

# PARENTS' VIEW OF PRIMARY SCHOOL CHILDREN'S PROGRESS: PRELIMINARY ASSESSMENT OF THE PROGRAM OF SENSORIMOTOR CORRECTION

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**Abstract.** *The aim of the study was a preliminary assessment of the sensorimotor correction program based on parental complaints about the difficulties experienced by primary school children and the improvements observed during the program. In most cases, parents are interested in the regular and systematic implementation of the correction program and are among the sources for assessing its results. The study involved 37 mothers with children aged 8 to 11 years ( $M = 9.8$  years;  $SD = 1.1$ ; 16% girls). Mothers were from 28 to 50 ( $M = 37.7$  years;  $SD = 6.7$ ). Before the correctional work, each mother was interviewed to identify problems. In the process of sensorimotor correction, one individual lesson was held with the child every week in the presence of a mother. Children performed exercises daily. Mothers received additional sessions every three weeks as part of informational and emotional support. For all identified categories (Self-regulation, Communication, Health and physical development, and Cognitive processes), the improvements after the correction concur with the manifestation of the problem before it. Thus, parents' assessments of improvements confirm the orientation of the correction to problem areas of children's development.*

**Keywords:** *parental assessment; primary school children; school difficulties; sensorimotor correction.*

## Introduction

Over the past ten years, the number of children and adults with symptoms of organic disorders of higher mental functions (memory, speech, attention) has increased (Chung et al., 2019). Problems associated with hyperkinetic spectrum disorder or attention deficit hyperactivity disorder (ADHD) are becoming major causes of learning disabilities and behavioral disorders (Gorjacheva & Sultanova, 2008; Gustafsson et al., 2010; Osipova, 2012; Shipicina, 2005).

Along with drug treatment, methods of non-drug correction of disorders of attention, memory, thinking, and other higher mental functions (HMF) are being developed using sensorimotor correction (Semenovich et al., 2001). Attempts are also being made to introduce sensorimotor correction into the program of basic or additional education for children at regular schools (Gerber et al., 2012; Osipova, 2012).

One of the foundations for sensorimotor correction is the concept of the patterns of development and the hierarchical structure of the cerebral organization of higher mental functions in ontogenesis, based on the development of the theory of three functional brain blocks (Lurija, 1973) and the concept of neuropsychological rehabilitation based on the principle of “substitute ontogenesis” (Cvetkova, 1995; Semenovich, 2007; Semenovich et al., 2001).

If school difficulties in learning, communication, and self-regulation are observed in children, their parents often have no idea about the possible relationship of these problems with the sensorimotor sphere (Semenovich et al., 2001). At the same time, most parents are interested in positive changes. Thus, parents need information about the options for correction. Simultaneously, they can actively participate in program implementation and provide feedback regarding experienced successes and failures (Sedova, 2014; Shevchenko, 2011).

The objective of this study was to analyze parental assessments of the difficulties experienced by primary school children and the improvements achieved after the sensorimotor correction program.

## **Method**

### **Participants**

The study involved a convenience sample of 37 mothers with children aged 8 to 11 years ( $M = 9.8$  years;  $SD = 1.1$ ; 16% girls), who sought help from a non-governmental child development center in Riga (Latvia) from 2016 to 2019. Children's age refers to pre-adolescence, which associates with intensive brain maturation and an increase in cortical gray matter (Toga et al., 2006). The mothers' age ranged from 28 to 50 years ( $M = 37.7$  years;  $SD = 6.7$ ).

### **Sensorimotor correction program**

In this study, the program of sensorimotor correction “TURUS” was used (Semenovich et al., 2001; Shevchenko, 2011). The program consists of exercises with gradually increasing complexity. They are involving various sensorimotor areas of the brain. Exercises of the first level are aimed at increasing the general energy status of the body, regulating tone, developing a body map, regulating respiration, and other functions, for which the stem and subcortical formations of the brain are responsible. Exercises of the second level develop properties and

functions of attention and control by strengthening interhemispheric connections, functional specialization of the left and right hemispheres (e.g., analytical and synthetical abilities), and their interactions. Exercises of the third level aim at the facilitation of stress resistance, planning, and self-control by improving the functional capacity of the anterior (prefrontal) parts of the brain (Sedova, 2014; Shevchenko, 2011).

Following authors and developers of the program (Gorjacheva & Sultanova, 2008; Osipova, 2012), stimulation of the brain at the sensorimotor level affects the development of all HMFs. The level of movements and locomotion provides the basis for the development of HMF, and the development of cerebral structures can be facilitated by breathing and motor exercises, involving various parts of the body. It can improve the general tone of the body, including the attentional network. Mastering stimulates attention and regulatory processes and cognitive functions (emotions, self-regulation, sensation, perception, and memory). Therefore, exercises include stimulation of both the sensory and motor systems (Table 1).

*Table 1 Lesson Content and Purposes within the Sensorimotor Correction Program*

Lesson content	Purpose
Basic exercises	A complex of bodily-motor exercises aims at developing basic motor skills (tonic and locomotor movements).
Stretching	These exercises help to optimize and stabilize the muscle tone of the body.
Relaxation	Promotes relaxation, introspection, and the recreation of polymodal sensory images. It can be used both to regulate tone, improve self-control, and integrate the experience gained during the lesson.
Reciprocal coordination	Exercises aimed at the formation of interhemispheric interaction, improving the effectiveness of self-control.
Eye movement exercises	Exercises expand the field of vision, improve perception, and contribute to the formation of voluntary attention. Joint movements of the eyes, hands, tongue develop hand-eye coordination, interhemispheric interaction.
Breathing exercises	They soothe, develop self-control, improve the rhythm of the body, autonomic functions, and concentration.
Finger gymnastics	Aimed at the development of fine motor skills, speech, memory, and attention.

The implementation of the program included one individual lesson per week for each child in the presence of a parent. The mothers received one additional individual session every three weeks as part of the cognitive behavioral therapy approach to maximize the support and effectiveness of the progress. The criteria for finishing the program were the complete mastery of the exercises by the child, which varied from 9 to 18 months, according to the child's physical state and ability to learn. This variability concurs with experience of the authors of the program (Semenovich et al., 2001; Shevchenko, 2011).

### **Procedures of data collection and analysis**

Information on observed difficulties and improvements was collected through two interviews. Before the start of correctional work, each mother was interviewed for problems and desired outcomes (i.e., determining the goal of correctional work). The main questions were:

1. "What difficulties does your child experience? Please, describe and specify each of them."
2. "What complaints about the child do you have, and what about those around you?"
3. "What do you expect from the program?"

At the end of the program, the final interview was conducted to summarize the results of the remedial work and to evaluate the observed improvements. The main questions of this interview were:

1. "What changes in child's behavior have taken place during our work? Please, describe and specify them."
2. "What can your child do that he/she was unable to do before?"

Parental responses were encoded by the first author and two school psychologists using a qualitative content analysis approach (Krippendorff, 2004). The experts were asked to evaluate elements of the content in interview notes (content items) and to name topics related to the content items. Then, they grouped the topics into categories. After the analysis of two interview notes, a discussion was conducted on the content and the best name of each category (e.g., thought operations and properties of attention were named cognitive processes). In the course of further work, two meetings were held to discuss and clarify the categories.

The final encoding of the categories was assessed for inter-rater agreement by Krippendorff's alpha coefficient (Hayes & Krippendorff, 2007). The frequency of occurrence of the categories and the consistency of the estimates were quantified using IBM SPSS for Windows 22.0. Evaluation of the agreement between observed difficulties and improvements was performed using the McNemar test for dichotomous variables. Since the sample size was less than 50 people, the binomial distribution was used to test the two-tailed significance. The

presence of correlations between age and observed problems or improvements was determined using the biserial correlation coefficient.

### Results

As a result of content analysis, four main categories of difficulties observed by parents in their children were identified: Self-regulation, Communication, Health and physical development, and Cognitive processes. Table 2 presents the examples of content items, their number, frequency of occurrence in parental responses, and the inter-rater agreement.

*Table 2 Parents' Evaluation of Difficulties in Learning before the Program of Sensorimotor Correction (N = 37)*

Category	Frequency of mentioning	Examples of content items	Units of analysis	Krippendorff's $\alpha$
Self-regulation	94.9%	"Not enough perseverance, turns, turns, distracts." "Cannot prepare for homework by himself." "It is hard to start doing homework. Laziness." "Fear, anxiety for not doing something." "Quit assignment if it gets difficult."	127	.76
Communication	53.8%	"He gets stuck, stubborn - he does not say anything, does not explain." "Does not answer his peers, he is silent. Cannot stand up for herself." "No friends." "He cannot formulate his point of view." "His interests do not coincide with the interests of his peers."	37	.87
Health and physical development	82.1%	"Poor performance. Cannot stand any stress." "Fatigue. Slowly doing homework. Frequent headaches." "Poor handwriting." "Often sick, gets tired quickly."	71	.79
Cognitive processes	92.3%	"Difficulties in generalizing, drawing conclusions. Does not perceive it as it really is." "Disjointed speech, does not incline, does not teach the genus." "Does not understand what the teacher is explaining." "Does not understand the clock, the calendar."	149	.87

Similar categories were established in the content analysis of the improvements observed after the children mastered the sensorimotor correction program (Table 3).

*Table 3 Parents' Evaluation of Improvements after the Program of Sensorimotor Correction (N = 37)*

Category	Frequency of mentioning	Examples of content items	Units of analysis	Krippendorff's $\alpha$
Self-regulation	92.3%	"She does the homework herself." "He can go to the blackboard." "There are responsibilities, and the child fulfills them." "Become more organized, tries." "...stopped shouting the answer from the place when they did not ask."	130	.78
Communication	51.3%	"Communicates with friends. He is interested in their affairs." "He stopped bothering; he considers the opinion of others." "Learned to understand the emotional state of others." "Easily adjust in class."	37	.89
Health and physical development	79.5%	"Learned to ride a bike." "Began to swim." "Physical fitness has improved." "Lessons are performed with a short break." "Clumsiness has decreased." "The handwriting has improved." "Success in physical education." "Talkative, energetic, cheerful."	63	.90
Cognitive processes	82.1%	"...teaches poems faster." "...got a better understanding of mathematics." "...started to think." "...accepts difficult instructions." "...understood what was required of him." "Speech becomes clear."	90	.89

The analysis of associations between the category of difficulties and the following improvements indicated that the observed improvements do not deviate

from the initial difficulties. There was no shift in the occurrence of each category before and after the program, which was confirmed by the significance of the McNemar’s binomial test for Self-regulation ( $p = 1.000$ ), Communication ( $p = 1.000$ ), Health and physical development ( $p = 1.000$ ), and Cognitive processes ( $p = .453$ ).

The biserial correlation coefficient confirmed an absence of a significant correlation among children’s age and observed difficulties or improvements (Table 4).

*Table 4 Biserial Correlation Coefficients for the Relationship between Age and Observed Difficulties or Improvements (N = 37)*

Modality	Self-regulation	Communication	Health and physical development	Cognitive processes
Difficulties	-.16	.28	.26	-.06
Improvements	-.15	.05	.01	-.03

*Note:* None of the correlations reached the level of statistical significance.

## Discussion

An analysis of the areas in which parents noted difficulties and problems revealed four main categories representing self-regulation, communication, health and physical development, and problems in the cognitive sphere. The difficulties identified by parents in our study coincide with the difficulties and problems described as typical indications for sensorimotor correction (Semenovich et al., 2001).

The coincidences of difficulties and improvements observed by parents within each of the defined categories confirm the orientation of parents to manifested problems and working on their solving. Since parents can notice not only improvement but also failures in the implication of the program (Sedova, 2014), reported improvements provide preliminary evidence for focusing on problem areas and the effectiveness of the program.

The absence of a relationship between age and difficulties indicates relative independence of problems on children’s age or their stability. This finding supports the view of neuropsychological rehabilitation as adding to natural processes of ontogenesis (Cvetkova, 1995; Semenovich et al., 2001) and a need for corrective work to achieve some developmental effect. It also should be emphasized that parents pointed at improvements during the program in pre-adolescents aged 8 to 11. This age associates with intensive maturation of cortical gray matter (Toga et al., 2006) and is sensitive for correctional work.

Undoubtedly, the conducted exploratory research has significant limitations. The sample size and its non-random nature indicate the difficulties of generalizing the results to a broader population. Unfortunately, fathers have not participated in the study, and their involvement is a task for further research and correctional work. Children's age is more sensitive to sensorimotor correction because of intensive processes of brain maturation in pre-adolescents. Mothers' interest in a consistent application of the program shows a relatively high motivation in the study group. The absence of a control group in our study requires its inclusion in further studies on the effectiveness of the correction program.

Using interviews as the data source constitutes another limitation of the study. Exploring parents' views of problems indicates their overlap with the main domains of adaptive behavior – social, conceptual, and practical – demonstrating cross-cultural invariance (Oakland et al., 2013). Simultaneously, specific skill areas of these domains remain underinvestigated. Therefore, the use of standardized quantitative measures of children's problems can be helpful for a more precise assessment of their dynamics.

## Conclusions

Based on the results of this exploratory study, we can conclude that the main children's problems following parents' views are self-regulation, communication, physical development, and cognitive processes. The improvements after the sensorimotor correction program indicate specific effects observed by parents in these areas. The relative independence of problems and improvements from age indicates a need for correctional work and the possible ineffectiveness of expecting changes just during natural growth.

## Acknowledgment

The authors would like to thank Tatyana Dogadaeva and Karina Borodulina for their participation in the content analysis of the parents' answers.

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