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Original research paper

THE IMPORTANCE OF PHYSICAL ACTIVITY FOR THE PSYCHOSOCIAL FUNCTIONING OF STUDENTS WITH DEVELOPMENTAL DISABILITIES*

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ABSTRACT

Research findings on the prevalence and importance of physical activity (PA) among children and adolescents with developmental disabilities have indicated insufficient PA levels in this population, which may lead to adverse effects on their physical and psychosocial health. The aim of this study, drawing on Goodman's approach, was to examine whether there are differences in the psychosocial functioning of students with developmental disabilities with respect to their PA level and whether the impact of their difficulties on areas of everyday life differs according to PA level. The sample included 95 students with developmental disabilities aged 11 to 17 years. The Strengths and Difficulties Questionnaire with the Impact Supplement (SDQ), parent-report form, was used to assess students' psychosocial functioning. The short form of the International Physical Activity Questionnaire (IPAQ-SF) was used to assess PA level. The Mann–Whitney U test showed significant differences in students' prosocial behavior with regard to attaining the recommended level of moderate PA. Significant differences also emerged between the sedentary and non-sedentary groups in terms of impact score and the influence of difficulties in the areas of school learning, leisure activities, and the burden on parents and the family. The results indicate that PA can serve as a basis for encouraging positive forms of social behavior and better everyday functioning among students with developmental disabilities.

Keywords:

physical activity, psychosocial health, difficulties in everyday life, children and adolescents, developmental disabilities.

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■ INTRODUCTION

Engaging in physical activity (PA), defined as any bodily movement produced by skeletal muscles that results in energy expenditure (Caspersen et al., 1985), is highly important for the overall health and quality of life of the general population (Diz et al., 2024; Kapsal et al., 2019; Lumpkin, 2014; WHO, 2020). There is also increasing evidence that inactivity manifested through sedentary behavior is associated with the risk of various physical and psychological problems (Tremblay et al., 2011). Research on children and youth with typical development has pointed to both the physical and psychosocial benefits of PA (Kapsal et al., 2019), whether observed in the context of organized exercise and sport, physical education classes, or extracurricular activities.

Research findings on the prevalence and importance of PA among children and adolescents with various developmental disabilities have indicated that this group of young people is not sufficiently physically active (Alghamdi & Alsaigh, 2023; Rimmer & Rowland, 2008; Sit et al., 2017; Stanish et al., 2019; Züll et al., 2019). This may lead to various adverse effects on their physical and psychosocial health, as well as on psychosocial functioning (Diz et al., 2024; Ma et al., 2024; Menear & Neumeier, 2015; Rimmer & Rowland, 2008; Züll et al., 2019).

Psychosocial functioning includes various aspects of psychological functioning such as emotional health, self-esteem, social competence, peer relationships, and the externalization of behavioral problems in interaction with the social environment (Arim et al., 2015). Compared with peers with typical development, children and adolescents with developmental disabilities demonstrate more difficulties in psychosocial functioning (Arim et al., 2015). In addition, research indicates that children and adolescents with developmental disabilities often experience deficits or delays in the development of motor, cognitive, and socio-emotional skills (Cheung et al., 2021; Emck et al., 2009). They are more vulnerable with regard to the development of behavioral and mental health problems later in life, which indicate that they need specific support in different aspects of functioning (Vandesande et al., 2022). Particular attention is directed toward the role of socio-emotional competences, which are important for their personal, social, and academic success, that is, for quality psychosocial functioning (Chan et al., 2021; Faria, 2019; Hong et al., 2022). When considering the social competences of children with certain developmental disabilities (physical disabilities, visual impairment, Down's syndrome, mild

intellectual disability and learning difficulties, autism spectrum disorders) and the impact of disability on these competences, it is concluded that understanding them requires taking into account children's individual characteristics, their needs, family goals, and cultural context (Hong et al., 2022). Participation in PA is cited as an important factor in strengthening these competences (Chan et al., 2021; Symeonidou, 2023). Research findings have shown that PA strengthens the mental health and psychological and social well-being of young people with developmental disabilities, contributes to reducing anxiety and depressive states, strengthening self-esteem, and enhancing social interactions, friendships, sense of belonging, and social integration (Ma et al., 2024; Perić & Milićević-Marinković, 2021), all of which is reflected in the quality of psychosocial functioning. By participating in sports or recreational activities, youth from this population can experience success, build resilience, and develop stress-coping mechanisms (Ma et al., 2024). Research has also shown that including children with developmental disabilities in PA programs can produce positive effects not only in the affective domain but also in the cognitive and psychomotor domains (Afont, 2023). Analyses of research results on samples of children and youth with certain developmental disabilities, such as intellectual disabilities (Diz et al., 2024; Kapsal et al., 2019) and autism spectrum disorders (Huang et al., 2020; Menear & Neumeier, 2015; Salar et al., 2024; Symeonidou, 2023), have likewise confirmed the positive effects of involvement in different forms of PA on both their physical and psychosocial health and functioning.

Given the role and importance of PA in improving the health of children and adolescents with developmental disabilities, the World Health Organization (WHO, 2020) provides specific recommendations regarding PA participation in this population of young people. It is recommended that they should be physically active every day for an average of at least 60 minutes in PA of moderate to vigorous intensity. However, achieving the recommended amount of daily PA may be more difficult for them than for their peers with typical development because they exercise less and spend more time in sedentary behavior (e.g., sitting, watching television, playing video games), which is characterized by low energy expenditure (Sit et al., 2017; Tremblay et al., 2011). In order to achieve the recommended amount of time spent in different forms of PA, it is necessary to ensure their gradually inclusion in PA which should increase in frequency, intensity, and duration, while simultaneously reducing sedentary behavior, which additionally unfavorably affects the underlying health difficulties of children and adolescents with developmental disabilities (WHO, 2020).

Research into the psychosocial functioning of children and adolescents with developmental disabilities is most often approached through the use of questionnaires that assess their strengths and problems, relying primarily on the responses of their parents, teachers, or other professionals in relevant institutions (Colavita et al., 2014; Murray et al., 2021; Stone et al., 2010). A review of the relevant literature showed that one of the most commonly used instruments for assessing difficulties in the psychosocial functioning of children and adolescents is the Strengths and Difficulties Questionnaire (SDQ; Goodman, 1997), which has been applied in many countries in various studies in developmental, social, clinical, and educational research (Duinhof et al., 2020; Goodman, 1997; Goodman & Goodman, 2009; Stone et al., 2015). The SDQ has been used in studies on samples of children with intellectual disabilities, learning disabilities, language development disorders, attention-deficit/hyperactivity disorder, autism spectrum disorders, eating disorders, and other developmental disabilities (Bryant et al., 2020; Grasso et al., 2022; Hall et al., 2019; Jelić & Stojković, 2016; Kaiser & Halvorsen, 2022; Murray et al., 2021). In interpreting the level of strengths and difficulties in the psychosocial functioning of children and adolescents with developmental disabilities, researchers rely on the existing categorization presented in the manual for this instrument (SDQ Information for Researchers, n.d.).

Research on PA among children and adolescents with developmental disabilities as a means of improving both their physical and psychosocial health and functioning is, in the opinion of researchers, highly necessary and should be given priority (Ma et al., 2024; Vanderloo et al., 2022). Since Goodman's (1997) approach to difficulties and strengths in the domain of psychosocial functioning of children and adolescents has been applied in numerous studies of various problems in this population of young people, we chose to apply it in examining the nature of the relationship between the psychosocial functioning of this population and their involvement in PA. This approach encompasses different aspects of psychological functioning and the quality of interaction with everyday life situations in the social environment, which provides a good basis for insight into the quality of psychosocial functioning of students with developmental disabilities (Goodman, 1997; 1999). An analysis of the available literature has shown that within the Serbian educational system there is a lack of studies examining the relationship between the level of engagement in PA and the psychosocial functioning of children and adolescents with developmental disabilities. Therefore, the aim of this study, based on Goodman's

approach (Goodman, 1997, 1999), was to examine whether there are differences in the psychosocial functioning of students with developmental disabilities with respect to their PA level. Also, the aim was to examine whether the impact of these students' difficulties on areas of everyday life differs according to PA level.

■ METHOD

Sample

The sample included 95 students from eight primary schools for children and adolescents with developmental disabilities in the Republic of Serbia. Personal data on the students (sex, age, grade), their PA, and psychosocial functioning were collected on the basis of parent responses (one available parent per student). Written informed consent was obtained from each parent allowing data on their child to be used for research purposes. Data on the students' developmental disabilities were provided by the professional services in the schools in accordance with the principle of confidentiality. Approval for conducting the research was also obtained from the administrations of the schools attended by the students.

The sample comprised 58 (61.6%) male and 37 (38.9%) female students. The age range was 11 to 17 years ($M=13.96$; $SD=1.37$), spanning from the fifth to the eighth grade of primary school. The sample included 69 (72.6%) students with intellectual disabilities, and 13 (13.7%) students each with autism spectrum disorders and sensory impairments (vision and hearing). Given that a primary disability is often accompanied by other disabilities, and considering that both scientific research and practice increasingly employ a transdiagnostic approach focused on softening sharp boundaries in the traditional categorization of disabilities (Bryant et al., 2020; Grasso et al., 2022), the sample in this study was observed as a whole with regard to developmental disabilities.

Instruments

Data on students' sex, age, and grade were collected by means of a Questionnaire completed by parents. To assess the psychosocial functioning of students with developmental disabilities, the Strengths and Difficulties Questionnaire with the Impact Supplement (SDQ; Goodman, 1997; 1999) was used, specifically the parent-

report form, intended for children aged 4 to 17 years, which had been translated into Serbian.¹

The questionnaire consists of five subscales, each containing five items rated on three levels (0=not true, 1=somewhat true, and 2=certainly true). Four subscales measure difficulties: emotional problems (e.g., Often unhappy, down-hearted or tearful), conduct problems (e.g., Often fights with other children or bullies them), hyperactivity (e.g., Restless, overactive, cannot stay still for long), and peer problems (e.g., Rather solitary, tends to play alone). Summing the scores of these four subscales yields the total difficulties score ranging from 0 to 40. The fifth subscale measures strengths, that is, prosocial behavior (e.g., Considerate of younger children), with a total score of 10.

In the second part of the SDQ, the Impact Supplement (Goodman, 1999), includes questions through which parents assess whether their children have difficulties in one or more areas (emotions, concentration, behavior, or getting along with others). If such difficulties are present, parents are asked to indicate how long these difficulties have been present and to rate on scales from 0 to 3 (0=not at all, 1=only a little, 2=quite a lot, 3=a great deal) whether these difficulties affect the child's everyday life in the following areas: *overall distress/upset*, *home life*, *friendships*, *classroom learning*, and *leisure activities*. After recording, the values on these scales range from 0 to 2 (0=not at all or only a little; 1=quite a lot; 2=a great deal). The responses to these questions provide *the impact score*. The last question in the Impact Supplement refers to the assessment of whether the difficulties place a burden on the parents or the family as a whole and is rated on a scale from 0 to 3 (0=not at all a burden; 1=a little; 2=quite a lot; 3=a great deal).

The reliability check of the SDQ subscales showed that *the conduct problems* subscale had a low Cronbach's alpha value ($\alpha=.43$), while the peer problems ($\alpha=.60$), *hyperactivity* ($\alpha=.64$), and *emotional problems* ($\alpha=.65$) subscales had values somewhat below the satisfactory level. A satisfactory level of reliability ($\alpha \geq .70$ according to Schweizer, 2011) was found for *the total difficulties score* ($\alpha=.75$), *the prosocial behavior* subscale ($\alpha=.77$), and *the impact score* ($\alpha=.83$).

Studies by other authors on the reliability of the SDQ instrument indicate inconsistency in the findings. Some results suggest good and satisfactory reliability of the instrument as a whole (Goodman, 2001; Stone et al., 2010; Tatalović Vorkapić et

1 The translation of the questionnaire into Serbian was taken from the official website dedicated to the SDQ instrument (SDQ Information for Researchers, n.d.), and was written by Nevenka Badnjarević, Nevenka Žegarac, Tamara Džamonja Ignjatović and Mima Simić.

al., 2017; Yao et al., 2009), whereas others point to low reliability of certain subscales (Duinhof et al., 2020; Mieloo et al., 2012). Because of possible shortcomings in the reliability of some difficulty-related subscales, the authors propose that *the total difficulties score* should be used for behavioral screening purposes (Mieloo et al., 2012). Given the results on the reliability of the subscales, we decided to include in the further analysis *the total difficulties score*, *the prosocial behavior* subscale score, and *the impact score* results.

To measure the level of PA, the short form of the International Physical Activity Questionnaire (IPAQ-SF; Craig et al., 2003), completed by the students' parents, was used. This questionnaire assesses PA performed as part of everyday life during the previous seven days, at both weekly and daily levels. The responses to the questions in this questionnaire make it possible to interpret the PA level of students with developmental disabilities in accordance with the recommendations provided in WHO documents (WHO, 2020). The instrument measures the level of PA through four types of activity, namely *vigorous* activity (e.g., lifting heavy objects, aerobics), *moderate* activity (e.g., carrying light loads, playing certain games), *light* activity (walking, strolling), and *sedentary* behavior (sitting, reading, watching television, computer-based activities). Each type of activity has a predefined MET coefficient (Metabolic Equivalent of Task) indicating energy expenditure within a given type of PA. The question on how much time is spent sitting per day is not included in the MET score, but is used as an indicator of sedentary behavior.

In this study, we calculated only the time in minutes that students, according to parent reports, spent in specific types of PA per day over seven days a week, without calculating the MET coefficient, as well as the time spent in sedentary behavior. This approach to the analysis was based on WHO recommendations (WHO, 2020), according to which the achievement of the PA level of children and adolescents in the general population, as well as youth with developmental disabilities, is assessed through time spent in PA (a minimum of 60 minutes of PA per day). Based on the time spent in sedentary behavior (300 minutes or more per day), students were classified into a sedentary group and a non-sedentary group (less than 300 minutes per day). Since the WHO recommendations on PA for children and adolescents with developmental disabilities do not specify the total time spent in inactivity as an indicator of sedentary behavior, we relied on findings from other studies (Sit et al., 2017; Fakhouri, 2013) when determining the cut-off point for grouping students as sedentary or non-sedentary. An additional question was added to the IPAQ-

SF regarding the child's weekly participation in organized exercise outside school through sports and recreation as subtypes of PA. Engagement of young people with developmental disabilities in organized exercise outside school is considered an important segment contributing to their overall PA (Steinhardt et al., 2021; Züll et al., 2019).

Data analysis

In the data analysis, we started from descriptive statistics (percentages, *Min*, *Max*, *Mdn*, *IQR*, *M*, *SD*) for the variables included in the study. The assessment of the normality of data distribution for the variables *total difficulties*, *prosocial behavior*, and the variables from the SDQ Impact Supplement, performed using the Kolmogorov-Smirnov test. The analysis showed that there was no normal distribution of data for the examined variables (*total difficulties* – $p < .005$; *prosocial behavior*, *distress/upset*, *home life*, *friendships*, *classroom learning*, *leisure activities*, *impact score*, and *burden on parents and family*, $p < .001$).

The analysis of PA level data obtained using the IPAQ-SF instrument (Craig et al., 2003) included data on the time spent in each type of PA (*light*, *moderate*, and *vigorous*) and *sedentary/non-sedentary* behavior) expressed in minutes per day. The data analysis also included the participation of students with developmental disabilities in organized exercises outside of school, observed through frequency on weekly basis.

To examine differences in students' psychosocial functioning (*total difficulties* and *prosocial behavior*, *difficulties in specific life domains*, and *impact score*) according to PA level, the Mann–Whitney *U* test was applied. For estimate the effect size of the Mann–Whitney *U* test, the *r* statistic was used (Tenjović, 2020).

RESULTS

The results of the descriptive analysis for the variables *total difficulties score* and *prosocial behavior* are presented in Table 1.

TABLE 1. Descriptive statistics for the variables total difficulties score and prosocial behavior

Variables	<i>N</i>	<i>Min</i>	<i>Max</i>	<i>Mdn</i>	<i>IQR</i>
Total difficulties score	95	0	27	11.00	8
Prosocial behavior	95	1	10	8.00	3

The basis for interpreting the descriptive statistics for the variables *total difficulties score*, *prosocial behavior*, and *impact score* was the more recent categorization provided for the SDQ instrument with four levels: “close to average,” “slightly raised,” “high/” and “very high” (Murray et al., 2021; SDQ Information for Researchers, n.d.). According to this categorization, the median for the *total difficulty score* (Table 1) is within the average range of values (0–13), and the interquartile range shows that the middle 50% of the students scores are in the range of 7 to 15, meaning that part of the sample reaches or crosses the threshold of the zone above the average values. From Table 1, it can be seen that the median for the variable *prosocial behavior* is within the interval of “average values” for this variable (8–10). The IQR shows that the middle 50% of students have scores in the range of 6.5 to 9.5, which indicates that one percent of students belong to the categories with lower values (category “slightly lower” – 7; category “low values” – 6).

In response to the question in the Impact Supplement asking whether their children have difficulties in one or more areas (emotions, concentration, behavior, or the ability to get along with others), 19 parents (20%) stated that their children had no difficulties, 46 (48.4%) reported minor difficulties, 22 (23.2%) reported definite difficulties, and 8 (8.4%) reported severe difficulties. Also, according to parents’ responses, two-thirds of children have had difficulties for more than a year.

The descriptive statistics related to the questions on the impact of difficulties on particular areas of students’ lives, on the basis of which the impact score is derived, are presented in Table 2.

TABLE 2. Descriptive statistics on the impact of difficulties on specific areas of students' lives and the Impact score

Life areas and impact score	<i>N</i>	<i>Min</i>	<i>Max</i>	<i>Mdn</i>	<i>IQR</i>
Distress/upset	74	0	2	0.00	1.00
Home life	73	0	2	0.00	0.00
Friendships	71	0	2	0.00	1.00
Learning at school	72	0	2	1.00	1.00
Leisure activities	72	0	2	0.00	1.00
Impact score	74	0	10	1.50	4.00

When the impact score results are considered, Table 2 shows that the median lies between the categories “slightly raised” (value 1) and “high” (value 2), according to the categorization of scores for this variable (SDQ Information for Researchers, n.d.), while the *IQR* suggest variability in the responses.

According to the assessment of most parents, in the life domains of *distress/upset*, *friendships*, and *leisure activities*, the median indicates that difficulties have no effect or only a very small effect on these aspects of the child's life. However, the *IQR* indicates some variability in the responses. When considering the impact of *difficulties on learning at school*, the results show that, according to parents' assessments, the difficulties have a moderate impact on this area of life. *IQR* indicates a certain difference in the responses. When considering the impact of difficulties on the child's *life at home*, the results show that they do not affect his functioning at home and that there is complete agreement among parents in assessing the impact of difficulties.

To the last question in the Impact Supplement, which referred to the assessment of whether the child's difficulties burden the parents or the family as a whole, of the 74 parents who answered this question, 10.8% answered that there was no burden at all, and 89.2% that the burden existed, but was expressed to varying degrees. For 39.2% of parents, the burden was quite small, for 35.1% quite a lot, and 14.9% estimated that the burden was very pronounced.

The analysis of *the level of PA* of students showed that the students included in the study were not engaged in *vigorous PA*, and the assessment of students' *PA* was carried out based on the time spent in light and moderate activities. Following the WHO criteria (WHO, 2020) for achieving the required 60 minutes of daily *PA*, students were categorized into those who met this criterion and those who did not,

according to the types of PA by intensity. Data on the level of PA, the prevalence of sedentary behavior and involvement in organized exercise are presented in Table 3.

TABLE 3. PA, sedentary behavior, and organized exercise among students

PA, sedentary behavior, and organized exercise	Category	N	n	%
60 min light PA	Achieved	95	51	53.7
	not achieved		44	46.3
60 min moderate PA	Achieved	95	21	22.1
	not achieved		74	77.9
60 min light and moderate PA (total PA)	Achieved	95	64	67.4
	not achieved		31	32.6
Sedentary / non-sedentary behavior	sedentary ≥ 300 min per day	95	34	35.8
	non-sedentary < 300 min per day		61	64.2
Organized exercise	Yes	95	15	15.8
	No		80	84.2

To examine differences in the characteristics of psychosocial functioning of students with developmental disabilities according to PA level, the Mann–Whitney U test was applied.

According to parents' assessments, students who engage in *60 minutes of moderate* PA per day achieve better results in *prosocial behavior* ($Mdn=9.00$, $IQR=2.00$) compared to students who do not reach this amount of exercise ($Mdn=8.00$, $IQR=3.25$). The Mann-Whitney U test showed that this difference was significant ($U=471.50$, $z=-2.79$, $p=.005$, $r=0.29$). No differences were observed in terms of students' *prosocial behavior* according to the variables *light PA*, *total PA*, *sedentary/non-sedentary* behavior, and *organized exercise*. Regarding the *total difficulty scores*, no difference was observed with respect to the examined variables according to the level of PA.

With regard to *impact score*, students belonging to the *non-sedentary* group ($Mdn=.50$, $IQR=2.75$) showed better results than *sedentary* students ($Mdn=3.00$, $IQR=3.25$), and this difference was significant ($U=350.50$, $z=-3.05$, $p=.002$, $r=.35$). When looking at the area of *school learning*, the *non-sedentary* group achieved better results ($Mdn=0.00$, $IQR=0.00$) compared to the *sedentary* group ($Mdn=0.00$, $IQR=1.00$) where the difference is significant ($U=435.50$, $z=-2.43$, $p=.015$, $r=0.29$). In terms of *leisure activities*, students from the *non-sedentary* group achieved better results ($Mdn=0.00$, $IQR=0.00$) compared to the *sedentary* group ($Mdn=1.00$,

$IQR=1.25$), where the difference is significant, ($U=390.50$, $z=-3.25$, $p=.001$, $r=0.38$). The difficulties of students belonging to *the non-sedentary* group are less burden on parents and the family as a whole ($Mdn=1.00$, $IQR=1.00$) compared to *the sedentary* group ($Mdn=2.00$, $IQR=1.00$) and this difference is significant ($U=471.00$, $z=-2.20$, $p=.028$, $r=0.26$). According to *the sedentary/non-sedentary* behavior variable, differences were not manifested in terms of the impact of difficulties on the domains of life: *distress/upset*, *friendships*, and *life at home*.

In terms of *impact score* and the influence of difficulties on the observed domains of students' life activities, as well as the effect on parents and the family as a whole, there were no significant differences between students when observed according to the variables of 60 minutes of daily exercise (*light*, *moderate PA*, *total PA*), and *organized exercise*.

■ DISCUSSION

Starting from Goodman's approach (Goodman, 1997, 1999) to the psychosocial health problems and functioning of young people, we examined whether there are differences in the psychosocial functioning of students with developmental disabilities with regard to their level of PA. We also examined whether the impact of these students' difficulties on areas of everyday life differs according to their level of PA. The psychosocial functioning of students with developmental disabilities was analyzed based on the results from the first part of the SDQ instrument (*total difficulties score* and *prosocial behavior*), as well as on the results from the second part of the instrument (the Impact Supplement), which indicate the effect of difficulties on students' functioning in certain areas of life (*impact score*; life domains: *distress/worry*, *home life*, *friendships*, *learning at school*, *leisure activities*, and *the burden on parents and the family as a whole*).

The results for the *total difficulties score* show that, with regard to these characteristics of psychosocial functioning, most students fall within the average range compared with the general population (Murray et al., 2021; *SDQ Information for Researchers*, n.d.). Likewise, the results obtained for *prosocial behavior* in the majority of students also belong to the average range. These findings confirm research indicating that parents of children with developmental disabilities tend to perceive primarily positive personality characteristics in their children, rather

than focusing only on problems (Colavita et al., 2014). However, in some students in our study, there are certain deviations in the results indicating more pronounced *overall difficulties*, including problems in the areas of *emotional functioning*, *conduct problems*, *hyperactivity*, and *peer relationships*, as well as less pronounced *prosocial behavior*. This is consistent with the findings of other studies pointing to the presence of difficulties, to a certain extent, in the psychosocial functioning of children and adolescents with developmental disabilities (Cheung et al., 2021; Emck et al., 2009; Faria, 2019; Hong et al., 2022). These students require greater professional support in overcoming difficulties in psychosocial functioning, both within the family and in the school environment (Faria, 2019; Ma et al., 2024). For example, physical education classes and school sports provide conditions for improving their prosocial behavior, given that in these contexts students have numerous opportunities for social interaction involving cooperation, support, and helping others (Telama & Povi, 2007). When students' difficulties are viewed in the context of everyday life, parents reported that they are present in the majority of children and have lasted for more than one year. This finding supports the need to strengthen both the family and the school in providing adequate support to students with developmental disabilities in different aspects of functioning in everyday life (Vandesande et al., 2022).

Based on the *impact score* results, it can be concluded that most parents assess the presence of the impact of difficulties on certain areas of the child's life as ranging from slightly elevated to high, with marked variability in their evaluations of this impact. When considered by life domains, the impact of the child's difficulties is most pronounced in the area of *learning at school*. It may be expected that, by involving students with developmental disabilities in appropriate school-based learning support programs (Nedović & Sretenović, 2019), the impact of the child's difficulties on the domain of learning could be reduced.

In the life domains of *distress/upset*, *friendships*, and *leisure activities*, the difficulties have little or very little impact on them. According to parents' assessments, the child's difficulties do not affect *home life*. This may be interpreted as an indicator of the support the child receives within the family, which is an important condition for the child to feel well in that environment, as confirmed by the findings of certain studies (Jelić & Stojković, 2016; Vandesande et al., 2022). However, when considering the burden on the parents themselves and on the family as a whole caused by the child's difficulties, most parents assess that such a burden is present. This points to the need for families to be provided with professional assistance and support,

given the evidence that they are at greater risk of family dysfunction compared with families of children with typical development (Priego-Ojeda & Rusu, 2023).

The analysis of PA data showed that, when considering total PA, most students (approximately two thirds) achieve 60 minutes of PA per day. However, when specific types of PA are examined, the research results show that *light* PA is the most prevalent, while *moderate* PA is considerably less represented, and *vigorous* PA is absent, which is not a satisfactory result in relation to the WHO recommendation of 60 minutes per day of *moderate* to *vigorous* PA (WHO, 2020). Similar findings regarding the lower prevalence of *moderate* to *vigorous* PA have also been reported in other studies. Therefore, it is recommended that, in work with young people with developmental disabilities, efforts should be directed toward increasing this type of PA, both in physical education classes and in other segments of the time students spend at school (Sit et al., 2017; Stanish et al., 2019). The results also indicate insufficient involvement of students in organized PA (sports and recreation) outside of school, which is consistent with the findings of other authors (Kapsal et al., 2019; Menear & Neumeier, 2015; Sit et al., 2017; Stanish et al., 2019; Züll et al., 2019).

With regard to *the sedentary/non-sedentary* behavior variable, the results of our study indicated a greater prevalence of *non-sedentary* behavior, which is not consistent with the findings of some other studies that point to a higher prevalence of *sedentary* behavior in the structure of students' daily activities (Ma et al., 2024; Sit et al., 2017). This inconsistency with the findings of other studies may be interpreted primarily in light of the different approaches to measuring sedentary behavior (parental assessment versus objective assessment), as well as the time period within which students' activity is observed during the day (only at school or throughout the entire day). In addition, differences also arise with regard to the criteria used to categorize sedentary behavior (Sit et al., 2017; Fakhouri, 2013; WHO, 2020).

The finding of low student participation in organized PA in sports clubs is consistent with the research of other authors (Züll et al., 2019). Answers to the question of the very limited involvement of children and adolescents with developmental disabilities in *organized exercise* outside physical education classes should be sought in data on the availability of sports clubs at the local community level, the availability of organized adapted sports programs, the determination of the degree of disability as a possible barrier to greater participation in organized sports activities, as well as the level of parental support. These factors are identified in the literature as relevant to greater involvement of young people with developmental

disabilities in organized sports activities and physical exercise in general (Alghamdi & Alsaigh, 2023; Steinhardt et al., 2021; Züll et al., 2019; Varner et al., 2025).

In examining differences in the psychosocial functioning of students with developmental disabilities with regard to their level of PA, the results showed that no significant differences were found in terms of *the total difficulties score* (emotional problems, conduct problems, hyperactivity, and peer problems), although studies by other authors, analyzed in systematic reviews or meta-analyses, have shown that there is a positive association between PA and certain aspects of their psychosocial functioning (Diz et al., 2024; Kapsal et al., 2019; Ma et al., 2024). Possible reasons for the inconsistency of these findings may be explained by differences in the aspects of psychosocial functioning that were measured, the selection of instruments, as well as the characteristics of the samples of young people with developmental disabilities included in studies in this field. However, regarding the relationship between PA and *prosocial behavior* (strength), a significant difference was found in favor of students who achieve 60 minutes of *moderate* PA per day, compared with students who do not. These results highlight the importance of PA, particularly *moderate* activity, in supporting positive social behavior in children and adolescents with developmental disabilities, which is consistent with the findings of other studies (Salar et al., 2024; Symeonidou, 2023; Telama & Povi, 2007). Given that no significant differences in the level of *prosocial behavior* were found with respect to other variables in the domain of PA (*light* PA, *total* PA, and *organized exercise* – sports and recreation), further research is needed.

The results regarding the impact of students' difficulties on particular areas of everyday life, as well as on the burden placed on parents and the family as a whole, showed that there are differences between *the sedentary* and *non-sedentary* groups of students. These differences were found in terms of *the impact score*, *learning at school*, and *leisure activities*, as well as in terms of *the burden on parents and the family as a whole*. The impact of difficulties on these areas of life is less pronounced in *the non-sedentary* group of students. Therefore, this finding indicates that it is necessary to provide conditions for the systematic inclusion of young people from this population in structured PA, both at school and during leisure time. In order to achieve this, it is important to consider both the barriers to participation in PA and the factors that facilitate such participation. Research in this field points to several groups of factors, ranging from those related to the child, through factors related to parents and professionals, to those associated with the broader social environment

(Alghamdi & Alsaigh, 2023; Steinhardt et al., 2021; Züll et al., 2019). It should be kept in mind that many environmental and family factors can act both as facilitators and as barriers, with parental support standing out as the most important facilitator of children's and adolescents' participation in PA (Steinhardt et al., 2021).

Limitations of the Study

This study has several limitations. One relates to the sample size and the imbalance in the number of students according to the type of developmental disability, which is why analyses of students' psychosocial functioning in relation to the level of PA, considered by type of developmental disability, were not conducted. In addition, the assessment of students' psychosocial functioning and their level of PA was obtained only on the basis of parents' responses, while assessments by teachers and other relevant professionals involved in the education of students with developmental disabilities were not included. Students' PA was assessed using a questionnaire, while a direct assessment of PA (e.g., the use of accelerometers), which has been employed in some studies of PA in the population of children and adolescents with developmental disabilities, was not carried out (Sit et al., 2017).

Directions for Future Research

The results of this study may serve as a starting point for further research on the importance of PA for the psychosocial functioning of children and adolescents with developmental disabilities. Such studies should be conducted with larger samples of students, with subsamples according to specific types of developmental disabilities balanced in size. This would provide a basis for obtaining more precise data on the importance of PA for the psychosocial functioning of students with particular developmental disabilities. In addition to parental assessments, future research should also include assessments by teachers and other relevant professionals in order to provide a broader basis for drawing conclusions about the importance of PA for the psychosocial functioning of students with developmental disabilities. Future studies should collect more detailed information on the forms and duration of PA in which students are involved during different segments of the school day, as well as in extracurricular sports and recreational PA, while also applying direct measures of PA. Such an approach would provide a basis for drawing more comprehensive conclusions about the overall importance of PA for the psychosocial functioning of

students with developmental disabilities and for their more meaningful inclusion in everyday life activities.

■ CONCLUSION

The results of this study showed that there is a significant difference in the *prosocial behavior* of students with developmental disabilities with regard to their level of engagement in *moderate* PA. Specifically, students who achieved 60 minutes of *moderate* PA per day demonstrated more pronounced *prosocial behavior*. In more active students with developmental disabilities, who belong to the *non-sedentary* group, developmental difficulties are reflected to a lesser extent in the overall quality of their functioning in everyday life and in specific domains (*impact score, learning at school, leisure activities, and the burden on parents and the family as a whole*). This indicates that PA, and above all *moderate* PA and *non-sedentary* behavior, may serve as an important basis for encouraging positive forms of social behavior in students with developmental disabilities and for reducing the impact of their difficulties on quality of life. In addition to achieving 60 minutes of PA per day, in order to attain its positive effects on the psychosocial functioning of students with developmental disabilities, greater efforts should be made to involve them in adapted physical exercise programs focused on *moderate* PA, with the gradual introduction of *vigorous-intensity* activities. Furthermore, encouraging students to participate in extracurricular activities during their leisure time (free play with peers, organized sports programs) may also contribute to reducing sedentary behavior, which has been associated with various physiological and psychological problems (Tremblay et al., 2011).

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