Approaches and Models in Special Education and Rehabilitation

Belgrade 2020.

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THEMATIC COLLECTION OF INTERNATIONAL IMPORTANCE

Belgrade, 2020

Approaches and Models in Special Education and Rehabilitation
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Publisher
University of Belgrade – Faculty of Special Education and Rehabilitation
Publishing Center of the Faculty

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Proceedings will be published in electronic format CD.

Circulation 150

ISBN 978-86-6203-139-6

By decision no. 3/9 from March, 8th 2008. The Teaching and Research Council of the University of Belgrade – Faculty of Special Education and Rehabilitation initiated Edition: Monographs and papers.

By decision no. 3/63 from June, 30th 2020. The Teaching and Research Council of the University of Belgrade – Faculty of Special Education and Rehabilitation has given approval for the printing of Thematic Collection "Approaches and Models in Special Education and Rehabilitation".

FACTORS RELEVANT TO SOCIAL PARTICIPATION IN PRIMARY SCHOOL STUDENTS WITH CEREBRAL PALSY IN THE REPUBLIC OF SERBIA[a]

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SUMMARY

The main aim of this paper is to identify factors that could determine social participation of pupils with cerebral palsy in elementary schools in the Republic of Serbia. Social participation is within this paper viewed from the perspective of independent execution of non-academic school activities that the pupils with cerebral palsy perform daily in the school environment, which they need in order to be able to fulfil the academic tasks.

The study included 75 pupils with cerebral palsy, 6 to 12 years old, who attended mainstream elementary schools and schools for students with special educational needs from the first to the sixth grade. In order to assess their participation in the school environment, the third part of the SFA (The School Function Assessment) questionnaire were used. The extent of impairment of pupils' gross motor and manual ability was assessed by the GMFCS (Gross Motors Classification System) and MACS (Manual Ability Classification System) scales. As independent variables, we have determined 9 individual factors that relate to the characteristics of pupils with cerebral palsy, and 1 environmental factor that relates to the type of school the students attend.

The results indicate the importance of motor skills and intellectual and writing abilities of pupils with cerebral palsy as significant predictors of social participation in school environment in the Republic of Serbia.

Key words: Cerebral palsy, social participation, school function assessment, primary school

INTRODUCTION

Cerebral palsy (hereinafter referred to as CP) is a group of movement and postural disorders that occur damage due to non-progressive brain at an early developmental period. Limiting motor activities from an early age almost always results in a decrease in early sensory motor experiences. Accordingly, these children often do not have the opportunity to develop their cognitive skills, social skills, and consequently, independence in everyday situations, satisfying their needs and interests fully as children without limitations. In addition, primary motor impairment is most commonly accompanied by associated disorders such as sensory and intellectual impairment, speech and language impairment, the presence of epilepsy, and secondary musculoskeletal and psycho-emotional problems, which further complicates the

a This research was done as part of the doctoral dissertation. Zulić, M. (2018). *Predictors of Social Participation of Children with Cerebral Palsy in Primary Schools in the Czech Republic and Republic of Serbia.* Faculty of Education, Charles University, Prague, Czech Republic.

functionality of these individuals (Zulic, 2018). Given the heterogeneity of this condition with a wide spectrum of disorders, the question is, how the consequences of this impairment affect the participation of persons with CP in different life situations.

According to Nedović, Rapaić, Odović, Potić and Milićević (2012), participation in everyday, school and leisure activities is the basis for development of social skills and a social support network for each child, while the inclusion of lower quality and less frequent activities can negatively affect the forming of social relationships and reducing the quality of its life. Also, King et al., (2003) emphasized that if individuals are not given the opportunity to participate in a range of different activities, then they are actually denied the opportunity to fulfill their potential as active participants in community life.

School is a place where the pupil develops and creates social contacts, acquires not only school habits but also practical skills as preparation for the next phase of life. Considering the fact that it is established that the participation of pupils with CP is an important indicator of their successful social participation in adolescence and adulthood (Mei et al., 2012), it is necessary to estimate the factors that influence their participation in school age. Therefore, the choice of school environment for examining the social participation of pupils with CP is of great importance for identifying their potential obstacles in future life.

The main objective of this paper is to determine the predictors of social participation, i.e. the factors which could determine, in advance, the intensity of social participation of pupils with CP in the primary schools established specifically for the pupils with special educational needs and the regular primary schools in the Republic of Serbia. The unique characteristic of this study is finding out the participation of the these pupils in six different school situations: in the classrooms, in the corridors and hallways between the classrooms, at the school playground, on their way to and from the school, when using the sanitary facilities, and in the school canteen. Each of the situations observed requires a certain level of function abilities to fulfil the demands they bring in an adequate manner. According to the information available, this is the first study which identifies the predictors of social participation of pupils with CP in schools in the Republic of Serbia using the School Function Assessment (SFA) questionnaire. The results of this study may help to detect important factors which support the effective participation of the pupils with CP in schools and thereby enable appropriate support measures for the purpose of their successful education, as well as the establishment of a more stable basis for their active social participation in adulthood.

Basic concepts

Social participation

Social participation represents an interaction between an individual and the physical, social and attitudinal environments (Colver, 2006, 2015). According to the international classification of functioning, disability and health, social participation is defined as taking part in a life situation or life experience in relation to the level on which the person actively participates and not in relation to how much the person can or wants

to participate (WHO, 2010). Being able to participate fully in society is particularly important for children to ensure their successful transition to adulthood and, ultimately, their independent living (Parkes et al., 2010). Through social participation, children form friendships, gain knowledge, learn skills, develop their own creativity and develop notions of the importance and meaning of life (Dijkers et al., 2002). Also, while participation in social learning situations stimulates cognitive development, lack of opportunities to participate may slow down cognitive development (Bottcher, 2010). Participation of children with disabilities in special education is a necessary prerequisite for the fulfillment of inclusive education and is also the goal of educational and support activities and measures (Pancocha, 2013).

A large number of studies throughout the world proves that the social participation in environment outside the family is of key importance for children with physical disability (Lepeage, 1998; McGavin, 1998). According to these researches the most common issues affecting the social integration of the children and adolescents with CP are reported in the functioning at school with the statistically significant relation to the level of the motor disorder of the individual (Schenker et al., 2005; Voorman et al., 2006). Participation is an important outcome measure, which should be considered when planning services targeting children and adolescents with CP (Longo et al., 2012).

Cerebral palsy

The term cerebral palsy (CP) includes a wide range of brain disorders resulting in the reduced value of motor function and a number of associated damages. According to Rosenbaum at al. (2007), CP encompasses a heterogeneous group of early-onset, non-progressive, neuromotor disorders that affect development of the fetal or infant brain. There are many definitions of the CP, in accordance with a variety of approaches to the large number of experts in this field, but the authors consider that the definition of the Executive Committee of the American Association for CP and Developmental Neurology (AACPDM), is the most comprehensive and most objective, therefore we will state it. "CP is a group of permanent disorders of the movement and body posture development bringing the limitation of activity caused by non-progressive damage to the brain in fetal and/or infant development" (Bax et al., 2005). Even though, according to the definition, CP is caused by non-progressive damage to the brain, there is a wide range and varying extents of lesions incurred. Motor disorders in CP are very often related to the sensory disorders, perception disorders, and disorders of cognition, communication, attention and behaviour as well as to the epilepsy and secondary muscular and skeletal disorders (Bottcher, 2010). The most serious and distinct problems of the children with CP affect motor skills, cognitive skills and speech. Through each of these areas, the child with CP establishes contact with closer and broader social environment in the manner determined by the nature of the brain damage (Rapaić & Nedović, 2011).

The common data on the occurrence of CP worldwide oscillates between 1,7 and 2,1 per one thousand of children born alive (Zoban, 2011). According to other authors, the prevalence in the world is two to five children with CP per one thousand of children born alive (Kraus et al, 2005). Due to the technical improvements of intensive care and the constant technological innovation in the field of medicine, an increasing number of

premature infants with very low birth weight survive the earliest period of life which, with the prolonged life span of the general population, leads to an increased number of adults with severe and multiple forms of disability, including CP (Milićević & Potić, 2012).

In addition to CP being a very complex medical problem, it becomes an educational problem in school age children and social problem in adolescence, as well. The issues of CP therefore extend to the family and subsequently social environment (Rapaić & Nedović, 2011). From these data it is clear the number of people with CP in the world is not marginal and that this issue deserves special attention of all relevant scientific fields.

Determinants of social participation of children with CP

Numerous researches show that children with CP experience certain limitations in social and personal life. Usually are stated the individual and environmental factors as the limiting elements in their proper social participation. Number of studies report individual characteristics of children with CP as the most important determinants of their social participation: severity of the disability, level of motor ability, intellectual status, manual skills, speech abilities, age, presence of pain, epilepsy, psychological problems, etc. (Beckung & Hagberg, 2002; Kerr et al., 2007; Law et al., 2004; Østensjø et al., 2003). Some studies favour environmental factors, or factors from the narrower or wider environment, which affect the social participation of these children, whether physical, political or institutional. These include, in particular: individual and institutional attitudes, architectural barriers, accessibility of transport, family support, place of residence and socio-economic possibilities of the surroundings (Forsyth et al., 2007; Hammal et al., 2004; Michelsen et al., 2009; Welsh et al., 2006).

Voorman et al., (2006) researched the level of functional activities and level of social participation of 110 pupils with CP aged 9-13 years in the following areas: movement, personal care, housing, social life and communication. Subsequently, they analysed the links between the activity and the participation and personal features and characteristics of the CP as the condition. The results obtained proved a high level of statistical interrelation between the finding of the evaluated gross motor functions (according to GMFCS scale) and evaluated participation in the areas of movement, personal care and housing. The presence of cognitive damage and type of CP are statistically interrelated with the success in the areas of personal care and housing while the presence of the cognitive damage and epilepsy are the most significant factors affecting social participation in the areas of social life and communication.

Ghaffari with the research team (2020) evaluated the intensity of leisure participation of 232 children with CP, aged 6 to 14 years and their parents, from four Iranian schools of children with special educational needs and five rehabilitation centres. They state that the intensity of CP children's participation in activities is influenced by child, family and environmental factors. The active participation of parents in children's leisure and recreational activities provide children more opportunities to participate. Higher gross motor function, manual ability, and communication function also play an important role in their participation.

According to the five-year longitudinal study performed with the participation of 594 children (aged 8-12 years) (later adolescents aged 13 – 17 years) with CP in Europe, it was discovered that social participation in childhood is the main predictor of participation during adolescence. Three factors in childhood which occur most frequent in the families who have children with CP are as follows: pain, mental problems and stress of the parents in different stages may result in limited social participation of the adolescents (Mo Dang et al., 2015).

Based on the researches above, we can clearly see that children with CP are at huge risk for experiencing limitations in their personal and social life.

Participation of children with disabilities in the school environment

For the integration of children with MO into the school environment, it is of great importance that the educational process corresponds to the child's abilities, both in terms of content and conditions adapted to its limitations and in terms of achieving other abilities needed for its physical, mental and social development. Experts also emphasize that good school results depend to a large extent on the level of the pupil's ability to perform everyday activities which allow the pupil to take part in all of the activities during the school day (Coster & Haley, 1992). These functional activities relate to non-academic aspects of the school program and differ significantly from the academic activities. The academic activities mean elaboration of school work and homework which reflect the level of mastering the school program and whose primary objective is to enhance knowledge in the respective areas, i.e.: language, mathematics, artistic subjects and science. Compliance with the school program entails mastering all of the basic functional skills including the handling of books and pens, fulfilling the instructions for the preparation of the learning material, finding the information or assistance, movement in the classroom and school, satisfaction of personal needs in an adequate manner and interaction with classmates during the classes. These activities are the non-academic ones. Pupils with developmental disorders often experience difficulties in fulfilling the assigned expectations due to their physical or cognitive limitations.

Schenker et al., (2005), in their research of 148 pupils with CP aged 6-13 years, found that there are significant differences in the levels of participation and functional activities (physical and cognitive-behavioural) according to the type of CP and level of movement preservation (SFA - part 1 and part 3, and GMFCS). The levels of participation and performance of activities are lower if there is a higher level of movement damage and/or if there are additional neurological damages.

A study from the Czech Republic (Zulic et al., 2018) which refers to the social participation of 75 students with CP using SFA instrument, showed that the participation of these pupils in the school environment depends primarily on the level of gross motor functions (estimated with GMFCS) and intellectual abilities of students, than on their speech and writing abilities and on the one selected environmental factor - the type of school the pupils attend.

All the facts stated in the studies mentioned above refer to the fact, that the participation in everyday, school and extracurricular activities is the basis for the

development of social skills and network of social support of each child while the involvement in activities with lower quality and frequency may negatively affect the establishment of social relationships and quality of life.

Legislation in the education system of students with special educational needs (SEN) in the Republic of Serbia

The document "The Salamanca Statement and Framework for Action on Special Needs Education" (UNESCO, 1994) set out the principles of education for all, and were integrated into the legal framework of education in Serbia. According to Serbian law, primary education is compulsory, which also applies to children diagnosed with CP. A pupil with CP can attend a regular primary school, a school for pupils with SEN or a special class of a regular primary school (Službeni glasnik RS, 2017). By law, every pupil should attend classes at a mainstream school, unless the parent / legal representative states otherwise. In this case, the child can attend a school for children with SEN. Each pupil should be provided with an education in accordance with their abilities, possibilities and interests, either in the regular educational program of the school or according to an individual educational plan (IEP). The undeniable advantage that pupils with CP in Serbia have, is the legislative ensuring of their right to study at school as close as possible to their place of residence (in the catchment school) in a group of classmates without disabilities (Hajkova & Zulic, 2015). This attitude determines the need for counselling services available to the school (Nišević & Ilić-Stošović, 2013).

One of the most important institutions of the education system in Serbia is the Interdepartmental Commission (IDC) (Interresorna komisija) whose work is based on the approved Law on the Foundations of the Education System (Službeni glasnik RS, 2018). The basic task or authority of the IDC is to assess the child's needs for additional educational, medical or social support. Additional support covers rights and services that ensure to the child overcomes the physical and social obstacles to the unrestricted performance of daily life activities that are important for participation in the educational process, life in society and its development (Službeni glasnik RS, 2018). The IDC provides an assessment of needs and barriers as well as specific solutions to overcome them, with the task of identifying and recommending various types of additional support, including monitoring and evaluation the implementation of the proposed support. Additional support of student is provided by one of three levels of support based on the pupil's pedagogical profile and defined priorities and needs. Support measures were provided free of charge by schools and interdepartmental commissions.

METHOD

The aim of the research

The main objective of this paper is to determine the predictors of social participation, of pupils with CP in primary schools in the Republic of Serbia. Participation is analysed on the basis of independent execution of 21 school non-academic activities in six different school situations and environments. Selected predictors used for the research

were considered based on previous research findings, indicated above (chapter II). Potential predictors are nine individual factors that represent the characteristics of each subject (gross motor functions, manual and intellectual abilities, age, gender, visual status, presence of epilepsy, handwriting and possibility of expressive speech) and one environmental factor (the type of school the student attends). Considering the fact that no one predictor can perform isolated, but in the combination with at least another one or more of them (Zulic, 2018), we accessed data processing using regression (multiple) analysis.

Participants

The sample (N = 75) consisted of 35 children from regular primary schools and 40 from schools for pupils with SEN with the diagnosis of CP. The students were from six to 12 years old (with a mean of 9.43 years), from the first to the sixth grade. Over 60% of the respondents were male (n=46), while 29 were female. Students included in this study were attending public primary schools in eight regions across Republic of Serbia. Due to the researched areas of social participation which are the part of the everyday school life and whose performance and training requires certain cognitive structure of the subject, only respondents with an IQ higher than 35 were considered (WHO 2010). Given that all participants have been diagnosed with CP, their motor function was tested by GMFCS assessment, and manual abilities were estimated by MACS scale as discussed below (Table 1).

Table 1. *Socio–demographic data and distribution of respondents with CP according to individual functional characteristics*

		Frequency	*Percent*	*Valid Percent*	*Cumulative Percent*
Age of respondents					
Age	6–7	8	10.6	10.6	10.6
	7–8	11	14.7	14.7	25.3
	8–9	9	12.0	12.0	37.3
	9–10	15	20.0	20.0	57.3
	10–11	11	14.7	14.7	72.0
	11–12	21	28.0	28.0	100.0
	Total	75	100.0	100.0	
Gender structure of respondents					
Gender	male	46	61.3	61.3	61.3
	female	29	38.7	38.7	100.0
	Total	75	100.0	100.0	
Number of respondents in regular schools and in schools for pupils with SEN					
School	1.00	35	46.7	46.7	46.7
	2.00	40	53.3	53.3	100.0
	Total	75	100.0	100.0	

		Frequency	*Percent*	*Valid Percent*	*Cumulative Percent*
Number of respondents by grades					
Grade	1.00	7	9.3	9.3	9.3
	2.00	19	25.3	25.3	34.7
	3.00	6	8.0	8.0	42.7
	4.00	11	14.7	14.7	57.3
	5.00	12	16.0	16.0	73.3
	6.00	20	26.7	26.7	100.0
	Total	75	100.0	100.0	
Number of respondents by regions in Serbia					
Regions	1.00	8	10.7	10.7	10.7
	2.00	45	60.0	60.0	70.7
	3.00	17	22.7	22.7	93.3
	4.00	5	6.7	6.7	100.0
	Total	75	100.0	100.0	
Intellectual status of respondents					
Intel. status	1.00	53	29.3	29.3	29.3
	2.00	22	70.7	70.7	100.0
	Total	75	100.0	100.0	
Speech (expressive) of respondents					
Speech	1.00	10	13.3	13.3	13.3
	2.00	65	86.7	86.7	100.0
	Total	75	100.0	100.0	
Handwriting of respondents					
Writing	1.00	50	66.7	66.7	66.7
	2.00	25	33.3	33.3	100.0
	Total	75	100.0	100.0	
Visual impairment of participants					
Visual status	1.00	16	21.3	21.3	21.3
	2.00	59	78.7	78.7	100.0
	Total	75	100.0	100.0	
Presence of epilepsy					
Epilepsy	1.00	16	21.3	21.3	21.3
	2.00	59	78.7	78.7	100.0
	Total	75	100.0	100.0	
GMFC – gross motor status of respondents					
GMFCS	1.00	11	14.7	14.7	14.7
	2.00	20	26.7	26.7	41.3
	3.00	17	22.7	22.7	64.0
	4.00	21	28.0	28.0	92.0
	5.00	6	8.0	8.0	100.0
	Total	75	100.0	100.0	

		Frequency	*Percent*	*Valid Percent*	*Cumulative Percent*
MACS – manual abilities of respondents					
MACS	1.00	9	12.0	12.0	12.0
	2.00	20	26.7	26.7	38.7
	3.00	22	29.3	29.3	68.0
	4.00	19	25.3	25.3	93.3
	5.00	5	6.7	6.7	100.0
	Total	75	100.0	100.0	

School: 1.00 - regular school, 2.00 school for pupils with special educational needs (SEN)
Grades: 1.00 - first grade, 2.00 - second grade, 3.00 - third grade, 4.00 - fourth grade, 5.00 - fifth grade, 6.00 - sixth grade
Areas of the state: 1.00 - Belgrade; 2.00 - Vojvodina; 3.00 - Sumadija and western Serbia; 4.00 - Southern and eastern Serbia (RZS, 2018)
Intellectual status: 1.00 - with disturbances; 2.00 - without disturbances
Speech (expressive) of respondents: 1.00 - with disturbances; 2.00 - without disturbances
Handwriting of respondents: 1.00 – write; 2.00 – don´t write
Visual impairment of participants: 1.00 – with disturbances; 2.00 – without disturbances
Presence of epilepsy: 1.00 – with presence of epilepsy; 2.00 – without presence of epilepsy
GMFCS: from the first to the fifth grade
MACS: from the first to the fifth grade

Instruments

a) SFA - The School Function Assessment: Original version of SFA (from publisher Pearson; Coster et al., 1998) was adapted through translation from English to Serbian and backward translation from Serbian to English. According to the analysis of the validity of the questionnaire, all subscales of social participation show good reliability in a sample of this research. This questionnaire was prepared to evaluate and measure the performance of respective function activities which are the base for the participation in the academic and social aspects on the level of the primary schools' programme and thus to allow the experts an insight into the abilities of pupils with various forms and levels of abilities and consequently preparation of individual educational programmes. The questionnaire consists of three units which may be used as separate, independent scales as well. Our research determined the joint participation of each pupil separately by summarizing the participations measured in six different environments – situations: (1) participation during the class at regular school or school for pupils with SEN, (2) at the school playground or during the school breaks, (3) transport to and from school, (4) use of sanitary facilities, (5) movement between the classes and (6) behaviour in the school canteen during lunchtime or snack.

In this paper we present the results obtained using the third part of the questionnaire SFA which concerns the quality of the performance of the pupil's activity. The third part of the SFA questionnaire names Activity performance is divided into two parts: a physical part which includes 12 separate activities in respect of the participation in the physical sense, and a cognitive and behavioural part which includes nine prepared cognitive and behavioural activities. Each of the tasks has a number of specific questions or claims that are intended to answer by selecting one out of four prepared numerical

answers ranked upwardly according to the participation level (answer 1 - student does not perform the activity, answer 4 - student consistently performs the activity). Data collection with the use of the SFA questionnaire is not based on the answers provided directly by the pupils. The research expects that the teachers (pedagogues, pedagogical assistants, special educators…) working with the students have sufficient knowledge to provide information on the function of the pupils in the school environment. The table below shows the tested areas of social participation based on the SFA questionnaire (Table 2).

Table 2. *Tested areas of social participations of pupils with CP in primary schools*

Part III-Activity Performance	
Physical Tasks	**Cognitive/Behavioural Tasks**
Travel	Functional Communication
Maintaining and Changing Positions	Memory and Understanding
Recreational Movement	Following Social Conventions
Manipulation with Movement	Compliance with Adult Directives and School Rules
Using Materials	Task Behaviour/Completion
Setup and clean up	Positive Interaction
Eating and Drinking	Behavioural Regulation
Hygiene	Personal Care Awareness
Clothing Management	Safety
Up/Down Stairs	
Written Work	
Computer and Equipment Use	

b) GMFCS - The Gross Motor Function Classification System: The GMFCS is a scheme designed for children and adolescents with diagnosed CP aged 18 and younger (Palisano et al., 2007). The classification is made based on five levels of current performance of gross motor function in daily activities with emphasis on mobility and sitting, ranging from level I (most able) to level V (least able). According to Palisano et al., (2000) and Wood and Rosenbaum (2000), the GMFCS has evidence of content construct and discriminative validity and inter-rater reliability as well as the reliability of the evaluation. The original English version of the GMFCS questionnaire is now available in 24 different languages, including Serbian.

c) The Manual Ability Classification System (MACS) describes the way of handling objects in children and adolescents with CP, aged four to 18 years in activities of everyday life (Eliasson et al., 2006). It was created as the equivalent of the GMFCS classification to emphasize the importance of manual skills for reaching independence in everyday life. This scale contains five levels, which are based on the child's ability to handle objects and the need for help or adaptation while performing manual activities. Grade I refers to children with minor limitations of manual ability, while children with more severe functional limitations belong to IV and V degree. This is about handling items that are adequate to the child's age and that are used in eating, dressing, playing, drawing or writing. This tool has been translated from English into 27 languages, including Serbian.

Procedure

The research was performed in the primary schools in the Republic of Serbia during 2017 and 2018 across the four regions of the state: Belgrade, Vojvodina, Šumadija and western Serbia and Southern and eastern Serbia (RZS, 2018). Data of students with CP were collected by the first author and research team. Each session took about two hours. The socio-demographic data (name, surname, age, place of stay, information concerning the education) were collected by the socio-demographic part of the questionnaire, reported by the teacher or psychologist and using basic school data. The answers to the SFA questionnaire were provide by the teachers, school psychologists, special education teachers, pedagogical assistants and other people working with the pupil in the school environment and well familiar with the pupil. The data collection was conditioned by the approval to perform the research from the legal representative of the child (pupil) and the management of the school in which the research is to be performed. The legal representatives, school principals and teachers (participating in the research) were informed of the characteristics and objectives of the research and handling of the data collected.

Statisical Analysis

Data analysis was performed in SPSS 21. The Cronbach reliability coefficient (Cronbach's alpha) was used to check the reliability of the tool SFA. The factor analysis check was performed in order to confirm the expected structure of the questionnaire. For statistical processing of this study were used T-test for independent samples, Pearson's correlation coefficient and the Mann-Whitney as a non-parametric substitution (in the case of less than 20 respondents in each group). To identify the common value of predictive variables and their individual value, multiple regression analysis was performed for each area of social participation (Hendl, 2012).

RESULTS

In order to show the effect of the selected predictors on the social participation of students with CP in the school environment, and taking into account their mutual influence, we conducted a regression analysis of all the predictors by performing physical and cognitive - behavioural activities. This analysis refers to the combined effect of the predictors set, as well as their individual contribution to the performance of these activities and provides conclusions regarding the full participation of students with CP in the school environment. The analysis was conducted separately for each area of social participation. The set of monitored predictors is statistically important for all evaluated areas and explains from 31 to 82 % of the variance (R2 column in the Table 3).

Table 3. *Predictors of performing all school functional tasks by pupils with CP*

PARTICIPATON III	gender	type of the school	age	intellect. status	speech	handwriting	visual status	epilepsy	GMFCS	MACS	F	R	R^2	P
Travel	0.006	0.098	0.124	0.015	0.065	0.014	**0.156****	0.001	**-0.675****	**-0.191***	17.534	0.868	0.754	0.00
Maintaining and Changing Positions	0.033	0.008	0.102	-0.044	-0.017	-0.110	-0.124	-0.091	**-0.845****	-0.055	27.608	0.910	0.828	0.00
Recreational Movement	-0.005	0.030	0.044	-0.078	-0.084	0.016	0.056	-0.055	**-0.746****	-0.071	10.49	0.804	0.647	0.00
Manipulation with Movement	-0.078	0.118	0.078	-0.048	-0.026	-0.029	0.061	-0.044	**-0.617****	**0.274****	15.07	0.851	0.725	0.00
Using Materials	-0.048	0.044	0.085	-0.090	-0.086	0.**229****	0.081	-0.121	-0.135	**-0.613****	14.76	0.849	0.720	0.00
Setup and clean up	-0.055	0.153	0.020	0.066	-0.053	0.034	0.042	-0.136	**-0.429****	**-0.450****	12.97	0.833	0.694	0.00
Eating and Drinking	0.095	0.049	0.049	-0.001	-0.013	0.093	0.096	**-0.207***	-0.174	**0.522****	7.51	0.753	0.492	0.00
Hygiene	0.032	0.024	0.109	-0.027	0.092	-0.011	0.024	-0.145	**-0.354****	**-0.465****	10.245	0.801	0.641	0.00
Clothing Management	-.0055	0.000	0.107	-0.053	-0.053	0.020	0.109	-0.030	**-0.600****	**-0.322****	23.242	0.896	0.802	0.00
Up/Down Stairs	0.017	-.0067	0.107	0.023	0.025	-0.083	-0.063	-0.074	**-0.765****	-0.164	21.803	0.890	0.792	0.00
Written Work	-0.049	-0.054	**0.255****	-0.141	-0.029	**0.493****	0.115	-0.067	-0.055	**-0.358****	12.492	0.826	0.686	0.00
Computer and Equipment Use	**-0.225***	-.0015	0.182	-0.**283***	0.046	**0.235***	0.060	-0.190	-0.098	-0.132	4.07	0.645	0.415	0.00
Functional Communication	-0.044	0.029	0.065	**-0.323***	**0.318****	0.074	0.005	**-0.258***	**0.299***	**0-.316***	4.65	0.67	0.448	0.00
Memory and Understanding	-0.110	0.099	-0.007	**-0.371****	0.042	**0.211***	-0.058	**-0.399****	**0.261***	**-0.322***	6.092	0.718	0.515	0.00
Following Social Conventions	-0.051	-0.004	0.165	**-0.319***	**0.221***	**0.210***	-0.078	**-0.212***	**0.345****	**-0.353***	5.25	0.69	0.478	0.00
Compliance with Adult Directives and School Rules	-0.044	0.071	0.190	-0.**325***	0.123	0.138	-0.151	**-0.208***	0.025	**-0.366***	4.38	0.66	0.433	0.00
Task Behaviour/Completion	-0.137	0.093	0.110	**-0.526****	0.002	**0.321****	-0.014	-0.091	0.239	-0.169	4.71	0.67	0.451	0.00
Positive Interaction	-0.028	0.068	0.134	**-0.535****	-0.006	0.181	-0.018	-0.075	0.240	0.257	4.35	0.66	0.432	0.00
Behavioural Regulation	-0.073	0.144	0.146	**-0.394****	0.103	0.101	-0.061	-0.179	0.274	-0.248	2.740	0.569	0.324	0.00
Personal Care Awareness	-0.102	0.033	0.072	**-0.346***	-0.038	**0.230***	-0.066	-0.195	-0.118	-0.169	3.865	0.635	0.403	0.00
Safety	-0.198	0.082	0.112	**-0.289***	0.145	0.124	-0.062	-0.210	0.221	-0.284	2.588	0.558	0.311	0.00

Bold indicates statistically significant correlation regression analysis

Our research has shown that manipulation skills (according to the MACS scale) have the greatest influence on participation of pupils with CP in out of all of the examined predicted factors. Gross motor skills measured by the GMFCS scale proved to be the second important predictor. Both values, MACS and GMFCS, proved stronger in performing physical in comparison to cognitive-behavioural activities. Intellectual status is the third predictor which proved to be important in performing all cognitive-behavioral and one physical activity. Slightly less important for the participation of these students is the ability to write. The presence of epilepsy is another significant predictor limiting participation when performing five cognitive-behavioral tasks and in one physical aktivity. The ability to speak comes next, while at the end of the list there is the presence of visual impairment, younger age and female gender as factors that have a negative impact, each on performing of the one physical school activity. The predictor type of the school that students attend did not show statistical significance in our study. In order to summarize a large number of data, we have also shown the results of predictors of social participation by frequency in the chart no. 1.

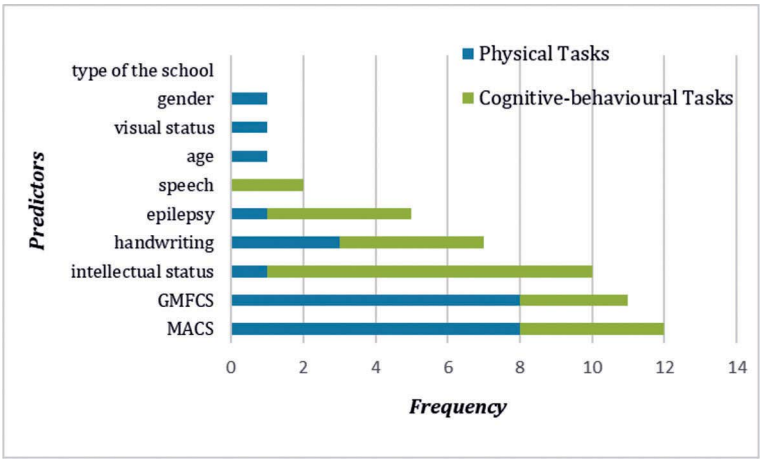

Chart 1. Predictors of social participation of pupils with CP in primary schools by frequency and representation by the task type (physical or cognitive-behavioural).

DISCUSSION

Our results correlate with the results of previous studies in which Kerr et al., (2007), Østensjø et al., (2003) and Schenker et al., (2005), refer primarily to the level of motor functioning (gross and manual) and then to intellectual capacities of students with CP (Mo Dang et al., 2015; Vorman et al., 2006) as the most important predictors for the participation of these children in the school environment.

Research has shown that writing ability plays a high role in participation, which is logical, given the high dependency of manipulative skills and participation on the most of school activities. If we proceed from the fact that writing ability is the most complex form of manual activities, for the performance of which it is necessary to meet

a number of sensorimotor conditions, namely the development of visual perception, fine motor skills, attention, memory, orientation and lateralization, which are the result of complex nervous mechanisms (Nikolić, 2012; Opatrilova, 2014;), this finding raises a new question: To what extent does each of these components actually affect the overall participation of pupils with CP?

The predictor presence of epilepsy showed statistical significance in the intensity of social participation of students with CP, especially when performing cognitive-behavioural tasks. This result was somewhat expected due to previous research of Schenker (2005) and Vorman (2006) which have shown that the presence of epilepsy affects social life and communication and reduce the level of participation of children with CP in the school environment. Therefore, the presence of epilepsy in children with CP is inversely proportional to their social participation in school.

Our research has shown that the predictor speaking ability is not as highly correlated with school participation as in the case of other studies (Ghaffari et al., 2020; Mei et al., 2014; Zulic et al., 2018). It could be explained by the influence of other predictors affecting speech, given that we used regression analysis which takes into account the interactions between the all predictors examined. The expressive speech we examine in the research is the part of motor functions, respectively, the motor function took the role of a mediator in speech as a predictive variable. Also, our sample were consisted of only ten students with expressive speech disorders, therefore, according to this criterion we have not had an adequate sample and these results should be taken with reserve.

The predictors with the least recorded significance in all analyses are age, gender and visual status of students with CP. The sample in this study was adequately widespread with respect to the variables of age, visual status and gender, according to the representation in the population so, as a significant factor in the effectiveness of the research, the size of the sample was imposed. The authors propose the further examination of the predictor factors visual impairments and gender in a larger sample of pupils with CP.

We have determined that adequate inclusion in the school environment requires successful mastering of activities in multiple domains, i.e. successful participation in the school environment requires a number of different developed, primarily individual abilities, the combination of which enables independence in the performance of non-academic school activities. The diversity of our results is in accordance with the nature of CP characterized by a wide range of impairments. Therefore, it is expected that the participation of students with mild impairments is generally achieved to a greater extent, while students with multiple disabilities tend to have greater restrictions on participation in the school environment.

CONCLUSION

The basic goal of our research was to determine the predictors of social participation of pupils with CP in primary schools in Serbia. The participation of pupils with CP in the school environment was examined during the independent realization of non-academic

school activities, according to the SFA tool (Coster, 1998). As predictive variables, the factors that have previously been reported to have a significant effect on pupils' independence in performing these activities in the school environment have been identified. These predictive factors included nine personal characteristics of students with CP and the one environmental factor - the type of school the pupils attend.

This study shows that participation of pupils with CP in school activities is positively correlated with the level of gross motor functions and manipulation skills, intellectual abilities, writing skills and the presence of epilepsy, while the effect of speech skills has not been clearly demonstrated and that it requires further examination on a larger and more representative sample of pupils with CP. We also pointed out that age, gender, visual status and the type of school that students attend do not have a statistically significant effect on the participation of pupils with CP.

From this we can conclude that activities aimed at improving the individual capacities of students with CP (physical, manual, cognitive) are the basis for their successful social participation in primary schools. Given that the most common focus of customized educational programs is on reducing or compensating functional limitations of students with CP, it is very important that non-academic activities, in addition to academic ones, be included in the assessment of students' abilities. In this way, experts in working with these students will have a more complete knowledge of their functionality and thus provide more adequate individual support to successfully overcome their academic and social challenges.

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