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CHILDREN WITH BEHAVIORAL PROBLEMS IN THE FIRST GRADE OF RUSSIAN SCHOOL: SIMILARITIES AND DIFFERENCES

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CHILDREN WITH BEHAVIORAL PROBLEMS IN THE FIRST GRADE OF RUSSIAN SCHOOL: SIMILARITIES AND DIFFERENCES[3]

Recent research indicates that behavioral problems may lead to low academic performance. The present study is aimed to discover, what differences exist between primary school students who meet a sufficient number of ADHD (Attention Deficit Hyperactivity Disorder) criteria and those who do not experience any behavioral problems, in terms of academic achievements in reading and mathematics, annual progress in these subjects and personal, social and emotional development, based on the Russian sample of first-graders. This paper is a part of Russian iPIPS project and the instruments developed as part of this study were used. The sample consists of 3021 first-graders from two big regions of the Russian Federation.

The results showed significant differences in both cognitive and social-emotional development but no differences in annual progress. The absence of differences in progress means that the development of children with behavior problems within the school system goes with the same speed but from the lower start level compared to other children. The results of the study provide important knowledge for the teachers and open a large area of further investigations in the field of ADHD in Russian school settings.

JEL Classification: I21.

Keywords: behavioral problems, ADHD, first-graders, primary school, iPIPS, cognitive development, social and emotional development

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Introduction

What is ADHD?

Attention Deficit Hyperactivity Disorder (ADHD) is characterized by inattentive, hyperactive and impulsive behaviors, and for a diagnosis to be made, a number of criteria must be met, respectfully to the approach to disorder classification used in a certain country. It has been among the most commonly diagnosed psychiatric conditions for children in the US at least for the past forty years (Conrad, Bergey, 2014). Recent statistics suggest that up to 9% of US children ages 4 – 17 and approximately 4,5% of US adults have ADHD (Kessler et al., 2006). European countries are not very far from that: UK national statistics reports that ADHD is the most prevalent behavioral disorder with an estimated 1,3 – 3,9% of school aged children and young people having the condition (Russel et al., 2013; Polanczyk et al., 2007). A study in one German state reports 2,21% of ADHD diagnosis among children from 0 to 18 years old, although the increase in the prevalence of ADHD between 2000 and 2007 is 45% (Schubert et al., 2009). There is no direct statistics for France and Italy, but some indirect measures (like sales data for Ritalin and other medicines which are usually prescribed for patients with ADHD) gives the scatter from 0,18 to 5,6% of youth in France (Lecendreux et al., 2010) and from 3% (Mugnaini et al., 2006) to 7% (Bianchini et al., 2013) of school-aged children in Italy.

There is no open official statistics in Russia, neither for the number of diagnosis, nor for the indirect data, like medicines sales statistics (private talk with the Health.Mail.ru representative). Ritalin, the most common medicine for ADHD cure in US and Europe, is prohibited on the Russian market, and all others (like Fenazepam or Strattera) are not specific for ADHD. Although some foreign research estimates ADHD rate in Russia from 1,4% to 3,7% (Faraone et al., 2003).

One of the important explanation of such variance in ADHD rates even within one country lies in the field of sociology: countries do not use the same set of criteria when making an ADHD diagnosis (Polanzyk et al., 2007; Conrad, Bergey, 2014). There are two main approaches in making the ADHD diagnosis: first, published by American Psychiatric Association – the Diagnostic and Statistical Manual of Mental Disorders (DSM) which now is in its 5th edition (DSM-V). It divides ADHD symptoms into two categories: “inattention” and “hyperactivity/impulsivity”. For a diagnosis “children must have at least six symptoms from either (or both) the inattention group of criteria and the hyperactivity and impulsivity criteria” (DSM-V), where symptoms are “a pattern of behavior, present in multiple settings (e.g., school and home), that can result in performance issues in social, educational, or work settings” (DSM-

V). Individuals with ADHD may present with both inattention and hyperactivity/impulsivity, or one symptom pattern may predominate. Three presentations of ADHD are commonly referred to: combined-type (all three core features are present and ADHD is diagnosed when ≥6 symptoms of hyperactivity/impulsivity and ≥6 symptoms of inattention have been observed for ≥6 months), inattentive-type (Diagnosed if ≥6 symptoms of inattention (but <6 symptoms of hyperactivity/impulsivity) have persisted for ≥6 months) and hyperactive/impulsive-type (Diagnosed if ≥6 symptoms of hyperactivity/ impulsivity (but <6 symptoms of inattention) have been present for ≥6 months)[4]. According to the DSM-V classification system, the appropriate presentation of ADHD should be indicated based on the predominant symptom pattern for the last six months.

Another approach, presented by World Health Organization, is International Statistical Classification of Diseases and Related Health Problems (usually called International Classification of Diseases or ICD). The latest 10th version was presented in 1992, and 11th is planned for 2017. ICD is designed to promote international comparability in the collection, processing, classification, and presentation of medical statistics, not limited only to mental health and behavioural disorders. ADHD in ICD-10 (diagnosis code F90.9) refers to Hyperkinetic Syndrome (World Health Organization, 1993). To make a diagnosis, a child should demonstrate all three dimensions: hyperactivity, inattention and impulsivity. ICD-10 also counts a less number of behaviours as indicators of the syndrome then does the DSM-5. Conrad and Bergey (2014) provide a comparison of ADHD diagnosis in DSM-V and ICD-10 presented in a Tab. **1**.

Tab. 1. ADHD in DSM-V and ICD-10

DSM-V	ICD-10
Symptoms in two dimensions	Symptoms in all three dimensions
Can do a diagnosis with symptoms in one dimension	Requires all criteria in at least two situational context
Requires some impairment in more than one setting	Mood, anxiety, developmental disorders are exclusion diagnoses
Comorbid conditions permissible[5]	

[4] http://www.adhd-institute.com/assessment-diagnosis/diagnosis/dsm-5tm/

[5] It means that a diagnosis can be made even if ADHD symptoms are a part of any other disorder.

This comparison clearly shows that ICD-10 system is much stricter that DSM-V. Conrad and Bergey (2014) provide a convincing set of evidences that countries that use ICD-10 (to which Russia also relates to) show lower rate of ADHD diagnosis than ones that use DSM-V.

Another important issue in ADHD expansion mentioned by Conrad and Bergey (2014) is the availability of simple checklists for parents and teachers which can help them to decide whether the child's behavioral problems are critical and to seek for a treatment (e.g. Connor's Rating Scale, the Vanderbilt Scale). In Russia we have such scales available for parents and clinical psychologist, and in this work we present another one, for the teacher, which aims to evaluate child's behavior in school settings.

ADHD and outcomes

Why is it so important to evaluate a child's behavior in school? There is a bunch of literature that shows that behavioral problems lead to low academic performance, both on clinical (Brooke et al., 2009; Shaw et al., 2012) and large-scale (Polderman et al., 2010; Washbrook et al., 2013; Sayal et al., 2015) studies. Merrell, Sayal, Tymms and Kasim also suggest that children with less severe behavioral problems which would not qualify them for a formal diagnosis of ADHD may nevertheless be at risk of academic problems. In their recent study they found a substantive negative relationship between the severity of inattentive behavior at age of 5 (end of a first school-year in England) and the attainment at age of 11 (end of the primary school) (Merrell et al., 2016). Merrell and Tymms (2005) in a longitudinal study following a cohort of children from age 4 to 7 discovered that the inattention has been the most strongly linked with negative academic outcomes among three ADHD dimensions. Another study (Barnard-Brak et al., 2015) reveals the relationship between a voluntary delayed of school entry (academic red-shirting), the severeness of ADHD symptoms (with medication as a criterion for the level of severity) and academic attainment. They show that parents, especially of boys in high-income families, tend to delay the start of schooling if a child demonstrates the ADHD symptoms, in order to give him or her more time to overcome the behavioral problems. The results of academic red-shirting are controversial: on the one hand, Barnard-Brak et al. state that academic red-shirting does not appear to be especially beneficial for students with ADHD (medicated or not) in terms of academic achievement across time. On the other hand, another study shows that children born in August has a higher risk of being diagnosed with ADHD then those who born in September of the previous year (so those who born in August are the youngest children in the class) due to the neurocognitive immaturity and large academic load, and another year at home seems to be beneficial for them (Mu-Hong et al., 2016).

Not only academic attainment is under risk when a child has behavioral problems. Shaw et al. (2012) revealed negative association between ADHD and drug use, addictive behavior, social functioning, self-esteem, type of occupation, unsafe driving and obesity in adolescence and adulthood. Cheng et al. (2015) add that IQ and family SES moderate the relationship between ADHD and a cognitive impairment as these variables reflect baseline characteristics that predict change in ADHD symptoms across development. They also refer to a number of studies (Biederman et al., 2011; Halperin et al., 2008; Harrt et al., 1995) that show that SES of ADHD remitters was higher than persisters'.

ADHD symptoms also relate to personality. A whole bunch of studies is dedicated to the ADHD manifestations and Five Factors personality traits (for example, Nigg, 2000; White, 1999; Braaten and Rosen, 1997; Shea and Fisher, 1996; Parker, Majeski and Collin, 2004). Most of them indicate that extraversion and neuroticism are the most influential part of the ADHD personality (Nigg, 2000; White, 1999; Shea and Fisher, 1996), but Parker et al. (2004) also add the negative poles of agreeableness and consciousness to this portrait.

In present study we are aimed to discover, what differences exist between primary school students who meet a sufficient number of ADHD criteria and those who do not experience any behavioral problems, in terms of academic achievements in reading and mathematics, annual progress in these subjects and personal, social and emotional development, based on the Russian sample of first-graders. In this study, we investigate a large sample of 3021 children from two big regions of the Russian Federation during their first year of school using a measure of behavior which provides scores for inattention, hyperactivity and impulsivity. This is a first large-scale study of quality of education in Russia which includes a measurement of behavioral problems as well as complex assessment of cognitive and noncognitive skills. As the sample is representative towards the region, our data can provide some useful statistics of ADHD which is not available in the pubic sources. The current study adds to the previous research by exploring the relationship between the severeness of ADHD symptoms and cognitive and noncognitive development at the age of 7 in Russian educational context on a large-scale sample.

Methodology

The instrument

Our study is a part of Russian iPIPS project which is aimed to assess cognitive and noncognitive progress during the first year of school (Ivanova, Nisskaya, 2015; Brun et al., 2016). The assessment is developed to be carried out twice a year: in the beginning of the school year instrument provides high quality information for teachers about what their pupils know and can do, and the follow-up assessment at the end of the first year of schooling provides reliable evaluation of children's educational progress. The cognitive assessment has an adaptive nature, so a child faces the tasks that best suits his or her abilities at the moment of assessment. The noncognitive part which includes a personal, social and emotional development (PSED) questionnaire and a behavioural assessment, which is the focus of the present study, is performed by teacher for each pupil in a class. The sum of all iPIPS scales is presented in Tab. **2**.

Tab. 2. iPIPS scales

Cognitive assessment	**PSED scales**	**Behavioral scales**
Handwriting	Comfort	Inattention
Vocabulary	Independence	Hyperactivity/Impulsivity
Ideas about reading	Concentration in teacher-directed activities	General behavioral scale
Phonological awareness: rhymes and repeats	Concentration in self-directed activities	
Letter identification	Actions	
Word recognition	Relationship with peers	
Reading as decoding	Relationship with adults	
Reading comprehension	Rules	
Counting	Cultural awareness	
Addition and subtraction problems presented with pictures	Communication	
Digit identification	Confidence	
Mathematics problems (including sums with symbols)		

In our study we used combined measurements of mathematics and reading abilities based on the iPIPS cognitive scales. Psychometrics analysis of iPIPS cognitive scale is specified in our previous paper (Brun et al., 2016).

PSED questionnaire

In the original iPIPS instrument which was developed in the United Kingdom PSED questionnaire has three-dimensional structure based on the statutory framework for early years' foundation stage provided by the UK Department of Education (Statutory Framework, 2014). This document does not provide any empirical evidence for these dimensions. Because of the lack of the empirical evidence for the PSED structure and differences in UK and RF educational standards, a dimensionality study of the PSED questionnaire was conducted by Russian iPIPS-team. It showed that for the Russian sample this data has two-dimensional structure (Brun et al, 2016).

The exploratory factor analysis (principal component analysis with Oblimin (with Kaiser Normalization)) was conducted to verify this result both for autumn and spring data. The results are showed in **Tab. *3***.

Tab. 3. Factor Analysis results (PSED questionnaire)

	Autumn			Spring		
	Loadings		Commu-nalities	Loadings		Commu-nalities
	Factor 1: Classroom behaviour	Factor 2: Self-confidence		Factor 1: Classroom behaviour	Factor 2: Self-confidence	
Comfortable		0.737	0.468		0.725	0.535
Independence		0.627	0.420		0.719	0.519
Confidence		0.859	0.694		0.829	0.693
Relationship with peers		0.515	0.546		0.594	0.551
Relationship with adults		0.609	0.572		0.715	0.598
Communication		0.521	0.504		0.661	0.569
Concentration in Teacher-directed activities	0.767		0.722	0.855		0.746
Concentration in Self-directed activities	0.757		0.715	0.851		0.745

	Autumn			Spring		
	Loadings		Commu-	Loadings		Commu-
Actions	0.887		0.727	0.835		0.715
Rules	0.910		0.733	0.817		0.689
Cultural awareness	0.440		0.419	0.750		0.576
Eigenvalue	5.025	1.495		5.494	1.444	
% of Total Variance	45.686	13.589		49.950	13.126	
Total Variance		59.275%			63.076%	

The analysis indicated two factors explaining a total of 59.275% in autumn and 63.076% in spring of the variance for the entire set of variables. Factor 1 was named Classroom behavior and Factor 2 – Self-confidence. The communalities of the variables included are rather high and the KMO and Bartlett's Test of Sphericity both indicate that the set of variables are at least adequately related for factor analysis.

Thus, the two-factor structure of PSED-questionnaire which was suggested in previous paper based on Russian samples was confirmed (Brun et al., 2016). In this study we also combined items to form two scales – "Self-confidence" and "Classroom behavior" and used them in the further analysis. All PSED scales have reliability (Cronbach's alpha) more than 0.8.

Behavioral questionnaire

Behavioral questionnaire consists of 21 rating scales questions (11 for inattention and 10 for impulsivity/hyperactivity) and it were included only in follow-up assessment. The items in the behavior scale were almost identical to the diagnostic criteria for ADHD in DSM-V (in original English version of behavioral questionnaire DSM-V criteria were enhanced by two more items: "Acts before considering the consequences" and "Thinks aloud"; we decided to keep them in order to provide the comparability of the further studies). Questionnaires for each child were completed by class teachers based on their observations of pupils during the year. Since the scales were intended for teachers of young children in the classroom setting, where necessary, the wording was adapted to reflect this. For example, the DSM-V criterion 'Often does not follow through on instructions and fails to finish schoolwork, chores or duties in the workplace' was presented as 'Does not follow through instructions, fails to finish work'. Teachers rated each pupil's behavior on a yes/no scale for each criterion and were asked to consider a criterion met only if the behavior has persisted for at least six months and is considerably more frequent than that of most other children of the same gender and developmental level.

To decide whether we can use this scale on Russian sample or not, we ask three experts in child psychology to evaluate the behavioral scale. The first expert is a neuropsychologist, who works with children of an early school age, the second one – a clinical psychologist, who specializes on ADHD, and the third one – the school psychologist, who works with primary school pupils. The experts were given the full information about iPIPS study (in the form of presentation for teachers and educational authorities, and a standard feedback for teachers; the same information in shorten form can be found in Brun et al. (2016). We asked them the following questions:

1) Relying on the information about the iPIPS study, please evaluate the content and face validity of the behavioral scale.
2) How relevant is the behavioral scale for the ICD-10 system, which is used in Russia?
3) Can the behavioral scale be used by a teacher, considering the fact that he or she normally doesn't have a proper psychological education?
4) What is the best way for providing a feedback for the teachers on the behavioral scale?

All experts worked separately and provided the documents with their answers. There was no divergence, all experts agreed that the behavioral questionnaire had good content and face validity and can be used in the Russian school settings, even though the country used ICD-10 system. All experts justified that the differences in criteria in ICD-10 and DSM-IV are nonsignificant and that the critical differences in those systems are provided by the number of criteria that must be met for a diagnosis. Our study is not intended to give a child a diagnosis of ADHD and our feedback can only consist a recommendation to see school psychologist if a child has high number of criteria met on the behavioral scale. All experts also agree that the scale can be used by a person who is not trained as a psychologist and gave some useful recommendations on feedback for the teachers.

All scales have satisfactory reliability indexes (Inattention – Cronbach's alpha 0.93; Impulsivity/Hyperactivity – 0.94; General Behavioral Scale, which is a simple composition of all items in the questionnaire – 0.96). In further analysis we will use only a General Behavioral Scale.

As an additional demographical information in this study we use a child's gender and age on the entrance of the school system. This will allow us to discover the gender differences in cognitive and socio-emotional development.

Sample

The sample consists of 3021 children from two big regions of the Russian Federation. There is an equal share of boys and girls in the sample (1381 (50,4%) are boys, 1360 (49,6%) are girls and 280 pupils have missing gender data), the average age is 7.34: 12% aged up to 7 years old, 47% from 7 to 7.5, 41% older than 7.5. A small part of data is lost during the analysis because of missings in different parts of the iPIPS assessment.

Following the aim of the study all children were ranged based on General Behavioral Scale and then divided into two parts: 'upper" and "other" groups. The 33% of the sample with the highest scores forms "upper group". We suggest that these pupils meet a sufficient number of ADHD criteria, so they have some problems with behavior in school. The Common Behavioral Scale scores are higher than 6. The other 67% forms "other group".

Tab. *4* and **Tab. *5*** present the descriptive statistics for all scales included in the further analysis for these two groups.

Tab. 4. Descriptive statistics for cognitive scales

Groups according to Behavioral scale			Beginning of the school (autumn)		Follow-up assessment (spring)		Progress in reading	Progress in Math
			Math	Reading	Math	Reading		
Upper group	N	Valid	740	740	658	658	658	658
		Missing	71	71	153	153	153	153
	Mean		48,1	47.35	58.28	57.17	9.83	10.09
	Std. Deviation		10,33	10.57	10.59	9.17	8.08	6.83
	Minimum		13,29	20.52	20.66	29.22	.00	.00
	Maximum		88,73	75.97	88.73	81.71	52.07	49.22
Other group	N	Valid	2001	2001	1773	1773	1773	1773
		Missing	209	209	437	437	437	437
	Mean		50,7	50.98	60.64	60.02	9.21	10.01
	Std. Deviation		9,78	9.6	9.75	8.53	7.71	6.59
	Minimum		13,29	20.52	13.39	20.52	.00	.00
	Maximum		88,73	81.75	88.79	81.80	42.39	43.16

Table 4 sets out the means, standard deviations and further details for the cognitive scales of iPIPS instrument divided into two groups according to behavioral scale. The table shows the

Maths, Reading and Progress scores for the start and the end of the school year. Cognitive scales are measured using 100-point scale and Behavioral and PSED scales are scored using sten-scale.

Tab. 5. Descriptive statistics for PSED

Groups according to Behavioral scale			Beginning of the school (autumn)		Follow-up assessment (spring)		Progress Self-confidence	Progress Classroom behavior
			Self-confidence	Classroom behavior	Self-confidence	Classroom behavior		
Upper group	N	Valid	717	719	826	828	706	710
		Missing	188	186	79	77	199	195
	Mean		4.71	4.04	4.40	3.68	-0.26	-0.36
	Std. Deviation		2.05	1.90	2.04	1.68	1.87	1.66
	Minimum		-1.91	.24	-1.91	-.08	-9.71	-8.44
	Maximum		8.71	8.79	8.07	8.41	6.75	5.17
Other group	N	Valid	1405	1410	1583	1602	1367	1391
		Missing	428	423	250	231	466	442
	Mean		5.94	6.27	6.04	6.44	0.18	0.18
	Std. Deviation		1.81	1.60	1.73	1.44	1.61	1.46
	Minimum		-1.91	.24	-1.00	.77	-5.61	-5.00
	Maximum		8.71	9.24	8.07	8.41	6.75	5.94

Table 5 shows the means, standard deviations and further details for the personal social and emotional questionnaire (PSED) which is also divided into two groups according to behavioral scale.

Results

It was assumed that children with behavioral problem may go to school at a later age. In other words, children from "Upper group" are older than children from "Other group". This assumption was checked using independent-sample t-test. The result shows that there are no significant differences in age (t (2212) = 0.623, p=0.534).

Tables 6 and 7 presents correlation matrix for behavioral scales and other scales which take part in further analysis.

Tab. 6. Correlation between Cognitive and Behavioral scales

		Pearson Correlation		
Cognitive Scales		General behavioral scale	Inattention	Impulsivity
Beginning of the school (autumn)	Math	-.178**	-.299**	-.058**
	Reading	-.223**	-.327**	-.114**
Follow-up assessment (spring)	Math	-.155**	-.274**	-.043*
	Reading	-.216**	-.313**	-.111**
Progress in reading		,037	.064**	,015
Progress in math		,026	,035	,014

**. Correlation is significant at the 0.01 level (2-tailed).

Table 6 shows that all correlations with cognitive scales except progress are significant and negative. The more severe child's behavioral problems are, the worse his or her results in mathematics and reading are. But behavioral problems are not associated with cognitive progress – all children have relatively same progress in cognitive development during the first year.

Tab. 7. Correlation between PSED and Behavioral scales

		Pearson Correlation		
PSED Scales		General behavioral scale	Inattention	Impulsivity
Beginning of the school (autumn)	Self-confidence	-.345**	-.450**	-.218**
	Classroom behavior	-.616**	-.616**	-.528**
Follow-up assessment (spring)	Self-confidence	-.476**	-.596**	-.317**
	Classroom behavior	-.784**	-.800**	-.659**
Progress Self-confidence		-.156**	-.170**	-.122**
Progress Classroom behavior		-.214**	-.224**	-.173**

**. Correlation is significant at the 0.01 level (2-tailed).

There are rather strong negative correlations with all PSED scales. This result may be one of the proofs for the validity of the instrument.

An independent-samples t-test was conducted to compare children with possible behavioral difficulties according to the questionnaire (upper group) and all others. The results of comparison for cognitive scales are shown in **Tab.** .

Tab. 8. Results of t-test for equality of means for cognitive scales

Cognitive Scales		t-test for Equality of Means			
		t	df	Sig. (2-tailed)	Mean Difference
Beginning of the school (autumn)	Math	-6.075	2739	0.00	-2.60
	Reading	-8.172	2739	0.00	-3.63
Follow-up assessment (spring)	Math	-4.983	2429	0.00	-2.36
	Reading	-7.175	2429	0.00	-2.85
Progress in reading		1.719	2429	0.09	0.61
Progress in math		0.292	2429	0.77	0.09

There were the significant differences ($p < 0.001$) in the scores for all scales except for progress in both math and reading. The biggest differences are observed in reading during the autumn assessment: children from upper group (M=57.17, SD=9.17) are significantly less successful in reading than other children (M=60.02, SD=8.53); $t(2429) = -8.17$, $p = 0.00$.

These results suggest that behavioral problem may really have an effect on cognitive skills in the first grade of school on absolute scale. But there is no matter whether a child have high or low scores on behavioral scales – he or she will make the equal progress during the first year in school.

The same analysis was performed to compare socio-emotional development between two groups. Results are presented in **Tab. 9**.

Tab. 9. Results of t-test for equality of means for PSED

PSED Scales		t-test for Equality of Means			
		t	df	Sig. (2-tailed)	Mean Difference
Beginning of the	Self-confidence	-14.142	2120	.000	-1.22897

PSED Scales		t-test for Equality of Means			
		t	df	Sig. (2-tailed)	Mean Difference
school (autumn)	Classroom behavior	-28.483	2127	.000	-2.23225
Follow-up assessment (spring)	Self-confidence	-20.743	2407	.000	-1.64146
	Classroom behavior	-42.253	2428	.000	-2.76302
Progress Self-confidence		-5.626	2071	.000	-.44479
Progress Classroom behavior		-7.696	2099	.000	-.54222

There is a significant difference ($p < 0.001$) in the scores for all scales even for progress in both Self-confidence and Classroom behavior. The biggest differences are observed in classroom behavior at the end of the first grade: children from upper group (M=3.68, SD=1.68) significantly worst behave in class than other children (M=6.44, SD=1.44); $t(2428) = -42.253$, $p = 0.00$ – this is an expectable result, because both scales measure behavior, but still significant for the further interpretation.

These results support the idea that behavioral problems relate to personal, social and emotional development of a child. Moreover, it can be assumed that noncognitive development of children with behavioral problems goes slower than for other children.

Discussion

In this paper we aimed to explore the differences between children with and without behavioral problems in school settings based on the ADHD criteria provided by DSM-VI. In our study we assessed the levels of cognitive and noncognitive development in the beginning and in the end of school year as well as the progress pupils show during the year.

In terms of the relationship between the cognitive and noncognitive development and ADHD symptoms, our study is in line with a large amount of previous studies performed in different educational settings (Brooke et al., 2009; Shaw et al., 2012; Polderman et al., 2010; Washbrook et al., 2013; Sayal et al., 2015; Merrell et al., 2016). Children with ADHD symptoms show lower level of cognitive development both in reading and mathematics – areas which are traditionally considered the most important in primary schools (Entwisle, Alexander, & Olson, 2005; Cunha, Heckman, Lochner, & Masterov, 2006). These children also demonstrate lower level of personal and emotional development, but this correlation is partially explained by the similar areas covered by two questionnaires.

One of the important findings of our study is that the progress the children make both on cognitive and social and emotional development are equal for those who have behavioral problems and those who don't. On the large sample we demonstrate the fact that their development goes with the same speed, but children with behavioral problems start school with the lower level. This is crucially important knowledge for the teachers, who tend to underestimate ADHD as a cause of academic underachievement. Recent study from South Africa shows that only 45% of teachers are well aware of the ADHD and its consequences on school settings (Topkin et al., 2015). Teachers' survey in Russia can be one of the further studies on this topic.

Another hypothesis which can be drawn from the fact of the equal progress in cognitive and social and emotional development is that if a child has behavioral problems, it would be better for him or her to go to school later. But the data shows that children with large number of ADHD symptoms are of the same age as all others. It means that, despite of the fact that the children will have the proper level of cognitive, social and emotional development a bit later (a year, as Chen et al., (2016) study shows), parents tend to push them into school at the normative age. This might be partly related to the strong tradition of going to school at the age of 7, partly – to the family socio-economic status (mothers have more opportunities to work while children are in school (Kvist at al., 2013)) and partly – especially for boys – to the compulsory military service at the age of 18 for those who are not enrolled to the higher education. Parents prefer to send a boy to school as early as possible, so he can have more time to enter to the university. This can lead problems related to the neurocognitive immaturity in the primary school.

This study opens a large area of further investigations in the field of ADHD in Russian school settings.

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