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Article

Structured Program for Developing Psychomotor Skills of Institutionalized Children with SEN

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Abstract: Adapted and personalized motor activities prove to be effective for meeting the specific needs of children with SEN, tailoring to their unique limitations and abilities. Our focus was to craft and apply a structured program for psychomotor abilities development, targeting balance and motor-cognitive skills. The study aims to enhance the behavior and psychomotor manifestations of 28 students with SEN (aged 12-14) from two institutional centers in Romania. The "Sfântul Ștelian" Inclusive Education School Center of Costesti, Arges (CC-12 subjects), and the "Sfânta Filofteia" Inclusive Education School Center of Ștefănești (CS-16 subjects). Across a 36-week training regimen, participants engaged in sessions lasting 30 minutes, twice weekly. Evaluation of their psychomotor skills involved a battery of tests: assessing balance, both with eyes open and closed, brain processing speed, upper limb motor laterality. Initial and final data were gathered to assess their motor development and physical state. Instruments utilized included the Optojump Next optical system for movement analysis, Witty SEM intelligent semaphore, Sensamove balance miniboard. Statistical analysis compared the initial and final assessments using the Kolmogorov-Smirnov test and Wilcoxon Z test. Out of the total comparisons made between the initial and final assessments for the evaluation of the psychomotor component, statistically significant differences were found in only 37.5% of these comparisons.

Keywords: psychomotor development; Motor Skills Assessment; Institutionalized Education

1. Introduction

In the context of concerns regarding the development of children with SEN, the importance of this investigation stems from experts' observations indicating that children with SEN typically exhibit lower levels of physical development (Wang et al., 2018; Cojanu & Visan, 2016). Their involvement in sports activities and team games is crucial for motor skill development, concurrently providing opportunities for socialization and enhancing social inclusion. The need to engage in sports, continuous movement, and play, even within institutionalized settings, is crucial in bridging school with life (Borca, 2010). Experts emphasize the significance of physical education and sports, which aids in overcoming challenges faced by children with SEN (Jylänki et al., 2022; Coates, 2011; Yılmaz & Soyer, 2018). Pérez-Ordás et al. (2021) highlight their beneficial impact on addressing social, political, and economic issues, as well as their role in reducing crime, violence, and drug dependence. Crucial physical abilities like dynamic coordination, laterality, and balance are essential for various motor activities (Patrascan & Stefanica, 2019).

However, children with SEN often display reduced motor-cognitive skills, leading to delays in motor development and functional limitations. These consequences stem from reduced sensory

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information processing and challenges in stimulus integration (Toptas Demirci & Tzarova, 2021; Leonard, 2016). Given the negative impact of SEN on adolescents' physical and social development, various interventions have been devised in order to enhance motor-cognitive abilities (Ion-Ene et al., 2014; Badau et al., 2023; Jeng et al., 2017; Marin et al., 2023). Educational programs focusing on psychomotor skill development stand as such interventions. They are designed to improve motor skills through structured training using movement-based games targeting balance, coordination, and overall motor abilities (Ikezawa et al., 2023; Marcu, 2011; Căpriță & Balint, 2023). According to Wuang et al. (2009) and Horvat et al. (2010), motor programs integrating stimuli from vestibular, auditory, tactile, and visual systems aid in enhancing motor-cognitive skills in individuals with SEN. Programs like adapted and creative sports circuits, specialized exercises for strength, endurance, and balance have shown effectiveness in improving balance, coordination, and laterality skills in individuals with SEN (Zubenschi, 2022; Seo & Suh, 2019; Cardoso & Lima, 2019). Playful activities within psychomotor education programs bolster participant motivation. Team games, imitation, improvisation, and expression freedom aid concentration and successful completion of motor-cognitive tasks (Termini & Sciurca, 2017; Jucan & Stan, 2023). Additionally, a holistic approach to psychomotor education, treating movement as a comprehensive perspective, holds the potential to promote holistic adolescent development. It emphasizes perceptual, motor, and sensory activities (Rusnac, 2012; Ionescu et al. 2021; Wuang et al., 2009). Complementary interventions like occupational therapy, physiotherapy, and psychological interventions have been developed to address the broader impact of SEN on adolescent development. These cover not only motor skills but also aspects of social and emotional development (Houwen et al., 2016; Havez et al. 2023). Therefore, our research aims to experiment and implement an effective educational strategy. The psychomotor education enhances both physical and psychological readiness through an adapted psychomotor program for children with SEN aged 12 to 14. Central to crafting action plans and selecting tools, methods, and materials influencing the psychomotor aspect is the concept of psychomotor capacity (PC) (Riga & Rouvali, 2023). Vickerman & Coates, (2009) consider PC a complex capacity that is involving synergy between two essential profiles: general motor skills and psychomotor skills. It notably relies on morpho-functional developmental profiles.

In the opinion of Lee & Kwon, (2021) the main guiding directional capacities for selecting psychomotor tools were outlined as follows:

- The capacity for coupling, combining, and recombining movements.
- Spatial-temporal differentiation capacity.
- Reaction capacity to visual and auditory stimuli.
- Rhythmic capacity.
- Spatial-temporal orientation capacity.
- Body and segment balancing and rebalancing capacity.
- Precision capacity in body segment movements during symmetric and asymmetric executions.
- Precision capacity in framing movements in space, time, positions, directions, amplitudes, tempo, and rhythm.
- Finesse, accuracy, and sensitivity in movement execution capacity.
- Attention concentration, anticipation, and decision-making capacity.
-Ability to exhibit appropriate and rapid responses in competitive or gaming partner/opponent/teammate actions.
- Developed sense of static and dynamic balance.
- Achievement capacity under varied conditions.

This issue is essential for developing adapted psychomotricity programs, considering the variability of individual capacities and needs of children with SEN.

The research objectives include:

- Conducting of the initial assessment;
- Assessing the level of motor development and physical condition;
- Developing the psychomotor program based on the primary data;
- Conducting the final assessment

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- Comparing the initial and final data through statistical-mathematical analysis;
- Establishing whether the program contributes to the development of psychomotor skills in adolescents with SEN.

Purpose of the research

The purpose of the research is to evaluate the impact of a 36-week psychomotor education structured program on children with SEN aged 12 to 14. This involves assessing improvements in various aspects such as balance, body schema, coordination (both static and dynamic), laterality, and movement speed. The study aims to understand how this tailored program influences the psychomotor development of students with SEN, considering their individual capacities and needs. Ultimately, it seeks to enhance inclusive education strategies by providing individualized approaches for children with SEN.

2. Materials and Methods

2.1. Subjects

The investigation was carried out at two Inclusive Education School Centers. The initial center identified as 'Sfantul Stelian' in Costesti, Arges (CC) while the subsequent center was 'Sfanta Filofteia' in Stefanesti (CS). The participants comprised 28 children categorized with SEN (mean age 13.69 ± 0.8 years, height 161.7 ± 6.7 cm, weight 54.9 ± 7.3 kg and BMI 20.5 kg/m2). Among these, 12 subjects attended CC, while 16 were enrolled at CS. Parental consent, as per the principles outlined in the Declaration of Helsinki, was a prerequisite and obtained before the commencement of the study. The Ethics Committee of the Doctoral School of Physical Education and Sport Science (ID: 04/21.07.2023), University of Pitesti, Romania, granted approval for this research.

2.2. Methods

In the first stage (September 2022), the psychological records of the subjects were analyzed. The records were filled in by the psychologists of the institutional centers for each individual subject, throughout the institutionalization period.

In the second stage (October 2022), the subjects went through a series of tests meant to provide specific information. The tests focused on the manifestation of some components in the sphere of psychomotricity and motors skills. The examinations were conducted employing specialized equipment, devices, and their corresponding software modules. These facilitated the recording, processing, and consolidation of individualized data for each subject. Specifically, the evaluation of static coordination utilized the Sensamove balance miniboard. The assessment of perceptual-motor coordination capacity and explosive force levels was accomplished using the Optojump Next optical system for motion analysis. Movement speed was quantified utilizing the Witty SEM Intelligent semaphores.

Following the preliminary research phase, we processed and analyzed the gathered data, and the resulting conclusions guided the selection process of psychomotor tools and the establishment of action systems within the segments of the psychomotor program. In the third stage, participants were integrated into an experimental group, benefiting from an adaptive psychomotor education program. The program comprised six action systems, each sustained for two weeks and repeated three times upon the completion of a cycle (November 2022 to July 2023). Table 1 illustrates the dynamics and synthesized content of these action systems.

Table 1. The dynamics and synthesized content of action systems.

No.	Description of Psychomotor Program[1]	Objectives of Psychomotor Actions Reflecting the Program
1	Systems of action through psychomotor means for dynamic balance and static and dynamic coordination Implementation Period:	- Execute a sequence of 6 steps marked at first glance in three attempts; - Perform motor actions with progressively increased complexity and effort;

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	2 weeks x 3 (Weeks 1-2, 13-14, 25-26) Practice Duration: 30 minutes	- Maintain a tempo in executing an exercise from the running school by means of a ladder/circles systematically applied on the ground; - Enhance the capacity to perform motor acts with increased speed indices. - Execute the correct sequence of positioning and start from the bottom in speed running;
2	Systems of action through psychomotor means for improving dynamic balance, spatial orientation, and perceptual-motor coordination Implementation Period: 2 weeks x 3 (Weeks 3-4, 15-16, 27-28) Practice Duration: 30 minutes	- Perform motor actions with progressively increased complexity and effort specific to speed running; - Maintain a tempo in executing an exercise from the running school by means of a ladder/circles systematically applied on the ground, synchronizing running steps through marked zones on the ground; - Enhance the capacity to perform motor acts with increased speed indices.
3	Systems of action through psychomotor means for spatial orientation education, dynamic balance, and laterality Implementation Period: 2 weeks x 3 (Weeks 5-6, 17-18, 29-30) Practice Duration: 30 minutes	- Master the basic mechanism of endurance running steps as well as the capacity for adaptation to effort; - Perform motor actions with progressively increased complexity and effort; - Enhance the capacity to perform motor acts amidst the effort of age-specific endurance and individual motor abilities.
4	Systems of action through psychomotor means for educating dynamic balance and laterality Implementation Period: 2 weeks x 3 (Weeks 7-8, 19-20, 31-32) Practice Duration: 30 minutes	- Maintain balance in a vertical position with a 1.5m stick while moving on various fixed/mobile/balance surfaces; - Execute a sequence of 3 turns of 90°, 180°, and 360° on a suspended balance surface at 1.6m (protected surface provided by mattresses); - Demonstrate the ability to grasp and throw a basketball/handball/volleyball/sponge ball while maintaining balance while moving on an inverted bench positioned on sticks, with freedom of movement between two box lids; - Consistently pass the mini-basketball sideways with a partner while moving on a balance surface at a height of 1.5m.
5	Systems of action through psychomotor means for educating coordination, movement speed, rhythm, and laterality Implementation Period: 2 weeks x 3 (Weeks 9-10, 21-22, 33-34) Practice Duration: 30 minutes	- Execute a sequence of 6 steps marked with circles on the ground, simultaneously catching the ball passed from the side and pushing it from the chest to a marked area at 10m in a "dart" system; - Perform motor actions with progressively increased complexity by catching and throwing balls while moving; - Execute 8 passes while catching the mini-basketball/soccer/volleyball/handball/sponge ball, while running through systematically arranged circles in a zigzag pattern interspersed with "skipping" exercises.
6	Systems of action through psychomotor means for educating coordination, movement speed, and laterality Implementation Period: 2 weeks x 3 (Weeks 11-12, 23-24, 35-36) Practice Duration: 30 minutes	- Execute a sequence of 3 turns of 90°, 180°, and 360° on a suspended balance surface at 1.6m (protected surface provided by mattresses); - Demonstrate the ability to grasp and throw a basketball/handball/volleyball/sponge ball while maintaining balance while moving on an inverted bench positioned on sticks, with freedom of movement between two box lids.

[1] At the conclusion of each motor activity undertaken by individual students, upon completion of routes, relays, and psychomotor courses, the students will have a 10-15 second period facilitated by the specialized teaching staff to complete worksheets. During this time, they will be required to provide rapid non-verbal responses solely through written gestures or indicated reactions on the work board positioned at the finish line.

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In the forth stage (August 2023 to September 2023), the statistical-mathematical analysis aimed to compare the results of initial and final assessments. In this analysis, several statistical tests were employed:

1.investigation of normality of distributions -this examines whether the data follows a normal distribution or not. It was evaluated using the Kolmogorov-Smirnov test

2.significance of differences between distributions - nonparametric test - Wilcoxon Z test - this nonparametric test is utilized to ascertain significant differences between two data sets or two sets of measurements, particularly when the data is not normally distributed.

For each specific measurement (such as static balance, processing speed, dynamic balance, etc.), statistical tests were conducted to compare the initial (I) and final (F) test outcomes. The t-tests employed in these comparisons include independent t-tests, as well as nonparametric tests like the Wilcoxon Z test. Test results are presented with mean values, standard deviation, the number of subjects, and Z-values, with significance expressed through p-values (probability).

3. Results

The Table 1 presents the temporal dynamics of systems of actions through psychomotor means and their corresponding objectives. These actions were grounded in engaging activities designed to enhance participants' balance and motor-cognitive skills.

The Table 2 presents the initial and final results obtained from tests targeting various components of psychomotor skills, encompassing static coordination, perceptual-motor coordination (involving spatial perception, rhythm, and self-movement perception).

Table 2. Psychomotor Profile of Subjects Before and After Intervention.

No	Static balance (%)		Neural processing speed						Dynamic balance with open eyes Contact time (ms)				Dynamic balance with closed eyes - Contact time (ms)			
			Identified stimuli (no)		Neural processing time (s)		Processing speed (pulses/sec.)		Left foot		Right foot		Left foot		Right foot	
I/F[1]	I	F	I	F	I	F	I	F	I	F	I	F	I	F	I	F
1	71	75	10	10	28.74	28.12	.35	.31	.83	.84	.81	.79	.80	.76	.79	.77
2	60	60	9	11	27.32	27.63	.33	.28	.72	.70	.73	.70	.69	.54	.68	.56
3	42	50	9	10	27.51	25.56	.33	.27	.69	.66	.70	.62	.71	.70	.72	.68
4	68	72	9	9	28.24	27.32	.32	.28	.75	.70	.58	.56	.83	.81	.70	.69
5	35	34	9	9	28.69	28.12	.31	.30	.94	.88	.90	.92	.96	.98	.92	.88
6	32	39	9	11	28.34	26.63	.32	.28	.85	.82	.74	.74	.72	.70	.73	.67
7	58	58	9	9	29.65	25.56	.30	.30	2.83	2.69	1.64	1.58	1.13	1.20	1.20	1.24
8	18	19	9	10	29.84	29.56	.30	.28	.84	.87	.87	.79	.91	.88	.86	.75
9	11	12	9	9	29.33	28.13	.31	.27	1.82	1.79	1.55	1.54	2.34	2.44	2.45	2.21
10	79	79	8	9	29.42	27.13	.27	.27	.88	.78	.83	.77	.69	.75	.69	.73
11	83	83	15	14	28.41	29.41	.53	.50	.98	.92	1.04	.98	.94	.85	.85	.78
12	35	36	15	15	29.34	30.78	.51	.47	.71	.73	.69	.59	.69	.68	.67	.75
13	17	17	14	15	29.37	29.19	.48	.45	.83	.80	.91	.95	.92	.88	.92	.86
14	69	68	13	14	25.19	25.15	.52	.47	.89	.82	.92	.92	.83	.75	.89	.85
15	74	74	15	15	29.08	29.20	.52	.52	1.42	1.44	1.25	1.23	1.36	1.48	1.36	1.33
16	79	79	18	18	28.64	27.32	.63	.60	.60	.74	1.42	1.40	.83	.78	.83	.77
17	86	85	14	16	28.92	28.12	.48	.49	.86	.66	1.30	1.38	.81	.83	.86	.94
18	73	73	18	18	28.46	26.63	.63	.62	.69	.82	.70	.72	.70	.66	.70	.62
19	44	46	17	18	29.78	27.56	.57	.58	.78	.85	.74	.65	.74	.66	.74	.63
20	79	77	18	18	29.72	29.72	.61	.61	.80	.71	.84	.79	.85	.75	.87	.99
21	90	88	18	17	29.90	28.13	.60	.53	.66	.65	.64	.64	1.00	1.03	1.02	1.04
22	55	54	15	16	29.21	28.13	.51	.66	.73	.70	.76	.77	.80	.73	.96	.84
23	81	78	17	17	29.13	29.13	.58	.58	.65	.66	.73	.71	.68	.56	.77	.65
24	77	76	18	17	29.62	28.12	.61	.75	.80	.88	.89	.90	.72	.63	.80	.75
25	76	79	15	17	29.18	28.63	.51	.48	.80	.78	.72	.71	.82	.79	1.03	1.09

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26	48	50	15	15	28.45	28.45	.53	.53	.94	.84	.75	.90	.97	.88	.79	.90
27	93	89	16	17	28.19	27.56	.57	.55	1.30	.99	1.27	1.29	1.33	1.30	1.31	1.30
28	66	66	16	16	28.33	28.33	.56	.56	.81	.93	.85	.88	.80	.86	.85	.87

[1] I =Initial testing ; F = Final testing.

4. Discussion

The essential contribution within our research lies in the development and implementation of an optimal psychomotor program tailored for children with SEN, adapted to each individual's complex characteristics. In outlining strategies, the focus is on enhancing targeting balance, coordination, laterality, and movement speed. Considering the corresponding age peculiarities (12-14 years old) as outlined in Table 1, objectives correlated with specific content have been established. According to Patrascan & Stefanica (2019), there exists a close correlation and interdependence between the physical development of students with SEN and their mental capacity, assimilation, and utilization of knowledge. By practicing physical education and sports, strengthening their physical vigor and health, students create the essential conditions required for intense inclusive activities and beneficial social engagement (Pradiante, 2022). As a result, in Table 1, our aim was to enhance, through elaborated action systems, the following psychomotor abilities: dynamic balance, static and dynamic coordination, spatial orientation, perceptual-motor coordination, laterality, movement speed and rhythm.

The first step was identifying the components of the educational strategy (objectives, content, methods, resources, material base, forms of activity organization, evaluation) for its optimal development and implementation in practice. An essential role in this process was played by the feedback obtained throughout the preparation, contributing to adjusting the educational strategy to emerging conditions and situations. There were three cycles, each comprising six action systems. At the end of each cycle, an evaluation of the results obtained and the problematic aspects arising in practice was conducted. The action systems are not fixed tools but rather adaptable and modifiable tools that evolve over the period of working with children with SEN. According to Chu (2017), the essential tool in the psychomotor education and re-education process is the lesson plan. It reflects the professionalism of the teacher or therapist by setting objectives, methodical steps, means of action, their dosage, creativity, and experience in the field they operate in.

Wu et al. (2010) believe that practicing physical education and sports through specially designed programs, based on behavior and psychomotor actions, strengthens physical vigor and health.

As a result, the second step involved the development and application of psychomotor action systems presented in Table 1. The most significant contribution consisted of selecting and systematizing psychomotor means into dynamic games, relays, and practical courses/routes. Subsequently, after selection, these were integrated into educational strategies aimed at optimizing psychomotricity. These strategies contribute to improving psychomotor behavior and specific manifestations. The primary objective was to enhance essential aspects of psychomotor capacity and psychomotor behavior. These aspects were accessed by students with SEN.

The action systems presented in Table 1 were implemented based on the following practical applications:

1. organizing them according to the components of educational activities, in various forms - practical courses, dynamic games, relays, contests, designed through psychomotor means, through tasks and psychomotor actions adapted to children with SEN.

2. methods used - exercise and collective game method, competitive methods, explanations, presentations, conversations, demonstrations.

3. specific means and materials- gymnastic benches, horse apparatus, rings, gymnastic vaults, trampoline, parallel bars, hoops, cones, small, medium, and large mats, cubes, rods, medicine balls, coordination balls, Bossu balls, small gates of 1 meter, etc.

We consider that this experimental process has generated positive effects on the behavior and psychomotor manifestations of students with SEN.

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Huotari et al. (2011) delved into how tailored exercise routines impacted the physical wellbeing of children facing intellectual disabilities (ID). They discovered a correlation between the level of ID and physical fitness. Consequently, children with ID exhibited notably lower performance in fitness assessments compared to their typically developing counterparts. Additional research emphasized the advantages of engaging in exercise to enhance skill-related fitness components (SRF) among young individuals with intellectual disabilities (ID) (Duchowny et al., 2018). In general, physical activities, particularly strength training (ST), can significantly benefit the health of individuals with SEN and ID. Findings demonstrated improvements in strength, balance, and fat-free mass, accompanied by reductions in fat mass and waist circumference. Consequently, the overall quality of life for adolescents with SEN and ID experienced notable enhancements (Collins et al., 2011). Within specialized literature, attention has been directed towards literacy instruction methods tailored for young individuals with cognitive disabilities. Researchers are exploring new approaches aimed at enhancing this domain. Moreover, specialists have scrutinized the consequences of an unhealthy diet among children and adolescents. Such dietary patterns might contribute to overweight conditions, cardio-metabolic risks, and could potentially impair cognition and academic performance (Sukhodolsky et al., 2003). Studies have explored high school students' perceptions of adolescents with SEN with a focus on the imperative need to improve both students' and teachers' attitudes toward these individuals. SEN encompasses conditions like Tourette Syndrome (TS). Experts clarify that TS is a neuro-behavioral and psychiatric disorder, constituting a disability. Consequently, adolescents with TS ought to be understood rather than penalized. It's crucial for students to cultivate acceptance toward adolescents with SEN (Freeman, et al., 2000).

Table 2 presents the before-and-after measurements of the psychomotor profile of subjects following the psychomotor intervention. Some authors explored the impact of sensorimotor training on static balance in 40 young individuals with mild Down syndrome, with 20 participants undergoing a three-month sensorimotor training program involving exercises with rehabilitation balls and air pillows. The remaining 20 individuals served as the control group. The study involved conducting balance platform tests, focusing on parameters like the length of the path of the general center of gravity (COG) and the duration of the COG within a specific radius circle, both with visual control and with closed eyes (Jankowicz-Szymanska et al., 2012). Hsue et al. (2009) investigated the dynamic stability of 32 children with cerebral palsy (CP) compared to 10 typically developing (TD) children by analyzing the displacement of the center of mass (COM) and center of pressure (COP) and their spatial relationship. The study demonstrates that COM-COP divergence can characterize the dynamic balance of children with CP while walking and may assist in comparing and differentiating balance patterns.

Others studies aimed to investigate if deficits in processing speed (PS) serve as a common cognitive risk factor in both reading disability (RD) and Attention Deficit/Hyperactivity Disorder (ADHD), two disorders known to coexist. Results indicated that PS deficits were under additive in the comorbid group, and partialling PS reduced the correlation between RD and ADHD. This suggests that PS serves as a shared cognitive risk factor that may contribute to the co-occurrence of these two disorders (Shanahan et al. 2006).

In Table 3 - Investigation of normality of distributions, the normality of distributions is examined using the Kolmogorov-Smirnov test. The Kolmogorov-Smirnov statistic values are presented for different measurements, along with their associated p-values (Static Balance%, Processing Speed, and Dynamic Balance). The p-values obtained from the Kolmogorov-Smirnov tests suggest that the distributions differ from normal distributions in most cases ($p < 0.05$), except for Static Balance%, Processing Speed - Processing Time, and Dynamic Balance - Eyes Open - Left Leg, where the p-values are greater than 0.05 ($p>0.05$), indicating that the distributions of these measurements are not significantly different from a normal distribution.

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Table 3. Investigation of normality of distributions.

Measurements	I/F[1]	df	Statistic Kolmogorov Smirnov	Sig. *KolgSmirn*	Interpretation p	Finding/ status of distributions	Statistic Test
Static Balance%	I	28	.162	.059	p>0.05	A normal and a nonnormal distribution	Wilkoxon Z
	F	28	.184	.016	p<0.05		
Processing speed - number of stimuli	I	28	.212	.002	p<0.05	Two abnormal distributions	Wilkoxon Z
	F	28	.194	.008	p<0.05		
Processing speed- Processing time	I	28	.164	.053	p>0.05	A normal and a nonnormal distribution	Wilkoxon Z
	F	28	.151	.101	p<0.05		
Processing speed pulses/sec.	I	28	.206	.004	p<0.05	Two abnormal distributions	Wilkoxon Z
	F	28	.202	.005	p<0.05		
Dynamic balance - eyes open -Left leg	I	28	.325	.001	p<0.05	Two abnormal distributions	Wilkoxon Z
	F	28	.344	.001	p<0.05		
Dynamic balance - eyes open Straight leg	I	28	.248	.001	p<0.05	Two abnormal distributions	Wilkoxon Z
	F	28	.198	.006	p<0.05		
Dynamic balance - eyes closed - Left leg	I	28	.257	.001	p<0.05	Two abnormal distributions	Wilkoxon Z
	F	28	.294	.001	p<0.05		
Dynamic balance - eyes closed Straight leg	I	28	.262	.001	p<0.05	Two abnormal distributions	Wilkoxon Z
	F	28	.216	.002	p<0.05		

[1] I =Initial testing ; F = Final testing.

Table 4 - Significance of differences between distributions using the Wilcoxon Z test, examines significant differences between distributions using the Wilcoxon Z test. Comparison between initial (I) and final (F) distributions:

1.For most measurements, there are significant differences between the initial and final distributions ($p < 0.05$), such as Processing Speed - Number of Stimuli, Processing Speed - Processing Time, Processing Speed Pulses/Sec, and all Dynamic Balance measurements. This suggests that these measurements underwent significant changes between the two testing moments.

2.In the case of Static Balance and certain Dynamic Balance measurements, there are no significant differences between the initial and final distributions ($p > 0.05$), indicating stability in these measurements during the testing period.

Table 4. Significance of differences between distributions - nonparametric test - Wilkoxon Z test.

Measurements	Test[1]	Mean	Std. Deviation	N	Z	Sig. (2 tailed)	p
Static Balance	I	60.67	23.347	28	0.894	.371	p>0.05
	F	61.29	22.346	28			
Processing speed - number of stimuli	I	13.46	3.636	28	2.504	.012	p<0.05
	F	13.92	3.420	28			
Processing speed- Processing time	I	28.78	.976	28	3.286	.001	p<0.05
	F	27.97	1.305	28			
Processing speed pulses/sec.	I	.46	.123	28	2.423	.015	p<0.05
	F	.45	.144	28			
Dynamic balance - eyes open –Left leg	I	.94	.449	28	1.480	.139	p>0.05
	F	.91	.421	28			
Dynamic balance - eyes open Straigh leg	I	.92	.282	28	1.598	.110	p>0.05
	F	.90	.290	28			
Dynamic balance - eyes closed – Left leg	I	.91	.330	28	1.936	0.53	p>0.05
	F	.88	.370	28			
Dynamic balance - eyes closed Straight leg	I	.92	.348	28	1.754	0.80	p>0.05
	F	.89	.326	28			

[1] I =Initial testing ; F = Final testing.

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The verification process aimed to assess the impact of the intervention on various aspects of the subjects' psychomotor abilities. The results highlight the following findings (Tables 3 and 4):

-static balance - no significant differences were observed between the initial and final measurements, maintaining similar levels, averaging around 60-61%.

-neural processing speed - significant differences were identified here, showing a clear increase between the initial and final measurements. The number of identified stimuli increased on average from about 13 to 14, while neural processing time decreased from about 28.7 to 28 seconds.

-processing speed in pulses per second - it experienced a slight decrease from approximately 0.46 to 0.45, presenting significant differences between the initial and final measurements.

-dynamic balance with eyes open and closed - no significant differences were found between the initial and final measurements, remaining relatively constant around values of 0.9 for open-eyed balance and 0.88 for closed-eyed balance.

These data suggest that the intervention had a significant impact on neural processing speed and certain aspects thereof, while no notable changes were observed in the subjects' static or dynamic balance. It's important to note that these results provide insight into the subjects' progression following the intervention, offering crucial information regarding how it might influence the psychomotor profile. Ultimately, while the intervention showcased notable enhancements in neural processing, the findings underscore the program's limitations in influencing certain elements of psychomotor skills, particularly static and dynamic balance.

The specialized literature focused too on the literacy instruction for young people with cognitive disabilities. In this regard, Farrokhian et al. (2021) investigated the effectiveness of functional training on static balance, dynamic balance, and flexibility in female students with intellectual disability. The study utilized a pre-test-post-test method with a control group. The research involved 30 female students with intellectual disability, divided into experimental (15) and control (15) groups. The experimental group received 15 sessions of functional training, while the control group received no intervention. Static balance was measured using the Single Leg Stance test, dynamic balance was assessed with the Tandem Gait test, and flexibility was evaluated through the Sit and Reach test. ANCOVA was used for data analysis, revealing that functional training significantly impacted the static and dynamic balance as well as flexibility of female students with intellectual disability ($p<0.05$). The study suggests that educators and child education experts should consider incorporating functional training into programs for students with intellectual disabilities.

The data from the tables further underscores the pivotal role of psychomotricity as an intervention tool. The examination of psychomotor behavior shifts among adolescents with SEN highlights the significant impact of tailored psychomotricity interventions on enhancing their overall quality of life. .

5. Conclusions

The structured program tailored for the psychomotor development of institutionalized children with SEN showcased promising outcomes. Despite focusing on enhancing specific motor abilities and cognitive-motor skills among 28 students from two Romanian institutional centers, the intervention exhibited varying impacts across different aspects of psychomotor abilities. While the structured program succeeded in significantly improving neural processing speed, evidenced by increased stimulus identification and reduced processing time, it didn't yield substantial changes in dynamic balance (relatively constant around values of 0.9 for open-eyed balance and 0.88 for closed-eyed balance).

Interestingly, the assessments revealed that static balance (60-61%) remained consistent throughout the intervention, suggesting stability in this aspect among the participants. However, the slight decrease in processing speed in pulses per second (0.46 to 0.45) indicates some alterations in this parameter despite not being as pronounced as the improvements seen in neural processing speed (from about 13 to 14).

The tests "Processing speed - number of stimuli", "Processing speed - Processing time", "Processing speed pulses/sec.", "Dynamic balance - eyes open - Left leg", "Dynamic balance - eyes

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open Straight leg", "Dynamic balance - eyes closed - Left leg", and "Dynamic balance - eyes closed Straight leg" showed significant changes ($p < 0.05$) between the initial and final tests.

Other tests such as "Static Balance", "Dynamic balance - eyes open – Left leg", "Dynamic balance - eyes open Straight leg", "Dynamic balance - eyes closed – Left leg", "Dynamic balance - eyes closed Straight leg" did not show significant changes ($p > 0.05$) between the initial and final tests.

Therefore, overall, psychomotor skills, measured in certain aspects through specific tests, significantly improved following the psychomotor skills development program. This is supported by the $p < 0.05$ values in the respective tests.

This highlights the complexity and multifaceted nature of addressing psychomotor abilities in children with SEN, signaling the need for further tailored interventions to comprehensively address these diverse skill sets..

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Institutional Review Board Statement: The present investigation, which involved human volunteers, adhered to the ethical principles outlined in the Declaration of Helsinki and received approval from the University of Pitesti. Prior to registration, all participants were provided with comprehensive information regarding the study's objectives, methodologies, potential hazards, and advantages.

Informed Consent Statement: All individual subjects included in the study provided written informed permission. The University Professional Ethics and Deontology Commission within the University of Pitesti noted the following: - the authors requested the consent of the subjects involved in the research before carrying out any procedures; - the authors have evidence regarding the freely expressed consent of the subjects regarding their participation in the study; - the authors take responsibility for observing the ethical norms in scientific research, according to the legislation and regulations in force.

Data Availability Statement: The authors affirm that the data substantiating the conclusions of this study may be found in the journal itself and its Supplementary material. The primary researcher can provide the raw data supporting the study's findings upon a fair request.

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