie, M. A. (1997). The effects of specific learning difficulties (dyslexia) on the learning of a foreign language in school. *Dyslexia*, *3*(1), 27–47.

Crombie, M. A. (2000). Dyslexia and the learning of a foreign language in school: Where are we going? *Dyslexia*, *6*(2), 112–123.

Czerniawska, E. (1999). *Dynamika zachowań strategicznych w uczeniu się z tekstów podręcznikowych*. Wydawnictwo Uniwersytetu Warszawskiego.

Denton, C. A., Montroy, J. J., Zucker, T. A., & Cannon, M. A. (2021). Designing an intervention in reading and self-regulation for students with significant reading

ISSN 2543-7585 e- ISSN 2543-8409

Multidisciplinary Journal of School Education • Vol. 12, 2023/1 No. 23
Skills, Competences, Values in Education: New Perspectives

difficulties, including dyslexia. *Learning Disability Quarterly*, *44*(3), 170–182. https://doi.org/10.1177/0731948719899479

Dimmitt, C., & McCormick, C. B. (2012). Metacognition in education. In K. R. Harris, S. Graham, T. Urdan, C. B. McCormick, G. M. Sinatra, & J. Sweller (Eds.), *APA Educational Psychology Handbook: Vol. 1. Theories, Constructs, and Critical Issues* (pp. 157–187). American Psychological Association.

Eilers, L. H., & Pinkley, C. (2006). Metacognitive strategies help students to comprehend all text. *Reading Improvement*, *43*(1), 13–29.

European Dyslexia Association. (2021). *Dyslexia in Europe*. https://eda-info.eu/what-is-dyslexia

Flavell, J. H., Green, F. L., & Flavell, E. R. (2000). Development of children's awareness of their own thoughts. *Journal of Cognition and Development*, *1*(1), 97–112. https://doi.org/10.1207/S15327647JCD0101N_10

Fogarty, M., Oslund, E., Simmons, D., Davis, J., Simmons, L., Anderson, L., Clemens, N., & Roberts, G. (2014). Examining the effectiveness of a multicomponent reading comprehension intervention in middle schools: A focus on treatment fidelity. *Educational Psychology Review*, *26*(3), 425–449. https://doi.org/10.1007/s10648-014-9270-6

Francis, D., Hudson, J. L., Kohnen, S., Mobach, L., & McArthur, G. M. (2021). The effect of an integrated reading and anxiety intervention for poor readers with anxiety. *PeerJ*, 9, e10987, 1–30. https://doi.org/10.7717/peerj.10987

Furnes, B., & Norman, E. (2015). Metacognition and reading: Comparing three forms of metacognition in normally developing readers and readers with dyslexia. *Dyslexia, 21*(3), 273–284. https://doi.org/10.1002/dys.1501

Ganschow, L., Sparks, R., & Schneider, E. (1995). Learning a foreign language: Challenges for students with language learning difficulties. *Dyslexia*, 1, 75–95.

Garner, R. (1994). Metacognition and executive control. In R. B. Ruddell, M. R. Ruddell, & H. Singer (Eds.), *Theoretical Models and Processes of Reading* (4th ed., pp. 715–732). International Reading Association.

Gindrich, P. (2014). Kwestionariusz Wsparcia Edukacyjnego (KWE) – struktura i cechy psychometryczne narzędzia. *Przegląd Pedagogiczny*, 1, 153–168.

Hayes, A. F. (2018). Introduction to mediation, moderation, and conditional process analysis: A regression-based approach. Guilford Press.

ISSN 2543-7585 e- ISSN 2543-8409

Humphrey, N., & Mullins, P. M. (2002). Personal constructs and attribution for academic success and failure in dyslexia. *British Journal of Special Education*, *29*(4), 196–203.

International Dyslexia Association. (2021). *Dyslexia basics.* https://dyslexiaida.org/dyslexia-basics-2

Jacobs, J. E., & Paris, S. G. (1987). Children's metacognition about reading: Issues in definition, measurement, and instruction. *Educational Psychologist*, 22(3–4), 255–278. https://doi.org/10.1080/00461520.1987.9653052

Kamińska-Ostęp, A., & Gulińska, H. (2008). Teaching methods and aids assisting dyslexic pupils in learning chemistry. *Journal of Baltic Science Education*, *1*(3), 147–154.

Kanani, Z., Adibsereshki, N., & Haghgoo, H. A. (2017). The effect of self-monitoring training on the achievement motivation of students with dyslexia. *Journal of Research in Childhood Education, 31*(3), 430–439. https://doi.org/10.1080/02568543.2017.1310154

Keskin, H. K. (2013). Impacts of reading metacognitive strategies and reading attitudes on school success. *International Journal of Academic Research*, *5*(5), 312–317. https://doi.org/10.7813/2075-4124.2013/5-5/B.48

Kolić-Vehovec, S., & Bajšanski, I. (2006). Metacognitive strategies and reading comprehension in elementary-school students. *European Journal of Psychology of Education*, XXI, 4, 439–451. https://doi.org/10.1007/BF03173513

Lajoie, S. P. (2008). Metacognition, self-regulation, and self-regulated learning: A rose by any other name? *Educational Psychology Review*, 20, 469–475. https://doi.org/10.1007/s10648-008-9088-1

Lauterbach, A. A., Park, Y., & Lombardino, L. J. (2017). The roles of cognitive and language abilities in predicting decoding and reading comprehension: Comparisons of dyslexia and specific language impairment. *Annals of Dyslexia*, *67*(3), 201–218. https://doi.org/10.1007/s11881-016-0139-x

Li, F. (2010). A study of English reading strategies used by senior middle school students. *Asian Social Science*, *6*(10), 184–192. https://doi.org/10.5539/ass.v6n10p184

Livingston E. M., Siegel, L. S., & Ribary, U. (2018). Developmental dyslexia: Emotional impact and consequences. *Australian Journal of Learning Difficulties*, *23*(2), 107–135. https://doi.org/10.1080/19404158.2018.1479975

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Skills, Competences, Values in Education: New Perspectives

Lufi, D., Okasha, S., & Cohen, A. (2004). Test anxiety and its effect on the personality of students with learning disabilities. *Learning Disability Quarterly,* 27(3), 176–184. https://doi.org/10.2307/1593667

Martinez-Lincoln, A., Barnes, M. A., & Clemens, N. H. (2021). The influence of student engagement on the effects of an inferential reading comprehension intervention for struggling middle school readers. *Annals of Dyslexia*, *71*(2), 322–345. https://doi.org/10.1007/s11881-020-00209-7

Mokhtari, K., & Reichard, C. A. (2002). Assessing students' metacognitive awareness of reading strategies. *Journal of Educational Psychology*, *94* (2), 249–259.

Moojen, S. M. P., Gonçalves, H. A., Bassôa, A., Navas, A. L., de Jou, G., & Miguel, E. S. (2020). Adults with dyslexia: How can they achieve academic success despite impairments in basic reading and writing abilities? The role of text structure sensitivity as a compensatory skill. *Annals of Dyslexia*, *70*(1), 115–140. https://doi.org/10.1007/s11881-020-00195-w

Oaten, M., & Cheng, K. (2005). Academic examination stress impairs self-control. *Journal of Social and Clinical Psychology, 24*(2), 254–279. https://doi.org/10.1521/jscp.24.2.254.62276

Ogundokun, M. O. (2011). Learning style, school environment and test anxiety as correlates of learning outcomes among secondary school students. *IFE PsychologIA*, *19*(2), 321–336. https://doi.org/10.4314/ifep.v19i2.69555

Peleg, O. (2009). Test anxiety, academic achievement, and self-esteem among Arab adolescents with and without learning disabilities. *Learning Disability Quarterly, 32*(1), 11–20. https://doi.org/10.2307/1593667

Ramli, N. H. H., Alavi, M., Mehrinezhad, S. A., & Ahmadi, A. (2018). Academic stress and self-regulation among university students in Malaysia: Mediator role of mindfulness. *Behavioral Sciences*, *8*(12), 1–9. https://doi.org/10.3390/bs8010012

Snowling, M., Adams, J., Bowyer-Crane, C. A., & Tobin, V. (2000). Levels of literacy among juvenile offenders: The incidence of specific learning disabilities. *Criminal Behaviour and Mental Health*, *10*(4), 229–241. https://doi.org/10.1002/cbm.362

Snowling, M. J., & Hulme, C. (2011). Evidence-based interventions for reading and language difficulties: Creating a virtuous circle. *British Journal of Educational Psychology*, *81*(1),1–23.

ISSN 2543-7585 e- ISSN 2543-8409

Snowling, M. J., Hulme, C., & Nation, K. (2020). Defining and understanding dyslexia: Past, present and future. *Oxford review of education*, *46*(4), 501–513. https://doi.org/10.1080/03054985.2020.1765756

Stevens, E. A., Murray, C. S., Fishstrom, S., & Vaughn, S. (2020). Using question generation to improve reading comprehension for middle grade students. *Journal of Adolescent & Adult Literacy*, *64*(3), 311–322. https://doi.org/10.1002/jaal.1105

Stevens, E. A., & Vaughn, S. (2020). Using paraphrasing and text structure instruction to support main idea generation. *TEACHING Exceptional Children*, *53*(4), 300–308. https://doi.org/10.1177/0040059920958738

Stevens, E. A., Vaughn, S., House, L., & Stillman-Spisak, S. (2019). The effects of a paraphrasing and text structure intervention on the main idea generation and reading comprehension of students with reading disabilities in grades 4 and 5. *Scientific Studies of Reading*, *24*(5), 365–379. https://doi.org/10.1080/10888438.2019.1684925

Świeży, M. (2008). Metapoznanie w samoregulacji procesów uczenia. In A. Niedźwieńska (Ed.), *Samoregulacja w poznaniu i działaniu* (pp. 141–164). Wydawnictwo Uniwersytetu Jagiellońskiego.

Unsworth, N., & McMillan, B. D. (2013). Mind wandering and reading comprehension: Examining the roles of working memory capacity, interest, motivation, and topic experience. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *39*(3), 832–842. https://doi.org/10.1037/a0029669

Wang, L. C., Li, X., & Chung, K. K. H. (2021). Relationships between test anxiety and metacognition in Chinese young adults with and without specific learning disabilities. *Annals of Dyslexia, 71*(1), 103–126. https://doi.org/10.1007/s11881-021-00218-0

Williams, K. J., & Vaughn, S. (2020). Effects of an intensive reading intervention for ninth-grade English learners with learning disabilities. *Learning Disability Quarterly*, *43*(3), 154–166. https://doi.org/10.1177/0731948719851745

Wong, A .M.-Y., Ho, C. S.-H., Au, T. K.-F., McBride, C., Ng, A. K.-H., Yip, L. P.-W., & Lam, C. C.-C. (2017). Reading comprehension, working memory and higher-level language skills in children with SLI and/or dyslexia. *Reading and Writing: An Interdisciplinary Journal*, *30*(2), 337–361. https://doi.org/10.1007/s11145-016-9678-0

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