SCHOOL READINESS IN THE ASPECTS OF MOVEMENT, LEARNING AND BEHAVIOUR

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Abstract

The number of children with special educational needs (SEN) who learn in inclusive education is increasing year by year in Hungary, and the number of children with learning, attention and behavioural difficulties/disorders is the largest problems between them (more than 70% of all SEN students in our country). We know that motor skills and behavioural functions are important factors in school readiness.

So the aim of our study was to assess the risk of movement problems, learning difficulties and emotional/behavioural problems in children who will start compulsory schooling in the school year of 2022-2023 in Eger (n=199). To research this topic we used MSSST screening test and SDQ questionnaire (version for teachers to children between 4-17 years).

According to our results 47 of 199 (24% of the sample), typically developing children showed risk for learning problems. Almost 30% of the sample showed motor, 36% emotional/behavioural problems before school beginning. Most of children in the sample had problems in pro-social behaviour, like adaptability, empathy and/or helping others (36%) and showed hyperactive patterns (29%).

We found that children who had risk for learning problems (47 children in the sample), 30 showed problems with their behavioural and emotion, too (p=0.00; Cramer's V=0.320), while of the 72, who had at risk of emotional/behavioural problems, 30 between them were classified as at-risk of learning problems in the school.

Our conclusion is that a lot of children have motor and emotional/behavioural problems in early childhood yet. Children, who have at risk of learning difficulties are more likely to show atypical behaviour patterns, but conversely it is not true.

So as we see, cognitive weakness more often go hand in hand with emotional-behavioural problems, but children with emotional-behavioural problems not necessarily have learning problems.

Keywords: *school readiness, SDQ, MSSST, emotional/behavioural problems, learning difficulties, movement problems*

1. INTRODUCTION

In Hungary, every child who reaches the age of six by August 31 of the given calendar year becomes compulsory schooler, i.e. is obliged to enroll in institutional education starting from the first school day of the school year. Children with special educational needs are an exception to this, since their kindergarten care can be extended by an additional educational year on the recommendation of the committee of experts [1].

However, with compulsory schooling not all children reach school readiness also. In many cases, school maturity does not reflect the existence of abilities, but rather social expectations towards children of that age. In a figurative sense, school maturity can also be interpreted as a regulation/self-regulation mechanism, since the key to success at school is for the children be able to regulate them attention and themselves, to anticipate the outcome of various situations, and be able to respond to them adequately: to be able to adapt [2, 3].

We can approach school readiness from the child's point of view, so it can mean readiness for learning, or even from the institution's point of view. In this case, we have to talk about school readiness.

Readiness to learn is a narrower definition in the sense that it only and exclusively expects the appropriate level of cognitive abilities, while the concept of "readiness" for school includes in addition to cognition, physical and social skills [4].

The correlations between movement state, learning abilities and behaviour have been a concern of researchers for decades. Since the beginning of the 2000s, international literature has been abundant with scientific results, yet we can say that the connection between these areas to the development of personality is still not sufficiently explored [5]. Nevertheless, according to a study in 2003, children who have motor coordination disorder often have learning disabilities, too [6].

Several studies have dealt with the examination of the motor and behavioural functions of persons diagnosed with DCD (Developmental Coordination Disorder). Developmental coordination disorder is a neurodevelopmental disorder and it affects 2-6% of children and is characterized by motor skills that are significantly below the expected level for their age and persist despite opportunities to acquire and develop skills. These motor difficulties must have a significant impact on daily life and academic results, must appear in the early stages of development and cannot be better explained by other explanations (e.g. general health condition, intellectual disability, visual impairment) [7]. DCD often shows comorbidity with, for example, attention deficit hyperactivity disorder (ADHD), which also involves emotional and behavioural difficulties (EBD) [8]. Motor problems, or coordination difficulties, can be associated with many difficulties in school, including underachievement and social isolation [5]. Dewey and his colleges compared DCD and DCD-suspected children with a control group, where the participants did not show differences in their motor skills. In their study, they found that both the group of DCD and DCD-suspected children show greater difficulties in the areas of attentional functions, activation level, and psychosocial skills than members of the control group, who do not have motor difficulties [9].

Studies in older children and adolescents have consistently observed an association between DCD and higher internalizing behaviour [10, 11, 12]. Crane et al. [10] for example aimed to examine patterns and profiles of emotional and behavioural problems among DCD (n=35) and non-DCD (n=29) children using teacher and parent versions of the Strengths and Difficulties Questionnaire (SDQ) (developed for 7-10 year olds). The teacher's characterizations showed that children with DCD showed a higher proportion of emotional and behavioural problems than their typically developing peers. Hyperactive patterns and behavioural problems were the most observed in the examined DCD sample. However, modest agreement was found between teacher and parent ratings of children with DCD. In their opinion, it is necessary to monitor the emotional and behavioural problems of children with DCD by several people who know the child in order to have a realistic interpretation.

Further studies specifically examined the coexistence of developmental coordination disorders and behavioural problems in young children [13, 14, 15, 16]. (King-Dowling et al., 2015; Mancini et al., 2018; Wilson et al., 2013; Gustafsson et al., 2017). In several of these studies, higher internalizing problems were observed in young children with poorer motor skills. Mancini et al. [14] found that lower motor skills were associated with greater internalizing problems. King-Dowling et al. [13] observed that children at risk for motor difficulties scored significantly higher on the withdrawn subscale of the CBCL (Child Behavior Checklist) scale, but not on the internalizing subscale. Gustafsson et al. [16] suggested that the teacher version of the SDQ for 2-4 year olds can be used as a screening tool to identify early signs of emotional/behavioural problems of young children. They believe that by using the SDQ, kindergarten teachers may be able to identify children with problematic behaviour at an early age. Hokama dos Santos and Celeri [17] examined the applicability of the "Strengths and Difficulties Questionnaire" (SDQ 2-4) as a screening tool for mental problems in preschool children (31-50 months) in the primary health care system. In order to evaluate the mental problems of the sample, the data of the SDQ (2-4) and the Child Behaviour Checklist (CBCL 1.5-5 years) were compared, examining correlation. The correlation between the SDQ and the CBCL was positive for all scales, except for prosocial behaviour, thus proving that both tests provide relevant data for mapping these problems.

Rodriguez et al. [18] in their research sought to examine the relationship between motor ability and emotional/behavioural problems among pre-schoolers with DCD. 589, 4-5 year old children were assessed with the Coordination and Activity Tracking in CHildren (CATCH) test and based on the

results obtained the sample was classified into group with at risk for DCD (n=288) and typically developing group (n=301). Then the children at risk of DCD were assessed with the MABC-2 (Movement Assessment Battery for Children-2) test and the child's parents filled in the Child Behaviour Checklist (CBCL) Questionnaire developed for 1.5-5 year olds. Their research results showed that children at risk for DCD scored significantly higher on all scales of the CBCL than children not at risk for DCD. They were significantly more likely to meet or exceed clinical thresholds on the syndrome scale for anxious, withdrawn, emotions, aggression, ADHD, internalizing, externalizing, and all problems. Peyre and colleagues [19] investigated how early cognitive factors contribute to changes in motor skills in preschool. They included 1144 children in their longitudinal research, where they were assessed using NEPSY, ELOLA and SDQ tests and questionnaires at the ages of 3 and 5-6. In the linear regression model, the SDQ hyperactivity scale was associated with negative changes in motor skills at 3 years of age, and also at 3 years of age, language skills were associated with positive changes in motor skills in preschool. Hirata et al. [20] used a longitudinal method to examine the relationship between motor skills and mental health in young children. In their study, they analysed the longitudinal data of 38 Japanese children aged 3-6 years by taking the MABC-2 and SDQ questionnaires at the ages of 3-4 and 5-6 years, respectively. The MABC-2 was used to assess each child's motor skills, while the SDQ was used to assess the extent of mental difficulties and prosocial behaviour. Logistic regression results showed that the MABC-2 score at 3-4 years of age predicts the risk of impaired motor skills at 5-6 years of age. However, motor skills assessed at 3-4 years of age did not predict the risk of mental health problems at 5-6 years of age. Analyses of longitudinal quantitative changes in motor skills and mental health confirmed these findings. Mental problems occurring at the age of 5-6 years were only related to individual SDQ score differences at the age of 3-4 years. MABC-2 total score measured at 3-4 years of age was not related to later prosocial behaviour. Boys tended to have lower MABC-2 scores at 5–6 years of age, while girls tended to have higher SDQ prosocial scores at the same age. The results of the study suggest that impairment of motor skills and mental health as measured by the SDQ are independent characteristics in 3-6 year old Japanese children.

2. MATERIALS AND METHODS

Our studied population is the children of Eger in Hungary who will become compulsory students in the 2022-2023 school year (N=422). In the research sample, we were able to work with the data of 199 children out of the 422 people named above, i.e. we managed to include 47% of the total population in the study. Only 6 of the 199 children had special educational needs (3% of the entire sample), of which 3 were diagnosed with early developmental disorder, 1 was diagnosed with childhood autism spectrum disorder (ASD), 1 was visually impaired, and another 1 was diagnosed with learning difficulties.

The average age of the children in the sample is 5.93 years (sd: 0.498). The youngest child was 5.1 years old and the oldest 7.2 years old at the time of the examination (January 2022). The gender distribution in the examined sample was as follows: 110 boys (55.3% of the sample) and 89 girls (44.7% of the sample).

The conditions for inclusion in the sample were as follows:

- Becoming a compulsory student in the 2022-2023 school year;

- Participation in the MSSST screening test for the 2021-2022 educational year;

- SDQ questionnaire filled out by kindergarten teachers (T4-17).

As a secondary method, we processed the results of the MSSST (Meeting Street School Screening Test), which is taken by the Eger Member Institution of the Heves County Pedagogical Service in September-October of each educational year among kindergarten students who become compulsory in September of the following school year. With this, their goal is to determine and screen the risk of a learning disorder and thus, in a metaphorical sense, school readiness.

The aim of the MSSST screening is to predict the risk of a learning disorder in preschool and elementary school children [21]. The screening procedure consists of verbal and non-verbal tasks. It measures (1)

motor skills, (2) visuo-perceptuo-motor skills and (3) language skills, which form the basis of the sensorimotor system. The test was divided into three subtests, each subtest consists of 5 tasks:

1. The motor patterns subtest maps the implementation of bilateral, serial movement patterns and spatial orientation related to the body outline.

2. The visuo-perceptuo-motor subtest measures visual discrimination, memory, ability to reproduce geometric figures and letter forms, spatial and sequential orientation.

3. The language subtest examines language skills, auditory attention, language memory, awareness of chronological concepts, and writing skills.

The completed tasks of the subtests can be graded with raw points, which can be converted into norm points from the norm table corresponding to the age of the examined children. The value of the norm points indicates whether the child's performance differs from the average. We can get an indication of danger, mild danger and lack of danger of learning difficulties/disabilities. The results obtained during filtering can be interpreted as a profile, and it is also suitable for determining the overall performance.

As primary research, we used the teachers' (shortened, "one-page") version of the Strengths and Difficulties Questionnaire (SDQ), specified for the 4-17-year-old age group, in such a way that the questionnaire was edited into an online form in order to make it easier to reach the kindergarten teachers concerned - by making use of the online space. Our choice in relation to the questionnaire used is justified by the fact that a large number of publications with a similar research topic also used some version of this questionnaire to explore the emotional and behavioural patterns of children.

The Strengths and Difficulties Questionnaire (SDQ) is widely used in community, clinical, and research settings to screen for externalizing and internalizing problems [16]. The SDQ has been translated into many languages and currently exists in 3 versions: a parent-teacher version for 2-4 and 4-17 year olds, and a self-report version for older children (11-17 years old) [22].

Teacher questionnaire (T4-17)	**Normal cases**	**Borderline cases**	**Abnormal cases**
Total Problem Score	0-11	12-15	16-40
Emotional Symptoms Scale	0-4	5	6-10
Behavioural Problems Scale	0-2	3	4-10
Hyperactivity Scale	0-5	6	7-10
Peer Relationship Problems Scale	0-3	4	5-10
Prosocial Scale	10-6	5	4-0

Table 1. SDQ score values and categories (teacher version for 4-17 year olds)

The data were analysed using the SPSS 18.0 statistical program, which was used to obtain basic statistical data, and non-parametric statistical differences and correlation tests were performed (in cross-tab analysis, a χ^2 test was performed with Cramer's V coefficient calculation to compare the results according to different subgroups, and the Mann-Whitney U test to map the significance between variables).

3. RESULTS

29.7% (n=59) of the preschool-age children included in the sample were confirmed on the basis of the MSSST Motor Patterns subtest to be in a slight danger or risk of danger (n=29 mild danger, n=30 danger). The same possibility appears with a frequency of 23.1% (n=46) in the examined sample in relation to the Visuo-perceptuo-motor subtest. Similar results were obtained considering the Language

subtest, as 24.6% of children (n=49) show a slight danger or danger in this area. Therefore, most of the registered problems and difficulties can be seen in the Motor Patterns subtest in the case of children who will become compulsory students in the 2022-2023 school year. This is certainly an attention-getter in terms of the issue to be investigated.

If we examine the total value according to the total score of the MSSST, the number of children who are considered to be at risk in terms of school graduation is 16 (8%), and those who show a slight risk is 31 (15.6%). A total of 47 people, i.e. 23.6% of the test sample according to the measured criteria, do not or do not fully meet the factors of school readiness that can be revealed with the MSSST screening test (see Table 2).

MSSST Motor pattern subtest		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No danger	140	70,4	70,4	70,4
	Mild danger	29	14,6	14,6	84,9
	Danger	30	15,1	15,1	100,0
	Total	199	100,0	100,0	
MSSST Visuo-perceptuo-motor subtest		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No danger	153	76,9	76,9	76,9
	Mild danger	36	18,1	18,1	95,0
	Danger	10	5,0	5,0	100,0
	Total	199	100,0	100,0	
MSSST Language subtest		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No danger	150	75,4	75,4	75,4
	Mild danger	40	20,1	20,1	95,5
	Danger	9	4,5	4,5	100,0
	Total	199	100,0	100,0	
MSSST total score		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No danger	152	76,4	76,4	76,4
	Mild danger	31	15,6	15,6	92,0
	Danger	16	8,0	8,0	100,0
	Total	199	100,0	100,0	

Table 2. Results of MSSST test in the sample

According to SDQ results in relation to the total examined sample (n=199) - to our great surprise - we found the highest number of cases in the borderline and abnormal categories in the Prosocial scale (abnormal: n=29, 14.6%; borderline: n=43, 21.6%). So, in the opinion of kindergarten teachers, children have significant difficulties in these skills (adaptation, empathy, helping, etc.). This is followed by the Hyperactivity scale (abnormal: n=41, 20.6%; borderline case: n=16, 8%), and the Behavioural Problems scale (abnormal: n=32, 16.1%; borderline case: n=22, 11.1%) is behind the previous one by a minimal difference. Although our results indicate that children are most at risk in the prosocial scale, if we

consider that the highest number of items in the abnormal scale is in hyperactivity (n=41), behavioural problems (n=32) and only then in the prosocial scale (n=29), we can evaluate our results as indicating that the largest problem for preschool teachers is the hyperactive-impulsive manifestations and behavioural problems rather than the lack of prosocial skills.

The interviewed kindergarten teachers indicated the fewest problems are in the Emotional symptoms (abnormal: n=17, 8.5%, borderline: n=10, 5%) and Peer relationship problems (abnormal: n=14, 7%, borderline: n=13, 6.5%) scales.

The total problem score of the SDQ yielded the following results: 127 of the 199 children included in the study (63.8% of the sample) had behavioural indicators in the normal range, i.e. they represent the part of the population who are able to regulate their emotions and behaviour when they reach school age. However, 39 children have the experience and impression of their kindergarten teachers that they cannot meet this criterion (in abnormal category, 19.6% of the sample), and another 33 people can only do so with difficulty (borderline case category, 16.6%) (see Table 3.).

Behavioural Problems Scale		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Normal	145	72,9	72,9	72,9
	Borderline	22	11,1	11,1	83,9
	Abnormal	32	16,1	16,1	100,0
	Total	199	100,0	100,0	
Hyperactivity Scale		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Normal	142	71,4	71,4	71,4
	Borderline	16	8,0	8,0	79,4
	Abnormal	41	20,6	20,6	100,0
	Total	199	100,0	100,0	
Prosocial Scale		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Normal	127	63,8	63,8	63,8
	Borderline	43	21,6	21,6	85,4
	Abnormal	29	14,6	14,6	100,0
	Total	199	100,0	100,0	
Emotional Symptoms Scale		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Normal	172	86,4	86,4	86,4
	Borderline	10	5	5	91,5
	Abnormal	17	8,5	8,5	100,0
	Total	199	100,0	100,0	
Peer Relationship Problems Scale		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Normal	172	86,4	86,4	86,4
	Borderline	13	6,5	6,5	93,0

	Abnormal	14	7,0	7,0	100,0
	Total	199	100,0	100,0	
Total Problem Score		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Normal	127	63,8	63,8	63,8
	Borderline	33	16,6	16,6	80,4
	Abnormal	39	19,6	19,6	100,0
	Total	199	100,0	100,0	

Table 3. Results of SDQ Questionnaire in the sample

In the following, we continue the presentation of the obtained results in relation to the total results and subtests of the MSSST test, which also helps to describe the movement state. To examine this we created "at-risk" groups, who have danger or mild danger in MSSST scales and "non-at-risk" groups, who have no danger of learning difficulties, For this, we used non-parametric two-sample t-test, the Mann-Whitney U test, to explore the differences between the two independent samples and then cross-tab analysis and Chi-square test to identify the cause of the differences between groups. From the Rank table of the Mann-Whitney U-test, we can read that when the "at-risk" and "non-at-risk" categories of the MSSST's total values are the basis of the comparison, the mean values (Mean Rank) in all MSSST subtests are higher in "at-risk" than in "non-at-risk" subgroups (see: Table 4.). This indicates that there is a difference between at-risk and non-at-risk groups along the examined variables (MSSST Motor patterns subtest U=583.5, Z= -10.781, p=0.00; MSSST Visuo-perceptuo-motor subtest U=1021, Z=-10.065, p=0.00; MSSST Language subtest U=1368, Z=-8.50 9, p=0.00).

MSSST TOTAL BY SUBGROUPS		N	Mean Rank	Sum of Ranks
MSSST Motor patterns subtest	Non-at-risk group	152	80,34	12211,50
	At-risk group	47	163,59	7688,50
	Total	199		
MSSST Visuo-perceptuo-motor subtest	Non-at-risk group	152	83,22	12649,00
	At-risk group	47	154,28	7251,00
	Total	199		
MSSST Language subtest	Non-at-risk group	152	85,50	12996,00
	At-risk group	47	146,89	6904,00
	Total	199		

Table 4. Rank table of U-test by MSST at-risk and non-at-risk subgroups in the examined sample

Based on the results of the Chi-square test of the cross-tabulation analysis, the reason for the difference is that those who can be classified as mild danger or danger (n=47, see Table 2.) in terms of the entire screening protocol (MSSST total), 42 of them are also at risk in the Motor samples subtest (p=0.00, Cramer's V=0.727 - very strong relationship between the variables). The correlation is similarly significant in the Visuo-perceptuo-motor samples, as 35 of the 47 children at risk in terms of the entire examination are also at risk in this subtest (p=0.00, Cramer's V=0.706). The same trend is observed in

the Language subtest: 33 of the 47 children at risk from the point of view of school readiness are also at risk in this subtest (p=0.00, Cramer's V=0,703)

The SDQ also defines 3 categories as a grouping criterion, but in our research, we worked with the data obtained by further grouping (normal cases= "non-at-risk", borderline and abnormal cases= "at-risk"). The average of the Rank table of the Mann-Whitney U test for all scales of the SDQ gives a higher average (Mean Rank) in the SDQ aggregate score in the vulnerable group than in the non-vulnerable group (see: Tables 5.). This indicates to us that there is a significant difference between the variables along the examined groups (Emotional symptoms scale U=3454, Z=-4.826, p=0.00; Behavioural problems scale U=2138, Z=-8.095, p=0.00; Hyperactivity scale U=1748, Z=-9.236, p=0.00; Peer relationship problems scale U=295 7, Z=-6.975, p=0.00; Prosocial scale U=2388, Z=-6.722, p=0.00).

SDQ TOTAL BY SUBGROUPS		N	Mean Rank	Sum of Ranks
Emotional Symptoms Scale	Non-at-risk group	127	91,20	11582,50
	At-risk group	72	115,52	8317,50
	Total	199		
Behavioural Problems Scale	Non-at-risk group	127	80,83	10266,00
	At-risk group	72	133,81	9634,00
	Total	199		
Hyperactivity Scale	Non-at-risk group	127	77,77	9876,50
	At-risk group	72	139,22	10023,50
	Total	199		
Peer Relationship Problems Scale	Non-at-risk group	127	87,28	11085,00
	At-risk group	72	122,43	8815,00
	Total	199		
Prosocial Scale	Non-at-risk group	127	82,80	10516,00
	At-risk group	72	130,33	9384,00
	Total	199		

Table 5. Rank table of U-test by SDQ at-risk and non-at-risk subgroups in the examined sample

However, the Chi-square test of the cross-tabulation analysis gives interesting results for the research. In the case of children, who - according to the total problem score of the SDQ - can be considered at risk for behavioural problems because they can be categorized as borderline or abnormal cases (n=72), 52 of them are not at risk in the Emotional symptoms scale of the SDQ (p=0.00, Cramer's V=0.343- weak/moderate relationship between the variables). The same is the case with the Peer Relationship Problems scale, since 46 of the 72 children considered to be at risk in terms of the overall problem score do not show any difficulties in their peer relationships and socialization. In the other 3 scales, this trend reverses: out of 72 children at risk for the total SDQ problem score, 42 are also considered at risk for the Behavioural Problems scale (p=0.00, Cramer's V=0.575- medium relationship between the variables), the same data were found in Hyperactivity scale for 49 children (p=0.00, Cramer's V=0.656- medium/strong relationship between the variables), and 48 children in the Prosocial scale (p=0.00, Cramer's V=0.478- medium/strong relationship between the variables).

Applying the Mann-Whitney U test to the total profile of the MSSST, we found a significant difference in all the scales measured by the SDQ between children who were not-at-risk for learning difficulties

(originally no danger category) and those who were at risk in this (originally mild danger and danger categories), except for the Peer Relationship Problems scale. If the obtained results are further analysed with the Chi-square test, the significant differences between the groups are given by the fact that children who are non-at-risk for learning difficulties according to the full screening protocol of the MSSST (n=152):

- 14 children are at-risk in the Emotional symptoms scale, while 13 of the 47 children classified as at-risk with MSSST have risk in the Emotional scale and this difference between the groups is significant (p=0.001; Cramer's V=0.229).

- 33 children are at-risk in the Behavioural Problems scale, while 21 of the 47 children classified as at-risk for learning problems have deviations in the Behavioural Problems scale and this difference between the groups is significant (p=0.002; Cramer's V=0.219).

- 33 children are at-risk of Hyperactivity, while 24 of the 47 children classified as at-risk for learning problems in the school have at risk of Hyperactivity and this difference between the groups is significant (p=0.00; Cramer's V=0.276).

- 48 children are at-risk on the Prosocial scale, while 24 of the 47 children classified as at-risk with MSSST screening methods have deviation on the Prosocial scale and this difference between the groups is significant (p=0.015; Cramer's V=0.172).

- 42 children show a risk in terms of the total problem score of the SDQ, while 30 of the 47 children classified as at-risk with MSSST screening test have at risk of emotional/behavioural problems according to the total problem score of the SDQ and this difference between the groups is significant (p=0.00; Cramer's V=0.320).

If the aspect of the investigation is reversed and the grouping is based on children who are at-risk or non-at-risk to EBD measured by SDQ, examined with the subtests of MSSST - including the total score of MSSST - we found a significant difference between the groups. Based on the results of the Chi-square test, the difference is that among the children who are non-at-risk for behavioural problems in terms of the SDQ's total problem score (n=127), among those:

- 22 children are classified as at-risk in the Motor samples subtest, while among the 72 cases who are at-risk for EBD to the SDQ's total problem score, 37 of them also perform below average in the motor samples of the MSSST and this difference between the groups is significant (p=0.00, Cramer's V=0.358).

- 21 children are classified as at-risk in the Language subtest, while among the 72 cases who are at risk for EBD to the SDQ's total problem score, 28 of them also perform below average in the language skills measured by the MSSST and this difference between the groups is significant (p=0.00, Cramer's V=0.249).

- 19 cases are classified as at-risk in the visuo-perceptuo-motor subtest, while 27 of the 72 people who are at risk in relation to the total problem score of the SDQ also perform below average in the visuo-perceptuo-motor samples of the MSSST and this difference between the groups is significant (p=0.00, Cramer's V=0.257).

- 17 people are classified as at-risk for learning difficulties according to total MSSST protocol, while of the 72 people who are at-risk to will have EBD, 30 of them also perform below average in the total protocol of MSSST, so they have at-risk of learning difficulties and this difference between the groups is significant (p=0.00, Cramer's V=0.320).

If the analysis is projected along the endangered/non-endangered categories of the MSSST motor patterns subtest to the behavioural problems measured by the SDQ, a significant relationship have between the Hyperactivity scale and the MSSST motor patterns should be highlighted. Among 59 children who are at risk in the MSSST motor patterns subtest, 30 of them also have problems in the Hyperactivity scale (p=0.00, Cramer's V=0.319). In the case of the Behavioural Problems scale, this number is 28 people (p=0.00, Cramer's V=0.297), and for the Prosocial scale, it is true for 32 people out of 59 people in addition to motor difficulties (p=0.01, Cramer's V=0.244).

And if we examine the relationship between the motor subtest of the MSSST and the total SDQ score, 37 of the 59 children with major motor difficulties are at risk for EBD according to the SDQ total problem score, and this relationship between the variables can be considered significant (p=0.00, Cramer's V=0.358).

4. DISCUSSION

The subject of this research was the correlations between movement status, learning abilities and behaviour as a function of compulsory schooling and school readiness.

We set ourselves the goal of shedding light on the relationship between physical activity and school readiness among large-group pre-schoolers of compulsory school age. In the sample, out of 47 children classified as being at risk of learning disabilities and thus not ready for school according to the entire protocol of the MSSST screening test, 42 are also at risk in the Motor Patterns subtest of the screening test, and the number ratio compared to the other subtests is the highest within this (Visual-perceptual-motor 35 people, Language subtest 33 people at risk). The relationship between the state of movement and the risk of learning disability is significant, the Cramer's V coefficient (0.727) also shows a very strong relationship between the examined variables.

Our aim was also to map the role of behaviour problems in the issue of not being ready for school. Based on the obtained results - along the examined variables - there is a significant difference between the groups (at-risk and non-at-risk categories according to the total value of the MSSST) with regard to all scales of the SDQ, except for the Peer relationship problems scale. Based on our results, it can be said that looking at the entire protocol of the MSSST, it can be verified that 47 people are at risk of a learning disorder and that 13 of them are at risk on the Emotional symptoms scale, 21 on the Behavioural problems scale, and 24 people each have a high risk of Hyperactivity and Prosociality. The marked coexistence of learning disability and behavioural problems is best achieved when the full screening results of the MSSST are examined in the case of children are at risk in the aggregated problem scores of the SDQ, because based on our results, 30 of the 47 children had a learning disability in terms of the total values of the MSSST, according to the aggregated problem of the SDQ. In other words, when it comes to determining school readiness, examining movement and behaviour is essential, almost unavoidable. The development of these personality-forming factors is closely related.

The third aim of the research was to map the correlation between the structure of motor skills and behavioural problems. Most of the international literature that has been discovered is dedicated to investigating this, so we also made an attempt to do so. Our research showed that 37 of the 59 children with motor difficulties were at risk for emotional/behavioural disorders according to the total problem score of the SDQ (a group formed by combining the borderline and abnormal categories) and this relationship between the variables was significant (p=0.00, Cramer's V=0.358).

5. CONCLUSION

Nowadays, the actuality of the examined topic can be seen very easily, if we only take the publications of the last 5-10 years as a basis (Hill et al., 2017; King-Dowling et al., 2015; Mancini et al., 2018; Wilson et al., 2013; Gustafsson et al., 2017). The issue of movement status, learning problems or difficulties and behavioural problems is one of the biggest, if not the biggest challenges of the public education system today.

Although the issue is very important, the individual researches often produce different results, in addition to the fact that they also formulate generalizations.

The aim of the present research was to examine the relationship between movement, learning abilities and behaviour in a target population whose ability-skill structure at a given moment can be decisive in terms of their further performance - in our case, their school performance - in line with the efforts in the literature: this population is the circle of large-group kindergarteners entering compulsory school age, specifically in the city of Eger.

Our research results were consistent with the research results of the specialized literature, we managed to get answers to our research goals and questions, and we had sufficient data to verify our hypotheses.

Taking into account the relevance and actuality of the topic, we think that further, large-scale, representative research could best serve the formulated research goals, that is, to reveal the importance of movement development and the movement state in relation to children's behaviour development and behaviour regulation.

In the future, it may be justified to include testing methods that enable a broader exploration of the movement status, because although the applied MSSST screening test can be an important indicator of school readiness, it is not a purely movement testing procedure. It would be worthwhile to use a standardized test according to the currently valid school readiness protocol, or a purely movement test, during future research.

Moreover, further analysis of the sample in terms of not only gender, but also age may yield interesting research results, but this task exceeds the scope of this thesis.

We are confident that our results can enrich the theoretical and practical repertoire of ongoing research on the subject, and that our results will help resolve the anomaly between school readiness and compulsory education, and that it will also bring new approaches to the field of Special Education and Sport Sciences also.

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