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ORIGINAL RESEARCH PROJECTS

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Izabella Kucharczyk

The Maria Grzegorzewska University, Warsaw, Poland
e-mail: ikucharczyk@aps.edu.pl
ORCID: http://orcid.org/0000-0003-1054-9825

Sense of Coherence, Self-Efficacy and Locus of Control as Predictors of the Level of Achievement Motivation of People with Dyslexia During Adolescence

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Abstract

The purpose of the article is to learn about and analyse personal resources such as self-efficacy, sense of locus of control, sense of coherence in students with dyslexia in adolescence and their achievement motivation. Four tools were used: KBPK-R Questionnaire for the Study of Sense of Control – revised version, KompOs – Personal Competence Scale SOC-13M Life Orientation Questionnaire and the LMI Achievement Motivation Inventory – short version. This research was carried out from January to June 2023 in Poland. The research sample (n = 225) consisted of adolescents with dyslexia (n = 112) and without dyslexia (n = 113). The results were analysed using hierarchical regression analysis. The study showed that overall sense of coherence correlated positively with sense of strength (r=0.255). Sense of self-efficacy correlated positively with sense of resourcefulness (r=0.196) and sense of strength (r=0.713) and perseverance (r=0.724) All indicators of sense of control correlated positively with each other. Sense of control in the area of success (r=0.374) and overall sense of control (r=0.472) also correlated positively with achievement motivation. The research analyses show that a predictor of achievement motivation is a sense of comprehension and a sense of locus of control on the success scale. Students with dyslexia on the self-efficacy scale score low, the sense of locus of control is external, and the sense of coherence ranks low. Students' knowledge of their own resources is crucial as it allows for increasing motivation for work and adequate response in dif-

ficult and stressful situations. These resources are also necessary for determining both short-term and long-term goals, the achievement of which will depend precisely on motivation.

Keywords: personal resources, sense of coherence, self-efficacy, sense of locus of control, achievement motivation.

Introduction

There is a growing body of research confirming that specific learning disabilities have a lifelong effects and impact many areas (Shaywitz et al., 2008; Stampoltzis & Polychronopoulou, 2009; Undheim, 2009; Ingesson, 2011; Nalvany et al., 2011), among others, they often influence the social sphere, including difficulties in establishing and maintaining peer relationships (Giovagnoli et al., 2009; Mugnaini et al., 2009; Kucharczyk & Dłużniewska, 2017), the emotional sphere, among others, lower self-esteem, health problems, including mental illnesses (Wiener & Schneider, 2002; Undheim, 2003; Armstrong & Humphrey, 2009; Terras et al., 2009; Whiting & Robinson, 2009; Wilson et al., 2009; Ahrens et al., 2010; Nelson & Harwood, 2011, Margari et al., 2013; Aro et al., 2022).

Students with specific learning disabilities are characterised by slower and less fluent reading, poor decoding, spelling, and sometimes writing and numeracy skills. Dyslexia is not the result of cognitive difficulties, but it is the result of abnormalities in the functioning of the central nervous system, for example in the processing of speech sounds. Delayed language development in the first years of a child's life is often a predictor of difficulties in the future in terms of fluency in both spoken and written language (Snowling et al., 2016; 2019). How the student deals with their emotions, how they understand and interpret them, will have an impact on the pace of their work, motivation to act, and belief that what they do makes sense and brings results. There is scientific evidence that many students with dyslexia experience very severe emotional stress during their education period (Hellendooorn & Ruijssenaars, 2000; Singer, 2005; 2007; Stampoltzis & Polychronopoulou, 2009; Nalvanyet et al., 2011) According to, for instance, Michael A. McNulty (2003), early negative experiences related to reading and writing, the lack of proper prophylaxis, the lack of therapy to eliminate the mistakes all have a negative impact on the motivation to learn in students with dyslexia, and

their confidence in their own skills and competences is low. Students with dyslexia also tend to use inappropriate coping strategies in difficult situations and are more likely than other students to react with learned helplessness and passive behaviours (Núñez et al., 2005; Lackaye et al., 2006; Sideridis et al., 2006), avoidance strategies emerge (Singer, 2007), there is withdrawal from social relationships (Forness & Kavale, 1996; Pearl, 2002; Wong & Donahue, 2002; Bryan, 2005; Kotzer & Margalit, 2007).

Therefore, a very important task of pedagogical therapists, educators, psychologists and other specialists is to teach their students to use their personal resources, which should be understood as mediating factors affecting the preservation of psychophysical well-being and improving the quality of life. They are essential because they help with coping with various stressful situations occurring in the course of learning. They are a kind of buffer, as they help to maintain mental resilience. Their deficiency and improper use have a disorganising effect, activating an inappropriate maladaptive behaviour. In addition, these resources affect the motivation to learn, to put more effort into the performed work.

The most frequently mentioned and used personal resources include, among others, self-efficacy, locus of control (LOC[1]), sense of coherence (SOC[2]) and social support. The literature on the subject shows that the problem of using personal resources in a group of students with dyslexia in adolescence is used relatively rarely.

A review of studies on self-efficacy in students with dyslexia found ambiguity in the results. For example, Emma Lindeblad, Idor Svensson and Stefan Gustafson (2016) found that the surveyed students are characterised by a similar level of self-esteem as students without difficulties in reading and

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[1] Locus of Control (LOC) – a personality dimension, decides on the autonomy of an individual, it allows a person to evaluate whether success or failure depends on external or internal factors (Kościelak, 2010).

[2] Sense of Control (SOC) is a term introduced by Anthon Antonovsky (2005), referring to the way of understanding the world. This construct consist of three elements: sense of comprehensibility, meaningfulness and resourcefulness. The sense of comprehensibility means that the stimuli that reach a person are understandable and explainable, sense of resourcefulness concerns the ability to perceive one's own resources as adequate to cope with difficult situations and the sense of meaningfulness refers to the conviction that all decisions and efforts makes sense, what provides an individual with the motivation to act (Antonovsky, 2005).

writing, and a similar sense of anxiety. Most likely, this may be because teachers, knowing the symptoms of dyslexia risk from the earliest stages of education, are able to observe and detect disturbing symptoms of abnormalities in reading and writing, also know how to work and conduct classes. Thanks to adapted materials, they learn how to use new techniques of acquiring knowledge. On the other hand, Michael A. McNulty (2003), Neil Alexander-Passe (2006) and Robert M. Klassen and Shane L. Lynch (2007) are of the opinion that students with dyslexia rate their skills related to effectively coping with school requirements very low and have low competences in coping with difficult situations. These results are also confirmed by the results of a study conducted on a group of 40 students with dyslexia and a complementary group of students without dyslexia (Kowaluk-Romanek, 2018). According to the researcher, students with dyslexia are characterised by a lower level of generalised self-efficacy and lower motivation to act.

An analysis of previous studies in which students with dyslexia during adolescence participated showed that this group is characterised by a lower sense of coherence, which may impact the motivation to learn. Also, a low level of hope negatively affects the learning process, intensifying discouragement, lack of faith in achieving success, which in turn reduces the willingness to take any action (Margalit, 2006). Students with specific difficulties have a low level of coherence, do not always know how to learn effectively, and when their efforts fail, they feel lonely and misunderstood. This is a group of students who should be helped to organise the conditions of the school environment in an appropriate way, to make adjustments, so that they can learn to objectively assess their abilities and acquire competences. Malka Margalit (2006) is convinced that it would be advisable to develop educational programs, but in such a way that the content is more practical than theoretical. Such classes would allow students to gain knowledge about their own emotions and those of others, they would learn how to react adequately in difficult situations, and how to reevaluate the goals they want to achieve.

The developmental tasks of adolescence include the need to establish peer relationships and being in a group. In the case of students with specific learning difficulties, dyslexia can be a predictor of low self-esteem, increased feelings of anxiety and stress when reading, increased feelings of isolation and rejection from the peer group. It should be emphasised that students with

specific learning difficulties consider themselves to be less intelligent, lowering their self-esteem, level of competence and skills (McNulty, 2003; Denhart, 2008; Mugnaini et al., 2009; Lisle & Wade, 2014). Perceiving oneself as inferior compared to one's peers usually has a discouraging effect, lowers motivation to work, which translates into increasingly low academic results. To take care of their psychophysical well-being, these students use defence mechanisms. An example of such a mechanism are locus of control (LOC) and self-efficacy. These mechanisms differ from each other in that that the student may be convinced that what will happen depends on their control of the situation (LOC) but does not have to believe that the undertaken activities will be conducive to success (self-efficacy).

Research on locus of control in students with specific learning disabilities in adolescence is inconclusive. According to Nola Firth et al. (2013), the greater the level of self-acceptance of dyslexic students, the greater their belief that the actions they take are meaningful and effective, and the greater their internal sense of control. Most likely, this means that they have the right adaptation strategies and know how to deal with various complex social situations.

Interesting data on the relationship between the occurrence of an external or internal sense of control and dyslexia have been provided by research conducted by, among others, Grażyna Krasowicz-Kupis (2005; 2019). In her opinion, students with dyslexia are no different from their peers in terms of their sense of control. Most likely, the existence of an internal sense of control is the result of early therapeutic activities that equip students with appropriate strategies, which allow their level of competence to increase. Similar problems were identified by surveys conducted by Ewa Łodygowska and Vitalia Shebanova (2018). It turns out that the more regularly therapeutic classes are conducted, the lower the level of school anxiety students have, and their locus of control will be internal, unlike that of students who do not attend such classes. They explain their failures or successes mainly by internal factors and are aware of their causes.

On the other hand, Neil Humphrey and Patricia M. Mullins (2002) claim that students with dyslexia most often attribute their successes to external rather than internal factors, and this is associated with intensifying the feeling of being inferior and using behaviours that intensify learned helplessness. In their opinion, these students have a very low level of internal control,

which is why it is difficult for them to distribute their work equally, their effort is often disproportionately high compared to the results, hence the motivation to act and learn may be very low.

Robert Burden and Julia Burdett (2005) are of a completely different opinion, claiming that students with dyslexia who like to learn use both cognitive and metacognitive strategies, use new learning techniques, know how to divide the material and acquire new competences. They have a positive attitude towards learning, which makes it easier for them to control the entire learning process.

The issue of resources has also been addressed in a broader study that has looked at the barriers faced by students with specific learning disabilities and how they cope with different situations (Ben-Naim et al., 2016). The analysis of the conducted data shows that these students are characterised by low levels of self-esteem, self-efficacy and coherence. The latter two perform a very important role in the learning process, they help to take care of psychophysical well-being and in adaptation to school conditions. Often, the level of decrease of these resources depends, among others, on school requirements, social relationships and the ability to manage time with many school responsibilities. The authors of the study also pointed out that the sense of coherence is a mediator in the formation of self-efficacy in the learning process. The sense of coherence influences the students' conviction whether they can understand the material being conveyed in a given situation and make a decision whether the undertaken effort make sense.

To sum up, it should be emphasised that the entire therapeutic process for students with specific learning difficulties should not be limited only to the organisation of specialist classes, that is corrective and compensatory classes. A specialist teacher should take into account the fact that personal resources perform a huge role in the learning process. They allow the students not only to get to know themselves, but also understand their emotional states that arise while reading and/or writing and seek an explanation for the purposefulness of the effort put into the learning process. The sense of coherence, that is the sense of comprehensibility (cognitive factor), resourcefulness (cognitive-instrumental factor) and meaningfulness (emotional-motivational factor) determine the sense of self-efficacy. They allow the students to know and understand why they have to learn a given material, why they have to do

a number of exercises to improve reading and writing, which will most likely impact their independence in the future. On the other hand, self-efficacy and locus of control can affect their sense of success, rather than failure, and their motivation to continue working (emotional factor) (Wejner-Jaworska, 2019).

The above-mentioned resources have a significant impact on self-perception, increase self-awareness, and allow working on expanding one's knowledge, competences and skills. If the student knows and can determine their resources, their motivation to continue working will be greater. It turns out that students with dyslexia often have trouble maintaining motivation to act and learn at the right level (Cano et al., 2021). Many researchers (Gregg & Nelson, 2010; Lewandowski et al., 2013) are convinced that the extended time that students with reading and writing difficulties may receive is a factor that sustains motivation. The stronger it is, the easier it will be for the student to react to difficult and stressful situations. Personal resources are also needed to set goals, both short-term and long-term, and achieving them will depend on the motivation.

Methodology

The aim of the article is to learn and analyse personal resources such as: self-efficacy, locus of control, sense of coherence in students with developmental dyslexia and their achievement motivation[3]. Therefore, the main research question is: Are there any relationships between self-efficacy, locus of control, sense of coherence in students with developmental dyslexia and their achievement motivation?[4]

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[3] The study is only a small part of the results of research conducted under the project entitled "Wybrane zasoby osobiste a motywacja osiągnięć młodzieży z dysleksją rozwojową. Badania porównawcze" [Selected Personal Resources and Achievement Motivation of Adolescents with Developmental Dyslexia. Comparative Study] finance from the statutory research of Maria Grzegorzewska Academy of Special Education in Warsaw BNS 24/23-P. The project received a positive assessment of the APS Ethics Committee. The article presents only the research results regarding selected personal resources of students with dyslexia. Comparative analyses between groups, students with dyslexia and without dyslexia, were omitted. These results will be presented in a separate article.

[4] In this article, no analyses were conducted to determine statistically significant differences in the level of self-efficacy, sense of coherence, and locus of control between students

Due to the quantitative nature of the research, the research method used was a diagnostic survey using four tools.

The first was **KBPK-R Kwestionariusz do Badania Poczucia Kontroli [KBPK_R Questionnaire for Locus of Control]** – revised version (Krasowicz-Kupis & Wojnarska, 2017). This questionnaire is intended for adolescents aged 13–18. It is used to measure a personality variable called locus of control over the consequences of behaviour, described in J. B. Rotter's theory of social learning. KBPK-R consists of 43 items, of which 38 are diagnostic items and 5 are buffer items. The overall KBPK-R score provides information about the internal or external location of the LOC. The results in the Success and Failure scales inform about the factors (people, phenomena) to which the examined person assigns responsibility for positive and negative events in their life. The value of Cronbach's Alpha coefficient of internal consistency alpha for the whole sample was $\alpha = 0.83$.

The second was **KompOs – Skala Kompetencji Osobistej [KompOs – Personal Competence Scale]** (Juczyński, 2000). This questionnaire is intended for adolescents aged 11–17. It measures generalised self-efficacy; it also allows obtaining results in two subscales: the disposition of the strength necessary to initiate the action and the perseverance necessary to continue the action. Each of the scales contains six statements, formulated half positively and half negatively. The questionnaire uses a 4-point scale (yes or almost always – 4; no or almost never – 1). In addition to the overall score, the questionnaire can be divided into two subscales: sense of strength and perseverance. The value of Cronbach's internal consistency coefficient alpha for the whole scale was $\alpha = 0.72$, for the subscale Sense of Strength $\alpha = 0.74$, and for the subscale Perseverance $\alpha = 0.62$.

The third questionnaire used was **Kwestionariusz Orientacji Życiowej SOC-13M [Orientation to Life Questionnaire SOC-13M]** (Antonovsky in Polish adaptation by M. Zwoliński et al., 2001). It is used to assess the sense

with dyslexia who had undergone therapy, for example, and students who had not undergone such treatments. The argument against such analyses was the uneven distribution of students in the groups. Out of the 112-person group, 110 dyslexic students declared that they attended corrective and compensatory classes in primary school. It would be valuable in the future to conduct research on the entire population of students with dyslexia in order to determine differences between students starting therapy and those completing the therapeutic process.

of coherence. It consists of 13 statements. A 5-point scale was used in the questionnaire. In addition to the overall score, three subscales are indicated: a sense of meaningfulness, coherence and resourcefulness.

The last, fourth one, is designed to determine the level of motivation **LMI Inwentarz Motywacji Osiągnięć [LMI Achievement Motivation Inventory]** – short version (Schuler, Thornton, Frintrup & Prochaski in Polish adaptation by Klinkosz and Sękowski, 2018). It is designed for adolescents aged 15–19 and consists of 30 items. The value of Cronbach's coefficient of internal consistency alpha was $\alpha = 0.87$

These studies were conducted from January to June 2023 in randomly selected facilities. In accordance with the methodological principles of the social sciences, a drawing method was developed. A list of schools was prepared, then institutions were randomly selected, and after obtaining consents from the principal of the institutions, consents from parents and the students themselves, surveys were conducted.

Results

The study involved 225 students aged 15-18 (*M*=16.87; *SD*=0.99), 112 persons with dyslexia, including 52 women and 60 men aged 15-18 (*M*=16.71; *SD*=1.03) and 113 persons without developmental dyslexia, 66 women and 47 men aged 15-18 (*M*=17.04; *SD*=0.92) from Poland.

It is worth noting that out of the group of 112 students with dyslexia, only 26 (23.2%) attended therapeutic classes, that is corrective and compensatory classes.

Table 1 presents the distribution of voivodeships in which the respondents lived.

Table 1. Voivodeships in which the respondents lived.

	students with dyslexia		**students without dyslexia**		**total**	
Voivodeship	*n*	%	*n*	%	*n*	%
Masovian	97	86.6	84	74.3	181	80.4
Lódź	13	11.6	28	24.8	41	18.2

Tabela 1. (continued)

	students with dyslexia		students without dyslexia		total	
Pomeranian	1	0.9	1	0.9	2	0.9
No data	1	0.9	0	0.0	1	0.4
Total	112	100	113	100	225	100

Explanation: *n* – number of people; % – percentage of the group

Source: Author's research.

The majority of the respondents lived in the Masovian Voivodeship, that is 80.4%. Only 18.2% lived in the Łódź Voivodeship and 0.9% in the Pomeranian Voivodeship.

Table 2 presents the distribution of the level of education of the respondents' parents.

Table 2. Educational level of the respondents' parents

	students with dyslexia				students without dyslexia			
	mother		father		mother		father	
parent's education	n	%	n	%	n	%	n	%
elementary	1	0.9	2	1.8	3	2.7	2	1.8
vocational	12	10.7	23	20.5	6	5.3	17	15.0
high school	21	18.8	22	19.6	19	16.8	29	25.7
incomplete high school	16	14.3	16	14.3	15	13.3	14	12.4
higher education	62	55.4	49	43.8	66	58.4	46	40.7
no data	0	0.0	0	0.0	4	3.5	5	4.4
total	112	100	112	100	113	100	113	100

Explanation: *n* – number of people; % – percentage of the group

Source: Author's research.

In most cases, the mothers and fathers of the respondents had higher education.

Table 3 presents descriptive statistics for the analysed interval variables, that is mean values, standard deviations, minimum values, maximum values, and values of skewness and kurtosis measures. The list was supplemented with the values of the Kolmogorov-Smirnov test.

Table 3. Descriptive statistics for the analysed interval variables.

Variables	*M*	*SD*	*min*	*max*	*S*	*K*	*S-W*	*p*
Locus of control – Success	9.39	2.54	2	15	-0.38	-0.11	0.13	0.001
Locus of control – Failure	5.92	2.13	0	10	0.01	-0.51	0.11	0.001
Locus of control – General	24.08	5.71	9	44	0.15	-0.02	0.07	0.028
Sense of strength	13.81	2.07	9	21	0.14	1.11	0.13	0.001
Sense of perseverance	15.78	2.09	10	24	0.27	1.31	0.12	0.001
Sense of self-efficacy	29.59	3.07	22	39	0.07	0.42	0.09	0.001
Sense of comprehensibility	12.76	2.91	6	20	-0.02	-0.44	0.08	0.003
Sense of resourcefulness	11.25	2.64	4	19	-0.13	-0.14	0.09	0.001
Sense of meaningfulness	12.35	1.85	6	17	-0.31	0.75	0.13	0.001
Sense of coherence	36.37	5.54	23	51	-0.27	-0.45	0.08	0.001
Achievement Motivation	126.31	24.77	43	183	-0.45	0.50	0.05	0.200

Explanation: *M* – mean value; *SD* – standard deviation; min – minimum value max – maximal value; *S* – skewness; *K* – kurtosis; *K-S* – Kolmogorov-Smirnov test value; *p* – statistical significance

Source: Author's research.

The values of the Kolmogorov-Smirnov test were statistically significant for all variables except the level of achievement motivation; however, the values of the skewness measures ranged from -1 to 1 and the values of the kurtosis measures were outside this range only for the sense of strength and the sense of perseverance, so subsequent analyses were based on parametric tests of statistical significance.

The analysis of the results shows that in terms of locus of control in the group of students with dyslexia, the average score obtained was M=24.08, with a standard deviation of SD=5.71, and in relation to the norms of the tool, it indicates an average result. The minimum score in the group is 9 and the maximum is 44 points. On the Success scale, the average score was M=9.39, with a standard deviation of SD=2.54. The minimum score is 2 and the maximum score is 15 points. The Failure scale is as follows: the average score obtained in the studied group of students with dyslexia is M=5.92 points, with a standard deviation of 2.13. The minimum score is 0 and the maximum score is 10 points. Taking into account confidence intervals, it should be emphasised that the scores in terms of the generalised sense of control and in the Success and Failure subscale are shaping as external LOCs (low scores) and unspecified (average scores). This may mean that students with dyslexia may be convinced that what happens to them, their failures and successes, are the result of various actions taken by others, e.g. by teachers or parents. The successes they experience are rather explained as the result not so much of their own efforts as of the favour of others. Such an interpretation of events can be a factor that can effectively lower students' self-esteem, reinforce their belief in their lack of self-efficacy and discourage them from making any effort. Failures, on the other hand, are explained as the result of other people's malice. Often, this approach allows reducing one's responsibility for one's shortcomings, protecting a person from lowering of their self-esteem and the dominance of negative emotions.

The Self-Efficacy Scale refers to the belief in how much you will be able to overcome the difficulties that arise. It turns out that students with dyslexia in adolescence are characterised by low self-efficacy (M=29.59; SD=3.07). This may mean that students do not fully believe that they can cope with the difficulties that arise.

A sense of coherence is another important resource for coping with difficulties and motivating oneself to act. In terms of subscales, the highest average score was obtained by the students in terms of the sense of comprehensibility (M=11.25, SD=2.91), and the lowest in terms of the sense of resourcefulness (M=11.25, SD=2.64). However, in terms of the general sense of coherence, the mean result obtained was M=36.37, with a standard deviation of SD=5.54.

The analysis of the data shows that the level of achievement motivation of students with dyslexia in adolescence is low (M=126.31; SD=24.77). Achievement motivation is important because it has a huge impact on the activities undertaken. It depends on many factors such as current needs, peer group, value system, and the environment in which a person is raised.

Table 4 presents Pearson's r correlation coefficients between the analysed variables obtained in the group of dyslexic patients. The sense of comprehensibility correlated positively with the sense of resourcefulness (r=0.537; p<005), with the general sense of coherence (r=0.822; p<0.005), with the sense of strength (r=0.193; p<0.01), with locus of control in the area of success (r=0.248; p<0.005), with the general locus of control (r=0.213; p<0.01) and with the achievement motivation (r=0.235; p<0.01) and negatively with the sense of perseverance (r=-0.193; p<0.01). The sense of resourcefulness was also positively correlated with the sense of meaningfulness (r=0.254; p<0.05), the general sense of coherence (r=0.840; p<0.05), the sense of strength (r=0.298; p<0.05) and the sense of self-efficacy (r=0.0.196; p<0.01). The sense of meaningfulness also correlated positively with the general sense of coherence (r=0.507; p<0.005). The general sense of coherence correlated positively with the sense of strength (r=0255; p<0.05), the sense of strength correlated positively with the sense of self-efficacy (r=0.713; p<0.05) and negatively with locus of control in the area of success (r=-0.222; p<0.05)) and negatively with the general locus of control (r=-0.220; p<0.01). The sense of perseverance correlated positively with the sense of self-efficacy (r=0.724; p<0.05). All indicators of locus of control correlated positively with each other. Locus of control in the area of success and the general locus of control also correlated positively with achievement motivation.

The last element of the analysis was to determine the predictors of the level of motivation in students with dyslexia. Indicators of coherence, self-efficacy and locus of control were analysed as predictors of the level of motivation of people with developmental dyslexia. Hierarchical regression analysis was performed. In the first block, indicators of the sense of coherence were included in the analysis. Since the sense of meaningfulness correlated very poorly with the other indicators of the sense of coherence (Table 4), the sense of comprehensibility, the sense of resourcefulness and the sense of meaningfulness were included in the analysis as separate indicators and not

Table 4. Correlation coefficients between the analysed variables obtained in the group of persons with developmental dyslexia.

Variables	Sense of comprehensibility	Sense of resourcefulness	Sense of meaningfulness	Sense of coherence	Sense of strength	Sense of perseverance	Sense of self-efficacy	Locus of control – Success	Locus of control – Failure	Locus of control
Sense of comprehensibility	--									
Sense of resourcefulness	0.537**	--								
Sense of meaningfulness	0.110	0.254**	--							
Sense of coherence	0.822**	0.840**	0.507**	--						
Sense of strength	0.193*	0.298**	0.032	0.255**	--					
Sense of perseverance	-0.198*	-0.015	0.174	-0.057	0.033	--				
Sense of self-efficacy	-0.006	0.196*	0.144	0.136	0.713**	0.724**	--			
Locus of control – Success	0.248**	0.111	-0.071	0.164	-0.222*	-0.004	-0.156	--		
Locus of control – Failure	0.105	0.088	-0.068	0.075	-0.142	0.112	-0.019	0.210*	--	
Locus of control	0.213*	0.040	-0.160	0.081	-0.220*	0.010	-0.145	0.712**	0.685**	--
Achievement motivation	0.235*	0.106	-0.085	0.147	0.029	-0.055	-0.018	0.374**	0.180	0.472**

Explanation to the table: * $p < 0.05$; ** $p < 0.01$

Source: Author's research.

as the general level of the sense of coherence. In the second block, self-efficacy was included in the analysis. Due to the limited dispersion of the results on the scales of the sense of strength and the sense of perseverance, which was reflected in the high values of the kurtosis measure (Table 3), the analysis included the general level of self-efficacy and not specific indicators. In the third block, the sense of control in the area of success and in the area of failures was included in the analysis. Since the sense of control in the area of success and in the area of failure were poorly correlated with each other (Table 4), separate indicators concerning these two areas were included in the analysis, rather than the general sense of control. As an explanatory variable, the level of achievement motivation was analysed. The results of the analysis are presented in Table 5.

Table 5. Predictors of the level of motivation.

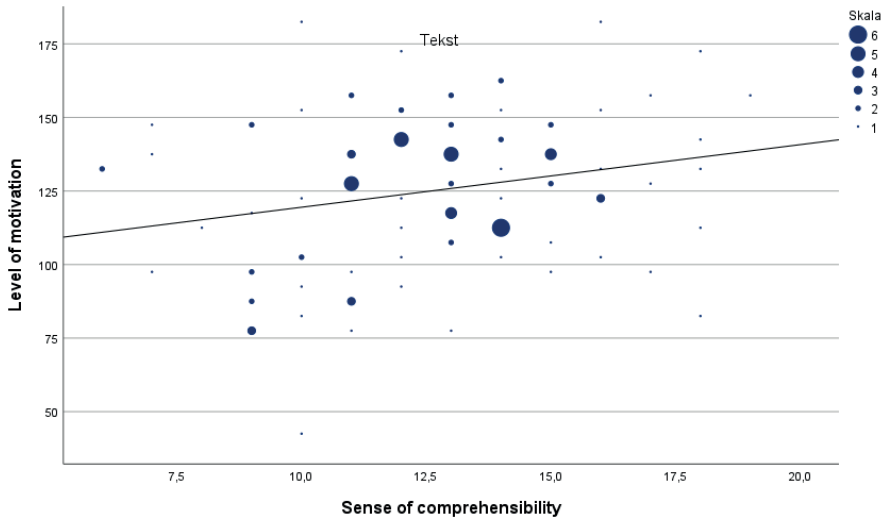
Block	Predictors	*Beta*	*t*	*p*	*ΔR2*
1	Sense of comprehensibility	0.24	2.14	0.035	0.07
	Sense of resourcefulness	0.01	-0.02	0.986	
	Sense of meaningfulness	-0.13	-1.28	0.205	
2	Sense of comprehensibility	0.24	2.12	0.037	0.01
	Sense of resourcefulness	0.00	-0.02	0.982	
	Sense of meaningfulness	-0.13	-1.27	0.208	
	Sense of self-efficacy	0.00	0.03	0.978	
3	Sense of comprehensibility	0.15	1.32	0.189	0.10
	Sense of resourcefulness	-0.02	-0.13	0.895	
	Sense of meaningfulness	-0.08	-0.86	0.394	
	Sense of self-efficacy	0.05	0.53	0.596	
	Locus of control – Success	0.31	3.15	0.002	
	Locus of control – Failure	0.09	1.00	0.319	

Explanation to the table: *Beta* – standardised regression coefficient; *t* – the value of the test of the predictor's statistical significance; *p* – statistical significance; *ΔR2* – change of the determination coefficient.

Source: Author's research.

Among the dimensions of the sense of coherence analysed in the first block, the sense of comprehensibility was a statistically significant predictor of achievement motivation (beta = 0.24; p<0.035). The greater the sense of comprehensibility, the higher the level of achievement motivation (Figure 1). A sense of comprehensibility explained 5.5% of the variance in the level of achievement motivation.

Figure 1. The relationship between the sense of comprehensibility and the level of achievement motivation.

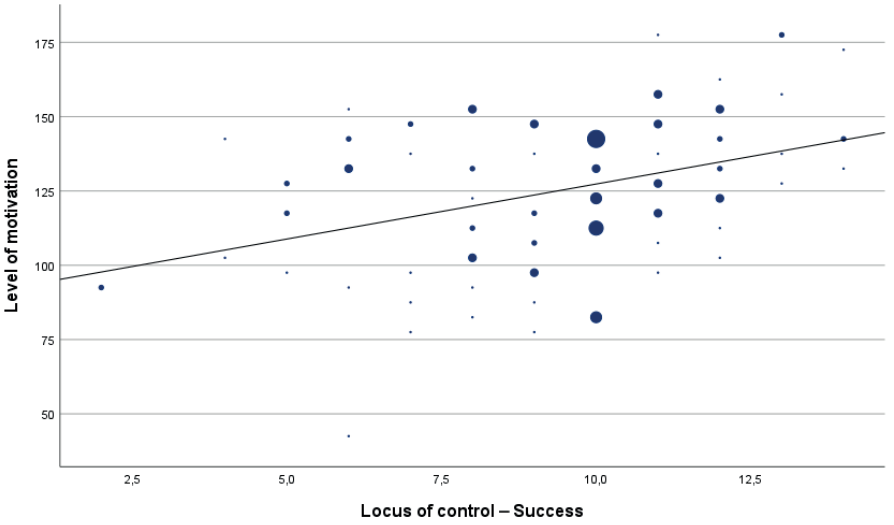


Source: Author's research.

Self-efficacy was not a statistically significant predictor of achievement motivation. Among the predictors included in the analysis in the third block, a statistically significant predictor of the level of achievement motivation was locus of control in the area of success. The greater the locus of control in the area of success, the higher the level of achievement motivation (Figure 2; beta=0.31; p<0.596). When controlling for the sense of comprehensibility, locus of control in the area of success additionally explained 10.4% of the variance in the level of achievement motivation. A sense of comprehensibil-

ity and locus of control in the area of success explained a total of 15.9% of the variance.

Figure 2. Relationship between locus of control in the area of success and the level of achievement motivation.



Source: Author's research.

Conclusions and psychopedagogical implications

The study searched for the answer to the question of what predictors determine motivation in students with dyslexia in adolescence. Four tools were used: KBPK-R Questionnaire for Locus of Control – revised version (Krasowicz-Kupis & Wojnarska, 2017), KompOs – Personal Competence Scale (Juczyński, 2000), Orientation to Life Questionnaire SOC-13M (Antonovsky in the Polish adaptation by M. Zwoliński et al., 2001) and LMI Achievement Motivation Inventory – short version (Schuler et al. in the Polish adaptation by Klinkosz & Sękowski, 2018).

Our own research has shown that students with dyslexia are characterised by low self-efficacy, an external locus of control, and an average level of co-

herence. This means that students with dyslexia are not fully convinced that they will be able to cope with the difficulties that arise, they rationalise responsibility for their failures. Similar results were obtained by Neil Humphrey and Patricia M. Mullins (2002), Malka Margalit (2006), Shiri Ben-Naim et al. (2016). This lower sense of self-efficacy, the external locus of control and their importance in the learning process may be the result of internalising repeated failures, experiencing a sense of frustration, difficulties in coping with complex social situations, but also a high amount of work with low effectiveness of the actions taken.

Taking into account regression analyses for the variable of achievement motivation, it can be seen that its predictors are the sense of comprehensibility and locus of control in the area of success. This means that the more a dyslexic student is more convinced that they have achieved success thanks to their own competences and efforts, and not thanks to external people, e.g. thanks to a teacher, parent or peer, the greater their motivation to learn.

The conviction that every action taken makes sense develops intellectual capabilities, fosters progress and acquisition of the competence to perceive the world from different perspectives. Thanks to internal control, self-confidence increases, which increases the chances of being willing to take on new challenges.

As the results of the study show, locus of control will increase even more when a student with dyslexia supervises the sense of comprehensibility, which will translate into even greater motivation to learn. The sense of comprehensibility is nothing more than the ability to explain to oneself that the content one is learning makes sense, is useful and serves development.

It is worth emphasising that thanks to a properly organised therapeutic process, support and actions of teachers and parents who use their resources and abilities, a student with dyslexia in adolescence will be able to maintain this motivation at an optimal level. If teachers prepare classes in such a way that the student can see that their effort brings results, they will see the results of the contribution put into their work, they will be more willing to broaden their horizons.

Preventive measures should also be introduced to equip students with dyslexia in adolescence with appropriate knowledge, skills and competences

using their resources. They will allow the student to believe in themselves and have greater motivation to work and take on new challenges.

Like many studies of this type, it has many limitations. It would be very interesting to include more diverse resources such as self-esteem, the sense of support felt and received, resilience. It would also be interesting to take into account the views of parents and teachers. This would provide a broader research perspective.

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