

Department of Health and Social Work

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A B S T R A C T

of a PhD Thesis

"Indirect Interventions in Therapy of Children with Autism Spectrum Disorders"

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The dissertation contains 204 pages (175 pages main body and 29 Pages appendices), includes 6 tables, 21 figures, 17 diagrams and has the following structure: table of contents, introduction, three chapters, conclusions, contributions, conclusion, recommendations, discussion and bibliography. The bibliographical list of the work brings together 247 literature and documentary sources, of which 217 in foreign language and 30 in Bulgarian.

The following scientific publications are directly related to the development of the thesis:

1. Stankova, M., Ivanova, V., & Kamenski, T. *Use of educational computer games in the initial assessment and therapy of children with special educational needs in Bulgaria. TEM J. 7, 488-494 (2018).*
2. Kamenski, Tsveta. "Application of online fidelity assessment of caregivers' skills in the implementation of home-administered parent-mediated program for children with ASD. *"KES International Conference on Smart Education and E-Learning. Singapore: Springer Nature Singapore, 2022.*
3. Stankova, Margarita, et al. "Emotional understanding skills training using educational computer game in children with autism spectrum disorder (ASD)-case study." *2021 44th International Convention on Information, Communication and Electronic Technology (MIPRO). IEEE, 2021.*
4. Stankova, M., Kamenski, T., Mihova, P., Datchev, T. "Online application of a home-administered parent-mediated program for children with ASD. *"Handbook of Artificial Intelligence in Healthcare: Vol 2: Practicalities and Prospects (2022): 149-167.*

The public defence will take place on 04. 04. 2025 at 13.00 in NBU, Hall 301, Building 3.

For the defense of the PhD dissertation of Tsveta Assenova Kamensky, full time doctoral student, awarded with the right to defend her thesis in the doctoral program "Logopedics", NBU, professional field 7.4 Public Health, **scientific specialty *Logopedics for the acquisition of educational and scientific degree "Doctor of Philosophy"***, by the order of the Rector of NBU from 29.11.2024 was appointed a scientific jury composed of:

1. Assoc. Prof. Dr. Ekaterina Vutkova Todorova, NBU, professional field 7.4. Public Health;
2. Assoc. Prof. Dr. Polina Mihova Mihova - Pavlova, NBU, 7.4. Public Health;
3. Prof. Dr. Ivanka Vassileva Assenova, International Business School - Botevgrad, professional field 3.2. Psychology;
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5. Assoc. Prof. Dr. Miglena Ivanova Simonska-Tsatsova, Southwestern University "Neofit Rilski", professional field 7.4. Public Health;

ABBREVIATIONS

MES - Ministry of Education and Science

IIN - Indirect Intervention Program for the Development of Language and Communication Skills in Children with Autism Spectrum Disorders

PET - Positron Emission Tomography

PPA - Applied Behavioural Analysis

PPT - Applied Behaviour Therapy

ASD - Autism Spectrum Disorders

ABA - Applied Behavior Analysis

ASD - Autism Spectrum Disorder

APA - American Psychiatric Society

ICD (International Classification of Diseases)

ICF (ICFUS) - International Classification of Human Functioning, Disability and Health

MECP2 - Mutations in methyl CpG binding protein 2 (MeCP2) - the underlying cause of Rett syndrome (RTT)

SEAN (South East Autism Network)

ToM - Theory of

WHO (World Health Organisation)

FOCC - Clinical Tool FOCCUS - Capacity Components

FOCUS - Clinical tool FOCUS - Components of expression/performance

Introduction

The challenges faced by individuals with autism spectrum disorders and their families begin in early childhood and accompany them throughout their lives (Anderson et al., 2018). Children with autism spectrum disorders (ASD) have multiple deficits in social communication and interaction, language and imitation abilities, limited interests, and more (Ingersoll, 2011). These are often associated with long-term prognoses that, for the most part, are unfavorable (Howlin et al. 2004 in Ingersoll, 2013). This shows us the significant need for interventions that aim to improve these skills as early as possible in a child's development (Ingersoll, 2011).

The last decade has seen a concerted effort to map the needs of families of children with developmental difficulties and disabilities in middle- and low-income countries in Europe. This is evidenced by the establishment of the Southeast European Autism Network-SEAN in 2010 as part of the Autism Public Health Awareness Initiative, which provides community-based information on autism and other neurodevelopmental disorders (Wallace et al, 2012). A growing number of scientific meetings, conferences, clinical and parent surveys, parent-founded organizations, and non-governmental organizations lead to the conclusion that there is a growing awareness and need for services for children with disabilities in the region (Barokova et al., 2022).

One approach to teaching young children with ASD social and communication skills is that of interventions in which the parent is the primary trainer/co-therapist. For the most part, these interventions are based on developmental behavioral theories and train parents in naturalistic learning intervention techniques in natural environments to improve their children's communication skills during play and other daily activities. Parents can use these techniques throughout the day, increasing the intensity of the intervention and extending and generalizing the skills learned (Brookman-Fraze et al., 2009). A number of such interventions have been developed (Ingersoll and Dvortcsak, 2010) and there is growing evidence that they lead to significant improvements in social communication and engagement skills over the course of child development (Casenhiser and Shanker 2013; Kasari et al., 2010). Such programs improve children's language and speech development (Coolican et al. 2010; Vismara et al., 2009), imitation, and play skills (Gillett and LeBlanc,

2007). Of course, there are also examples of research on interventions supporting social communication skills conducted by parents that show modest or no effectiveness (Carter et al., 2014).

Through the creation of an Indirect Intervention Program for the development of language and communication skills in children with autism spectrum disorders and the subsequent study conducted with 21 families, we tried to track the effect of parental involvement in the therapeutic process of children and the processes involved. The author's program was created with an emphasis on the mastery and development of language communication, and the different stages in this process are presented in this paper. In addition, it was necessary to adapt an instrument for the assessment of communicative abilities, the results of which served for the comparative analysis of the data of the study.

The present work consists of two parts: theoretical and research. The first chapter provides a comprehensive literature review of the problem, including definitions and historical information and prevalence; aetiology, describing neurobiological, biochemical, genetic, cognitive and psychological theories of the onset of ASD, as well as theories on the impact of vaccines and the influence of a range of external factors. Autism is discussed in detail as a nosology within the ICD, ICD-10, ICD-11, and classifications.

The characteristics of individuals with ASD are comprehensively described in section 1.5, with a focus on features of social functioning, behaviour, language development, speech and communication. A separate section is devoted to the general characteristics of the language of children on the autism spectrum in terms of phonology, morphology, syntax, and pragmatics and discourse. Particular attention is paid to the features of prosody and echolalic behaviour in children with ASD.

Section 1.6 is devoted to the specifics and stages of the diagnostic process in RA, and describes the most widely used diagnostic and screening tools worldwide (ADI-R, ADOS-2, CARS, CAST), as well as modern medical procedures and tests.

Therapeutic interventions, practices and programmes for working with children with RA, based on evidence and global experience, are discussed in Section 1.7 of this paper. Therapeutic interventions are also described and divided into two broad categories: highly structured Comprehensive Treatment Models (CTMs/CTMs) and Focused Intervention

Practices FIPs/FIPs), as well as psychopharmacological treatments for symptoms on the spectrum.

As this paper deals with the involvement of parents in the work with children with RAS, we also reviewed the challenges faced by parents of children with RAS worldwide and in Bulgaria, and outlined the main aspects of working with them. The role of parents in working with children with autism is discussed in detail and with care, as well as ways in which they can be supported in engaging with their child through the acquisition of knowledge and skills.

Training programs for parents of children with developmental difficulties and delays, conducted in Bulgaria, are studied and described. Last but not least, the theoretical constructs on which the next part of this paper is based are described, namely the development of the author's programme and the research.

In the second chapter the aims, objectives, contingent of the research, its stages are described and relevant hypotheses are derived. The reader is provided with a detailed methodology, concept and design of the author's program, as well as the manner in which it was conducted. Information is provided on the translation, factor analysis and validation of the FOCUS instrument for Bulgaria.

The third chapter of this thesis systematizes the results obtained from the research, conclusions, contributions, conclusion and discussion.

RESEARCH METHODOLOGY

Objective of the research

The aim of the present work is to investigate the impact of purposeful, structured and active involvement of parents of children on the autism spectrum in a home-based educational intervention on their language and speech development, communicative abilities behaviour.

Tasks of the research

Our main goal implies solving the following tasks:

1. To seek and validate for use in Bulgaria a toolkit to measure the dynamics of speech-language competence and communicative competence as a result of the therapeutic intervention;
2. To develop a program for indirect intervention with the active participation of parents, tailored to the specific characteristics of children with ASD;
3. In order to implement the programme, identify suitable families willing to implement it
4. In order to clarify diagnostically to look for tools to examine the communicative and emotional-behavioural symptomatology of the children in the group;
5. Develop a design to track the implementation over time of program elements and parent adherence to instructions for proper implementation;
6. Collect and process parent feedback material and analyse the data
7. To make a mathematical-statistical analysis of the obtained results;
8. Make relevant recommendations for theory and practice in the context of the current issues.

Stages of scientific research

The research and its preparation went through the following stages:

1. Study of the theoretical framework and formulations of the problem;
2. Determination of the intervention contingent and the research accordingly;
3. Development of the intervention programme;
4. Developing a methodology for the study;
5. Identification and selection of appropriate instruments for the purpose of the study;
6. Translation and validation for Bulgaria of the clinical tool FOCUS;
7. Identification and recruitment of intervention participants;
8. Conduct the intervention
9. Inform and provide guidance on the principles and modalities of the intervention;
10. Monitor the implementation of the programme and provide guidance during the intervention;
11. Collect feedback from parents on the impact of the program
12. Conduct an empirical study on the effectiveness of the programme - before and

- after the intervention;
13. Processing and analysis of results;
 14. Presentation of conclusions and recommendations from the obtained results.

Hypotheses

- 2.4.1 Children with ASD will show improvement in some elements of language, speech and communication through the implementation of an indirect intervention involving parents in a structured programme.
- 2.4.2 Children with ASD will show a significant reduction/reduction in some of their emotional and behavioral problems through the implementation of an indirect intervention involving parents in a structured program.
- 2.4.3 Children with ASD will show significant improvement in their communication abilities, accompanied by a reduction in some emotional-behavioural problems through the implementation of an indirect intervention involving parents in a structured programme.
- 2.4.4 Parents will show high satisfaction with their participation in the implementation of the indirect intervention program to improve the communication abilities of children with ASD.

Subject of the intervention and the study

The intervention and study subjects were children aged 24 to 60 months diagnosed with autism spectrum disorders and their families.

Subject of the study

The subject of the intervention and the study is the communicative abilities and behaviors of children with RAS aged 24-60 months and their interrelationship with emotional-behavioral aspects of their functioning with the active support of parents.

Contingent of the intervention and research study

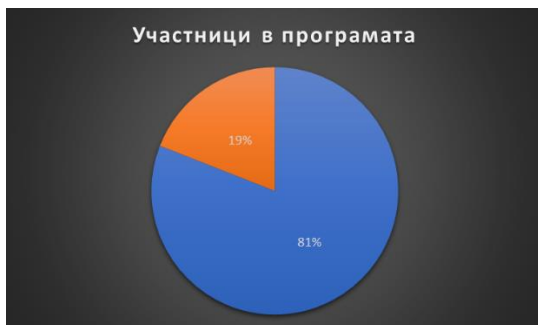
Twenty-one children aged 24 to 60 months participated in the intervention, 4 were girls and 17 were boys. In order to parallel the results shown, we also studied a group of

neurotypical children of the same age and gender division, 4 girls and 17 boys, at the time of program implementation

The criteria for participation in the program was a diagnosis of autism spectrum disorder and the corresponding age, as well as the parents' willingness to participate in the therapeutic process. All children were previously diagnosed in a medical institution, and their ICD -10 diagnosis was F84.0 Infantile autism.

At the time of the intervention, the children were not receiving any other type of therapy. The start of the intervention coincided with the start of the pandemic declaration due to the emergence of COVID-19. They did not attend nursery/preschool and their mother tongue was all Bulgarian.

FIGURE 1. Programme participants by gender



19% - girls

81% - boys

Intervention and study design and methodology

Preparatory activities

Prior to the intervention, a statement of informed consent was signed for each child by a parent or guardian (Appendix 1), as well as a statement of consent for videotaping for the purposes of the intervention (Appendix 2). Parents were provided with information about the purpose of the intervention, how it was conducted, and the test batteries that were included in the study (Appendix 5). An information day was held where parents were informed and educated on the principles to follow when implementing the programme. In

five (5) short videos, detailed instructions were given on how the intervention should be conducted at home and principles to be adhered to by the parent conducting the intervention that corresponded to the five types of tasks in the program (Appendix 3). The visual and didactic materials were the same for all children, and a set of implementation materials was also prepared on paper for each family participating in the program (Appendix 4).

Ethical approval

The conceptual framework of the "Program for Indirect Intervention for the Development of Language and Communication Skills in Children with Autism Spectrum Disorders" as well as the methodology of the research were approved by the Departmental Council of the Department of Health and Social Work of New Bulgarian University.

"Indirect Intervention Program for the Development of Language and Communication Skills in Children with Autism Spectrum Disorders" - methodology and description

The Indirect Intervention Program for the Development of Language and Communication Skills in Children on the Autism Spectrum was organized into modules, each lasting one week, and conducted by the parent of the child with ASD at home over a period of 12 weeks, which, according to a number of researchers in the field, is the optimal duration for such interventions (Kim, J. M., & Utley, C. A., 2009)

Based on **Lev Vygotsky's Proximal Development Theory** and A. Bandura, the combined therapeutic intervention uses techniques from some of the main methods of therapy for autism, such as Applied Behavior Analysis; it rests on the principles of classical speech therapy (systematicity, gradualness of impact, complexity, individual approach), as well as active involvement of parents in the therapeutic process. The communicative framework thus set aims to increase the quality of communication, to prolong the time spent in shared activities and attention, to increase verbal initiations by the child, to increase the use of proto-communicative means such as gestures, pointing, etc., to give the parent the opportunity to create communicative situations, as well as to respond to and extend the communication of his/her child and model his/her communicative behaviour.

Organisation of the intervention

Content: for the 12 weeks of the intervention, each weekly module of the programme includes the following components :

- a short text from a fairy tale, accompanied by an appropriate commentary
- narrative illustration related to its content;
- seven images with target words for each module (nouns, verbs and adjectives) related to the text

Selection of linguistic, textual, visual stimulæ

The text of the fairy tales, as well as the story illustration, are selected from the book "52 favourite animal fairy tales" by the publishing house "PAN" with their kind permission. The texts have been adapted to the children's level of language development in order to avoid the possibility of difficulty leading to reluctance to follow the programme.

The target words were carefully selected from the LDS (Language Development Survey), part of the adapted Bulgarian version of one of the instruments used in the research, namely the CBCL (Child Behavior Checklist). The LDS contains 310 words, 185 of which are considered to be the first words acquired by the child in the early development of his/her vocabulary.

Target visual stimuli were selected from freely available resources on the Internet and included drawn images and photographs, selecting clear images and avoiding overly bright colors and sharp shapes.

Organisation and implementation guidelines

Each module contains different text and visual stimuli, but the associated exercises are the same. They are performed daily according to a predefined schedule, and the exercises are related to the **acquisition of impressionistic/expressive language; dialogic speech; k-questions; nominative function; pragmatics and generalization.**

The program is based on 12 popular fairy tales mostly about animals of similar difficulty level and duration. It takes between 7 and 9 minutes to read and comment on each story. Each week the parent reads one story, following a pre-submitted schedule and

completing the tasks submitted for that day using the storyboard and visuals provided. The visuals are pictures or drawings that represent the target words, different for each story, respectively each week. On a weekly basis, there are seven target words associated with the individual tales and related to task performance, namely 3 nouns, 2 verbs and 2 adjectives.

There are five **tasks** to the stories and they support the acquisition of different skills related to children's language and communication development. They are implemented by combining and using the visual stimuli (7 images related to the story objects and the story picture) in different ways for the different tasks together with the story illustration for the week. Exercise 3 suggests different questions for each module and these are submitted by the author in a separate file.

The five tasks in the programme (with a total duration of 10-15 minutes) are completed by parents each day according to a pre-set schedule. The instructions for the tasks are clearly formulated and accompanied by a video tutorial on how to complete them. Participants are informed about the importance of consistency in implementing the program as well as following the instructions given by the team when working with the child

Instruction includes: appropriate encouragers for success/attempt, appropriate ways to assist the child when the task is difficult so that her level of independent performance is achieved; appropriate behavior on the part of the parent when the child makes a mistake on the task; appropriate parent positioning and space organization. It is stressed that tasks should be performed calmly, encouraging the child at each attempt. Another important instruction for parents is the task should not be rushed, the instructions given by the parent should be clear, the rhythm and speed of the parent's speech and articulation should be appropriate to the child's level of understanding.

The tasks and materials are the same for all children, as is the timetable. The objectives of the tasks cover different language competences and skills, speech production, dialogic speech skills, use of k-questions, nominative function, pragmatic skills and generalisation of the knowledge acquired.

Guidance and support: there are 6 videos uploaded to the platform, each between 5 and 7 minutes long - an introductory video with information about the programme and its principles and general instructions for parents. The other five demonstration videos, one

for each exercise in the modules, show the tasks clearly with verbal instructions and visuals.

Sample text for a story of the week with commentary and questions for exercise 3

Week 2

Fairytales: the FIVE, the CAT and the MUSHLE

Nouns: mouse, eye, blouse

Adjectives: red, small

Verbs: see, grasp

TEXT - FAIRY TALE

One day the little mouse went for a walk in the yard. It was so interesting there! Until now he had only stayed at home with his mommy, but in the yard it was so colorful! He walked around all day and looked - there were lots of different animals big and small in the yard! She looked at them and went home to tell her mom everything.

Parent comment:

Is the mouse small or big? Which other lives are small? And do you know bigger animals?

What are they, name them?

Where did the mouse go? In the yard...do we have a yard? Did it see other animals there?

Who are they? A rooster, a kitten...

Do grandparents have any animals like that? Which ones do you like/are your favourite?

Text - continued:

- Mom, I saw a scary beast in the yard with a red hat on his head and a loud voice. It had small and scary eyes and could fly. Scary beast!

The mother realized that the mouse had seen the rooster, calmed down and asked him to tell her more.

Parent comment:

Who did the mouse see? In the picture, what is the rooster wearing? With a red blouse..What other red is he wearing? What shirts are the rooster, kitten and mouse wearing?

What are the eyes of the rooster? Show me in the picture the eyes of the mouse, the rooster and the kitten? Mmmm the kitten has one eye closed, is it blinking? Will you show me how to wink?

Show me your eyes one by one....and mine?

Text - continued:

- And I saw a very nice and sweet animal," said the mouse.

- He had a coat as soft as velvet and very smooth, as well as a tail, ears and whiskers that resembled ours. I wanted very much to meet him, but that terrible beast came near and frightened me! I could hardly get away from him!

Parent comment:

Show me who else the mouse has seen? Who has it liked? The kitten ...Hey, what does the kitten do? Meowwww...meowwww...mrrrrr...mrrrrrrr ... And when it's angry and pissed off? xxxxxxxxxxxx.....Do we have a kitten at home? And another pet? Is it small or big? What's his name? And what would you like to have?

Text-continued:

- My little mouse, it's good that you escaped!" said Mama Mouse.

The beautiful animal is the cat - our worst enemy! It hides sharp claws and teeth under its soft fur. And the animal that scared you is just a rooster!

Parent comment:

What does the kitten eat? Does the kitten chase mice? Does it catch them? Who is dangerous to the mousetail- the kitten or the rooster?

Questions for Exercise 3

1. Where is the mouse in the picture?
2. Who is wearing a red blouse in the picture?

3. Who did the mouse see in the yard?
4. Who is small in the picture?
5. Where are the kitten's eyes? And the mouse?
6. What does the kitten do?
7. From whom should the mouse be kept?

Assignments *to the* Indirect Intervention Program for the Development of Language and Communication Skills in Children on the Autism Spectrum

Task 1: Reading a story/Expressive language/Discourse

Preparation and materials: Story illustration /story and accompanying text

Frequency: Mentioned in the schedule

METHOD: A short text, a story, of up to 1 page is provided, and is divided into paragraphs, to each of which examples are given for questions and stimulating discursive/dialogic speech. The parent reads the story sitting next to the child, with the illustration visible to both/and. At the end of each indicated paragraph, the parent asks questions and tries to initiate dialogic speech, assisting the child in the process in various ways - he/she may take the child by the hand and point with it, point from a distance, etc.

If the child is struggling, the parent helps by giving the answers to the questions after a short wait, or pointing out the answer.

If the child makes a mistake, he says: "Let's try again", helps and try again. On each successful attempt the child is praised, and on every few successful attempts - rewarded with a favourite toy or activity

The words we practice are the same as those for the week.

The exercise is done once at the beginning and once at the end of the week.

The frequency of the exercise shall be entered in a protocol submitted in advance.

Task 2: Development of an impressionistic language

Preparation and materials: visualisation cards for the week

Frequency: Mentioned in the schedule

Method: Provided are 7 visualization cards, the words for which were practiced the previous day with the story. Each week there is a different set of words to practice.

The parent places three cards in front of the child, names them, and then instructs the child to point to a named card, e.g., "Show me your shoes."

If the child is struggling, the parent can help by pointing to the card or guiding the child's hand. If the child points to the wrong card, he or she says, "Let's try again," shuffles the cards, and they try again.

With each successful attempt, the child is praised or rewarded with a favorite toy or preferred activity.

The exercise is done as indicated in the attached schedule and each word is practiced 5 times. In week two the cards from the previous weeks can also be practiced.

The frequency of the exercise shall be entered in a previously submitted protocol.

Task 3: Development of impressionistic language, k-questions by story picture, nominative function

Preparation and materials: story image from the week's story

Frequency: Mentioned in the schedule

METHOD: The parent places the image in front of the child and asks questions that the child can answer by pointing or verbally, for example, "Where is the sun? Who is walking?"; "Who is shining?" etc. For each weekly module, questions are provided for each story illustration.

If the child is struggling, the parent can help by pointing to the card or guiding the child's hand. The exercise is done as indicated in the attached timetable and the 7 questions previously submitted are asked to the picture.

The frequency of the exercise shall be entered in a protocol submitted in advance.

Task 4: Development of expressive language

Preparation and materials: visualisation cards for the week

Frequency: Mentioned in the schedule

METHOD: The parent places two cards in front of the child and instructs the child to name

Monday	Task 1, 2 and 5
Tuesday	Task 2, 3 and 5
Wednesday	Task 2, 4 and 5
Thursday	Task 1, 3 and 5
Friday	Task 1, 4 and 5

a card from it, "What is this? What does...?". If the child struggles, the parent names the card and says, "Let's try again." If there is difficulty, he tries up to

three times, then the card is changed, the parent shuffles the cards, and the next word is practiced. The exercise is done as indicated in the attached schedule and each word is practiced up to 3 times.

Each week there is a different set of words to practice.

The frequency of the exercise shall be entered in a protocol submitted in advance.

Task 5: Development of expressive language/pragmatics

Preparation and materials: visualisation cards for the week

Frequency: Mentioned in the schedule

Method: the aim of this exercise is to use all the words of the week - nouns, verbs, adjectives, in the child's natural environment in the form of questions, comments, etc.

Each submitted word for the week should be used in at least 4 sentences of a different type, e.g. "Look, the bird is flying!"; "Let's go see the bunnies!"; "Are you watching the movie?".

In this way, we practice the verb "look" in the child's natural environment and in different life situations.

The frequency of the exercise shall be entered in a protocol submitted in advance.

Table 1. Weekly schedule of tasks for the Indirect Intervention Programme for the development of language and communication skills in children on the autism spectrum

Supervision and feedback

One of the important elements in the program is not only the participation of the parent, but also the mastery of the principles of program implementation, for which a Supervision and Adherence Protocol was specifically developed based on several criteria. When participating in the IIN, parents submitted videos of 9 to 15 minutes in length at the beginning, middle (weeks 5-7), and end of the program to show interaction implementing the IIN. It was evaluated by a supervisor according to predefined criteria, and the results were plotted on online Google forms and analyzed. Each skill corresponding to a criterion was rated on a scale of 0 to 4, reflecting the degree of mastery of the skill. The severity of each criterion was rated as follows:

- 0-** The skill/strategy is not applied or is applied incorrectly;
- 1- Beginnings of strategy/skill use but needs adjustments/guidance;
- 2- The strategy/skill is partially mastered and applied;
- 3- Correct execution of the strategy/skill nearly 80% of the time;
- 4- The strategy/skills are applied correctly 80-100% of the time.

Subsequently, a supervision meeting was held with each parent where feedback and guidance for improvement was given. The following is a list of the criteria that were assessed and communicated to parents in advance:

1. Task position - the parent's position should be face-to-face with the child to encourage engagement;
2. Adequate level of task assistance - encouraging new routines through the minimum level of assistance the child needs
3. Environmental organization - providing an environment without distractions and too many objects;
4. Providing "communicative space" on the part of the parent -waiting and pausing to allow the child to initiate communication;

5. Noticing the child's communication and responding to it, trying to extend it (by imitation, addition, etc.);
6. Providing communicative models tailored to the child's communicative goals (sign, language);
7. Create opportunities for on-demand communication;
8. Create opportunities for communication for sharing;
9. Maintain and encourage the child's engagement and self-regulation during the interaction;
10. When implementing the program, use adequate level of language, speed of speech; clear articulation during the intervention.

Based on the results, parents were consulted and given guidance on how to implement the programme more effectively.

Research Methodology

The following **questionnaires and tools** were used to **evaluate and measure** the effectiveness of the intervention:

Childhood Asperger Syndrome Test (CAST) - a screening questionnaire for parents developed by the Autism Research Centre-University of Cambridge for children aged 5 to 11 years. It consists of 37 items and is administered by parents and carers to identify social deficits and communication difficulties in the child. If a child has a test score greater than 15, he or she is identified as a potential RAS case.

The test was conducted at the beginning of the research to confirm and validate the medical diagnosis of the children participating in the study.

CBCL

The Child Behaviour Checklist for Ages 1.5-5, authored by Achenbach & Rescorla, 2000 (Behaviour Questionnaire for Children Ages 1.5-5), is an instrument designed for preschool children. The questionnaire contains 99 statements and the possibility to describe problems and disorders that bother parents or caregivers regarding the child, as well as the best things about it. The parent form is to be completed by the parent/guardian respectively.

The questionnaire consists of 3 parts: internalized problems, externalized problems and general problems.

The questionnaire data are grouped into the following scales: Emotional Reactivity; Anxiety/Depression; Somatic Complaints; Withdrawal; Attention Problems; Aggressive Behaviour; Sleep Problems.

A special part of the parent form is the Language Development Survey (LDS), which uses parent responses to assess children's expressive vocabulary and word combinations, and also to identify risk factors for language development delays. The Language Development Survey (LDS) indicates whether a child's vocabulary and word combinations are lagging compared to age norms. It is administered at the beginning and end of the survey to identify changes in children's behavior and status.

FOCUS

The Focus instrument was developed by a team of leading Canadian researchers Thomas-Stonell, N., Oddson, B., Robertson, B., Walker, J., and Rosenbaum, P. in 2012 from Holland Bloorview Kids Rehabilitation Hospital, Ontario, Canada, to chronologically track the communication abilities and dynamics of children from 2 to 6 years of age and validated through testing of more than 2000 children across Canada. FOCUS[®] gives us insight into how a child communicates in different environments - at home, in kindergarten, playing with friends. It is administered at intervals to **report progress or identify areas and skills that need to be worked on.**

The constructs used in Focus are based on the ICF framework and measure changes in communication and communicative behavior. The FOCUS consists of two parts:

Part 1 of the tool describes the child's communicative behaviour at a particular moment in time with subscales **Speech, Expressive Language, Pragmatics and Comprehension/Attention.**

Part 2 of the tool assesses the transition from capacity to performance by measuring the level of support needed to use a task.

Part Two contains the following subscales: **Comprehension, Expressive Language, Social Play, Independence, and Strategies for Coping with Challenges/Emotions.**

The instrument was translated and validated for use in Bulgaria by Tsveta Kamensky, PhD student; statistical processing of the data was done by L. Djalev, lecturer at NBU. It

was administered at the beginning and end of the study to detect changes in communicative abilities and behaviour.

Qualitative questionnaire

At the end of their participation, parents completed a survey about the effectiveness and usefulness, positive and negative qualities of the Program. The survey was administered after completion of the program and the responses are systematized in this paper.

Validation of FOCUS clinical tool for Bulgaria

The main assessment tool used in this thesis is the Focus on the Outcomes of Communication Under Six (FOCUS), the development of which is presented in Thomas-Stonell et al. (2010).

The Focus on the Outcomes of Communication Under Six (FOCUS) is a valid and reliable instrument based on the World Health Organization's (WHO) International Classification of Functioning, Disability and Health - Children and Youth (ICF-CY) and aims to examine the effect of therapy on the child's actual communication and participation in daily activities (Thomas-Stonell et al., 2012). The questionnaire is based on the framework for describing human health and health-related conditions set by the World Health Organization in the International Classification of Functioning, Disability and Health (ICF) (World Health Organization, 2001). This document is published in English by the Ministry of Labour and Social Policy under the title International Classification of Functioning, Disability and Health (ICF) (World Health Organization, 2018). A few years later, WHO introduced a version of this classification intended for children and youth (ICF-CY) (World Health Organization, 2001). These WHO documents have enabled professionals to set therapeutic tasks aimed at participation in life situations, which in turn raises the question of evaluating the impact of the intervention carried out by measuring the changes that have occurred in children's communication skills .

Aimed at assessing improvement in general real-life performance, the tool not only allows for tracking improvement as a result of language and speech therapy in children

with developmental disabilities, but also assesses change in general functioning, not just learning of specific components.

The FOCUS questionnaire[©] gives us an insight into how a child communicates in different environments - at home, in kindergarten, playing with friends. It is administered at set intervals to **report progress or identify areas and skills that need to be worked on.**

The FOCUS has two versions - for parents and for professionals, which contain 50 questions. The questionnaire is easy to complete and only takes 10 minutes (Thomas-Stonell, et al., 2010).

Translation of the FOCUS Aims, form for parents

The translation of the questionnaire was done in accordance with the recommendations of the International Test Commission (ITC) to implement fair practices in test adaptation (Hambleton, 1994). In accordance with these recommendations, a forward and backward translation of the items was made. The reverse translation from Bulgarian to English was done by an English language specialist with a Master's degree, a long-time lecturer in English at New Bulgarian University. The English translation was provided to the authors of FOCUS for review and approval for use of the Bulgarian version of the questionnaire.

Analysis of the latent structure of FOCUS, a form for parents

The study of the latent (factor) structure of the questionnaire proceeded in 5 phases. In the first phase, the assumption of unidimensionality of the questionnaire was tested by confirmatory factor analysis. In the second phase, exploratory factor analysis was applied to establish the factor model of the questionnaire based on the actual data from the empirical study. In the next phase, three possible factor models with a fixed number of factors were analyzed to establish the orthogonality of the factors and the factor membership of the items. In Phase 4, through confirmatory factor analysis, the factor models were compared and the most adequate one was selected from the empirical data. In the last phase, an exploratory factor analysis was conducted on the selected model, and the

factor weights of the aitems were determined and the reliability of the corresponding scales was examined.

Phase 1. Verification of the assumption of unidimensionality of the latent structure questionnaire

To test the validity of the assumption of unidimensionality of the factor structure of the questionnaire, confirmatory factor analysis was performed on a preliminary sample of 93 i. l. The ages of the children in this sample ranged from 2.17 to 7.08 years, with a mean age of $M=4.73$ ($SD=1.07$).

For use in a Bulgarian population, the latent structure of FOCUS cannot be regarded as one-dimensional and another, more adequate solution to this issue must be sought.

Phase 2. Defining the factor model of the questionnaire

To determine the factor structure of the questionnaire, exploratory factor analysis using the Principal Axis Method (Pryncial Axis Method) was applied to the data from a sample size of $N=272$ i.l., different from that in the first phase of the study. The ages of the children in this sample ranged from 2.17 to 6.25 years, with a mean age of $M=4.91$ ($SD=1.10$). The children were selected by age from two kindergartens in Sofia, namely 127 kindergarten "Sun" and 161 kindergarten "Laska"

The initial iteration was performed under the assumption of a maximum number of factors equal to the number of variables (aitems) in the questionnaire (50) and a minimum eigenvalue of 0.00. The number of factors extracted in this configuration was 42, with a strong first factor with an eigenvalue of 17.79 accounting for 35.59% of the total variance, followed by 7 weak factors with eigenvalues between 2.79 for the second factor (5.57%) and 1.02 for the eighth factor (2.04%). The remaining factors have eigenvalues below 1.00 and explain less than 1.72% of the total variance, respectively. The cumulative explanatory power of all extracted factors was 78.54% of the total variance. A methodology combining Cattell's (1966) graphical test and Horn's (1965) parallel analysis was applied to determine the optimal number of factors.

Phase 3. Analysis of 4-, 3- and 2-factor models

In the third phase, a series of hierarchical factor analyses were conducted on three possible factor models with a fixed number of factors (4, 3, and 2 factors, respectively) to

establish their orthogonality and the factor membership of the aitemis in each model. Analyses were conducted on the data from the sample used in the previous phase (N=272).

Phase 4. Comparison of factor models

In the previous phase of the analysis, the factor membership of the aitemis of three possible models was established: with 4, 3 and 2 factors. The results of the analyses demonstrated two features of the factor structures examined that were similar across all models: (1) the presence of a strong, dominant first factor and significantly weaker subsequent factors and (2) high correlations between factors.

To this end, a confirmatory factor analysis was conducted on the sample data used in the first phase (N=93). Tests of model adequacy were performed assuming the presence of correlation between factors and the absence of correlation between residual variables (residuals). Three indices (criteria) were applied, two of which are from the group of comparative indices that allow the adequacy of different models to be compared to empirical data: the Akaike Information criterion (AIC), the Schwarz's Bayesian Criterion (SBC) and the Browne-Cudeck Cross-validation index (BCCVI) (Hu & Bentler, 1999; Hooper et al., 2008). The results of the analyses are presented in Figure 2.

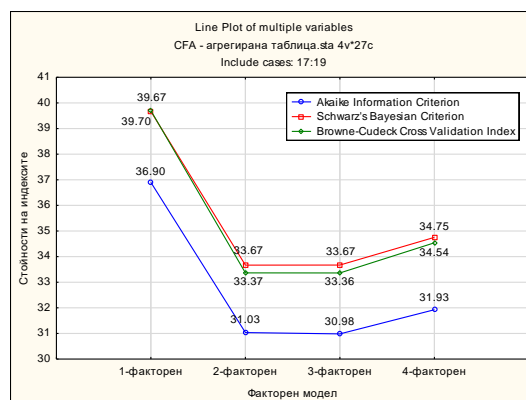


Figure 2. Comparison of AIC, SBC and BCCV values

Phase 5. Selection of the final FOCUS model. Rock structure and rock reliability

During the last stage of the study, more in-depth analyses of the latent structures of the 2- and 3-factor model were conducted in order to select the most appropriate final model

of the Bulgarian version of the questionnaire. The data of the same sample used in phase 3 (N=272) as well as some results from this phase were used as a basis for these analyses .

In the 3-factor model, the first factor again has the largest amount of aitems (24), the other two have 8 and 15 aitems respectively, 3 aitems are removed from the model. The levels of the factor weights are also acceptable, ranging between 0.29 (for factor 1 aytems 1-25) and 0.82 (for factor 1 aytems 1-17 and factor 2_13). Overall, the factor weights of the factor 1 and factor 2 aytems are comparable to, and yet higher than, the factor 3 aytems.

The 2-factor model's 2-factor atoms are here divided into two unequal parts. One of them includes 8 athymemes that manifest the child's willingness and his confidence in communicating with adult (other) people, mostly those who do not know him well. The meaning of factor 2 can be defined as "Social communication skills with adults". The other part of the 15 items manifested the same type of skills but in communicating with other children (peers). Factor 3 can therefore be represented as 'Social communication skills with children'.

If the two groups in the detailed profile are traced in the questionnaire results: the ICF-CY Body Functions/Capacity Components and the ICF-CY Activity Performance Components, the two-factor structure meets the expectation of separating questions that relate more to skills and abilities and those that relate more to performance and/or performance in life situations. The three-factor model can be viewed as separating performance in more communicative situations with children and communicative situations with adults.

The two-factor model of the FOCUS tool in English shows a good orientation towards two specific functions - "capacity" or communication skills - verbal and in some aspects using non-verbal communication and "performance" or communicative performance, i.e. putting the skills into practice in real situations and meeting expectations for social communication, which is in fact the meaning of communication in general

CHAPTER THREE: RESULTS AND ANALYSIS OF THE RESEARCH FINDINGS

The main objective of our study was to develop a program that could be provided to parents to conduct at home and to track the dynamics of key processes related to language competence, communication, and social skills as an outcome. These dynamics were tracked by analysing the FOCUS scales, which were systematised into two broad groups and provided information about these processes.

If one traces the two groups in the detailed profile in the questionnaire results: the ICF-CY Body Functions/Capacity Components and the ICF-CY Activity Performance Components are divided into questions that rather refer to skills and abilities and those that rather refer to performance and/or performance in life situations. Within each group, we compared the scores of the same individuals, which is why paired tests were used. Due to the small sample size of each group and the discretization of the results, we used permutation tests to determine the p-values of the respective tests.

Comparisons were made using the perm TS function from the perm package (Fay & Shaw, 2010). Because we performed several tests, the resulting p-values were adjusted using the Benjamini-Hochberg procedure (Benjamini & Hochberg 1995). The results for some of the statistically significant outcomes are shown in the following tables.

The results of the CAST questionnaire confirmed the diagnosis of every child seen in the medical facility, i.e., all child participants had scores exceeding 15.

Analysis of FOCUS test results - Part 1 and Part 2, pre- and post-intervention - summarised

In addition to the scores from the two groups, capacity and performance, children's scores can be calculated as the sum of the scores from Part 1 and Part 2, and the sum of the questionnaire data (Total). Table 2 shows the outcomes of children with RAS before and after the intervention. The data in the table clearly show the statistically supported improvement evident in both parts of the FOCUS.

TABLE 2. Part 1, part 2, and subtotal scores from the FOCUS test before and after the intervention.

	Before					Following					
	Average value	Art. Off.	Min.	Max.	Mediana	Medium C	CO	Min.	Max.	Mediana	p-value paired permutation test
Part 1	79.19	36.09	37	187	66	92.43	39.45	46	207	86	< 0.001
Part 2	38.38095	22.35	18	109	34	44.43	22.69	21	109	40	< 0.001
Total	117.5714	57.86	56	296	100	136.86	61.03	67	316	124	< 0.001

Comparative analysis of FOCUS data - Part 1

The model of the FOCUS tool in Bulgarian, validated by the team, shows an orientation towards two specific functions - "capacity" or communication skills - verbal, and in some aspects the use of non-verbal communication, and "performance" or communicative performance, i.e. the application of skills in practice in real situations and meeting expectations for social communication, which is in fact the meaning of communication in general.

The first part of the FOCUS includes scales related to speaking skills, expressive language, pragmatics, and receptive language/attention, or put another way, the child's ability to speak and process language - comprehension and production.

Table 3 presents the pre- and post-program outcomes of the children with RA who participated in the study.

TABLE 3. Results of the **FOCUS part 1** test before and after the intervention

	Before	Following	
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		Med ium Valu e	Off.	min .	ma x	Me dia n	SS	CO	min .	ma x.	Medi an	p-value paired permutati on test
FOCUS- Compon ents of capacity	Speech	1.76	1.3 7	1	5.6 7	1	2.0 3	1.4 9	1	6.3 3	1.33	< 0.001
	Expressiv e language	1.72	1.0 6	1	5	1.3 3	2.1 0	1.2 6	1	5.6 7	1.67	< 0.001
	Pragmatic s	2.79	1.4 5	1	6.4	2.8	3.2 4	1.4 2	1	6.4	3	< 0.001
	Receptive language/ attention	3.17	1.3 7	1.7 5	6	2.7 5	3.5 8	1.2 3	2	6	3.25	< 0.001

It can be seen from the table that the implemented IIN has a markedly positive effect in the first part of the FOCUS - Capacity Components. This includes speech, expressive language, pragmatics and receptive language/attention. In all cases, comparative analysis of pre- and post-programme data show significant differences in the direction of improvement, which are supported and evidenced through statistical analysis. This difference is particularly strongly demonstrated when comparing the values of the speech component - with a baseline maximum value of 5.67, at the end of the intervention this value is now 6.33, with $p < 0.001$, i.e. the difference is significant and has statistical significance. As can be seen from the table, $p < 0.001$ for the other three criteria as well, which clearly illustrates the fact that the results are significantly better after program implementation.

The next few diagrams present the dynamics of these processes in each of the children who participated in the experiment in absolute values.

Results from tracking dynamics on the FOCC-Speech scale,

which illustrates the child's speech skills as reported by the parents.

We present the results of **Diagram 1**, which shows that a large number of children have relatively good dynamics of this important process for communication and social activity of the child. The outputs of 16 of the children were rated by parents as one, suggesting challenges in speech communication. Only 5 children had relatively higher speech use in communication, and two of these had values above 5 units, which is somewhat similar to the sample of KG children without autism. From the chart, it is noticeable that children who start from very low values on this scale show greater dynamics than those who start from higher values. We illustrate this phenomenon later with some of the individual analyses we have done on each child in the experimental group. In practice, in 23.8% of the children we find no improvement after the program, while in 76.2% of the children we have dynamics with improvement in these abilities.

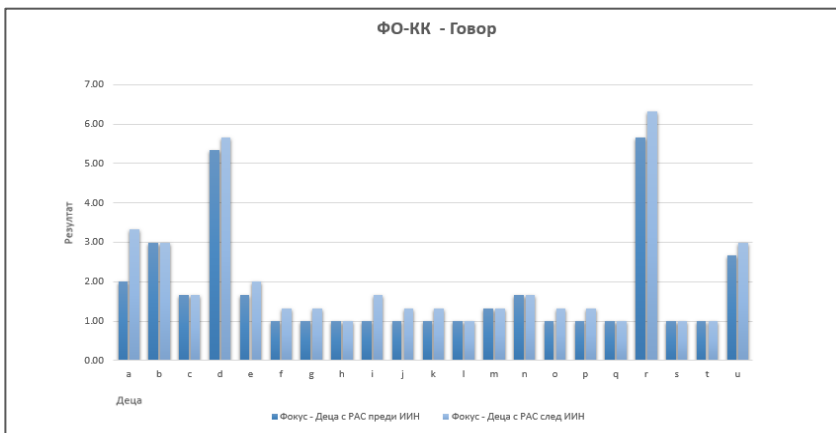
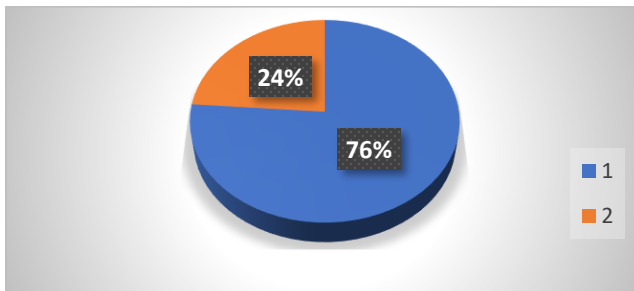


Diagram 1. FOCC-Speech; comparative analysis of children with ASD before and after IIN



- 1- children who show an improvement in absolute terms
- 2- children no reported improvement in absolute terms

Fig. 3. FOCC-Speech: Percentage improvement on the FOCC-Speech scale, which illustrates the child's speech skills as reported by parents.

FOCC-Expressive Language Scale

This scale gives us information about children's language abilities based on data from parents. Again, there is an upward movement of this studied component of language ability in the studied children. In absolute terms, 61.9% of them have an improvement in this function; 33% have no dynamics. In one child, the mother noted a decrease in these abilities in her child. It should be noted here that various factors can occur in the home to negatively affect this component, and there are many factors that could affect the child's abilities. However, in 4 children there was a very marked improvement and increase in the values of the scale we have applied.

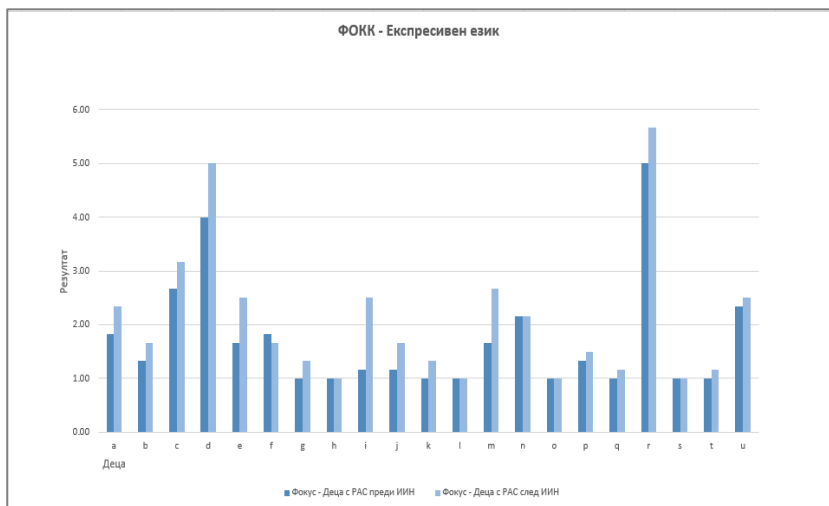
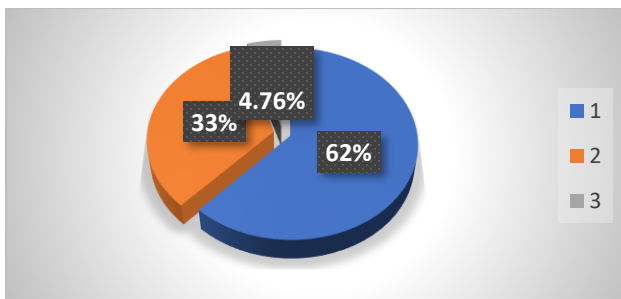


Diagram 2. FOCC-Expressive language; comparative analysis of children with RAS before and after IIN.



- 1- children who show an improvement in absolute terms

- 2- children no reported improvement in absolute terms
- 3- children with a deterioration in this component in absolute terms

Fig. 4. FOCC-Expressive language: Percentage ratio on the FOCC-Expressive language scale.

Results from a comparative analysis of pre- and post-programme pragmatics tracking data.

Pragmatics is an important component of any child's communicative ability. It is a process that ensures the correct situational use of language. It is known that in children with autism one of the areas of difficulty and deficit is precisely pragmatics (Matanova, Todorova, 2013; Tager-Flusberg et al. , 2003; Ramberg et al., 1996).

Data from the present study showed that active parent-child work in a familiar home setting led to significant improvement in this language component. The chart shows that in absolute terms, 15 children showed improvement in this aspect, and in 3 of these children, Nos. 1, 3 and 5, this improvement was significant. In 5 of the children there was no improvement and the data is consistent with baseline levels, and in one child there was a worsening of the score (Chart 3).

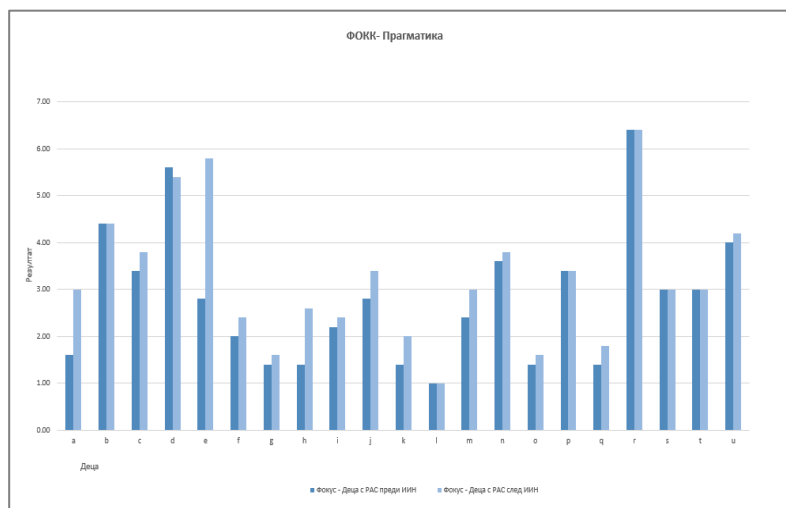
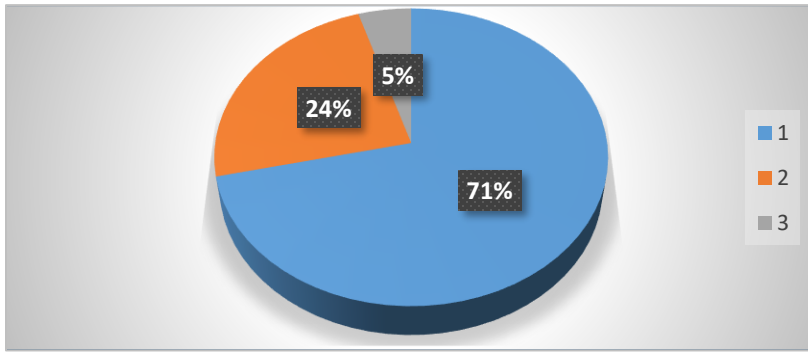


Diagram 3. FOCC-Pragmatics; comparative analysis of children with RAS before and after IIN.



- 1- children in whom we see an improvement in absolute terms;
- 2- children in whom we see no improvement in absolute terms;
- 3- children in whom we observe a deterioration in absolute values.

Figure 5 illustrates the dynamics **for FOCC-Pragmatics**. In absolute terms, in 24% of the children we find no improvement after the program, and in 71% of the children we have dynamics with improvement in these abilities. In 4.76% of the children, we observe worsened performance in this component.

Comparative analysis of the FOCC-Receptive Attention Scale

Understanding is at the heart of learning a language and using it. The data from our study showed that this is where there was the most marked increase in the ability of the children studied. In 80.96% of them there was a visible - according to the parents' data - improvement and only in 4 of them (19.04%) there were no dynamics before and after the implementation of the program.

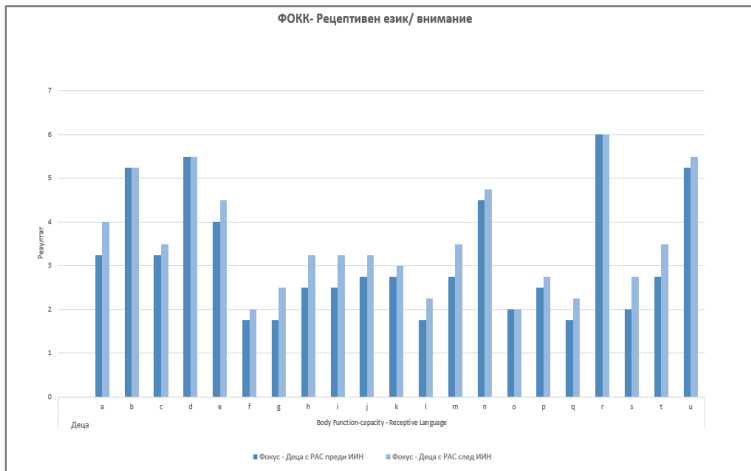
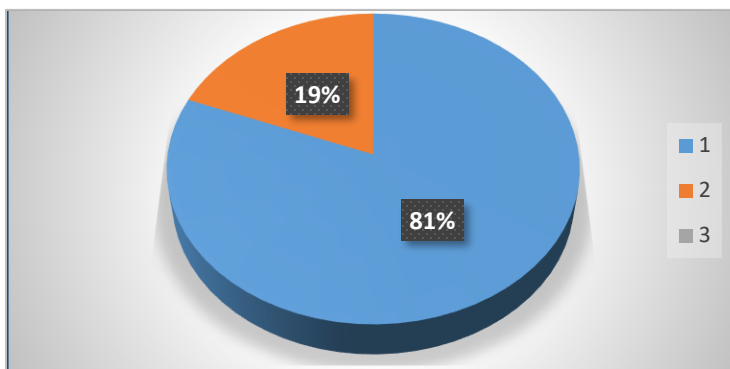


Diagram 4. FOCC-Receptive Language/Attention; comparative analysis of children with ASD before and

after IIN.



- 1- children where we report an improvement in absolute terms
- 2- children with no dynamics in the absolute score

Figure 6 illustrates the dynamics in **FOCC-Receptive Language/Attention**. In absolute terms, in 19% of the children we find no improvement after the program and in 81% of the children we have dynamics with improvement in these abilities.

Comparative analysis of FOCUS data - part 2, before and after the intervention

The second part of the FOCUS includes subscales related to performance - the Performance Component: Comprehension, Expressive Language, Social Play, Independence, and Strategies for Coping with Challenges/Emotions. **Table 4** presents the scores of children with RAS on these scales in Part 2 before and after the IIN.

TABLE 4. FOCUS test results - part 2 before and after IIN.

		Before					Following					p-value paired permutation test
		SS	CO	Min.	Max.	Median	SS	CO	Min.	Max.	Median	
ICF-CY Statement-Component implementation of activities	Understands-bridge	1.99	1.20	1	5.5	1.75	2.31	1.29	1	5.5	2	< 0.05
	Express-grey tongue	1.51	1.27	1	6.5	1	1.73	1.39	1	6.7	1.25	< 0.05
	Social game	2.43	1.35	1.08	6.75	2	2.84	1.39	1.08	6.83	2.5	< 0.05
	Self-ity	2.12	1.26	1	5.6	1.6	2.4	1.31	1	5.8	2	< 0.05
	Coping strategies/emotions	3.11	1.18	1	5.29	3.14	3.62	1.35	1.29	6.86	3.29	< 0.001

It can be seen that here too there is a relative improvement in the individual elements of the processes studied in these children. This improvement is statistically supported by a p that is less than < 0.05 . For the final subscale, namely Coping Strategies for Challenges and Emotions, we observe a highly salient and strong result supported by $p < 0.001$. As absolute values, for example, we report a maximum value for the last subscale of 5.29, which becomes 6.86 after the treatment.

The next few diagrams show the dynamics of these processes in each of the children in the experimental group. As can be seen from the questions on the scale, this is information about the children's expression of capabilities, specified in the scales Comprehension, Expressive Language, Social Play, Independence, and Strategies for Coping with Challenges/Emotions.

Comparative analysis of the FO-CI-Comprehensibility scale before and after IFI

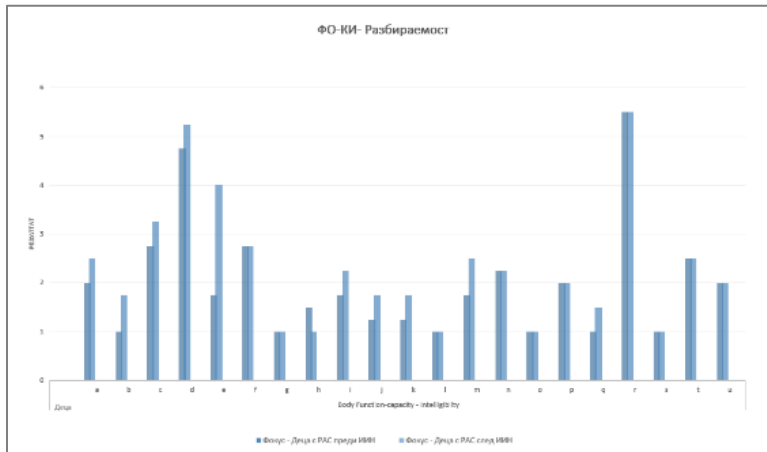


Chart 5. FO-CI-Comprehension; comparative analysis of children with RAS before and after ICU by absolute values.

Data from this subscale provide insight into how well others are able to understand the children's speech, before and after the therapy program. As can be seen from Fig. 5, only, in absolute terms, we have an improvement in 10 of the children, which is 47.6% of the total. For the same number of children, 10 or 47.6%, no dynamics were observed in both positive and negative directions.

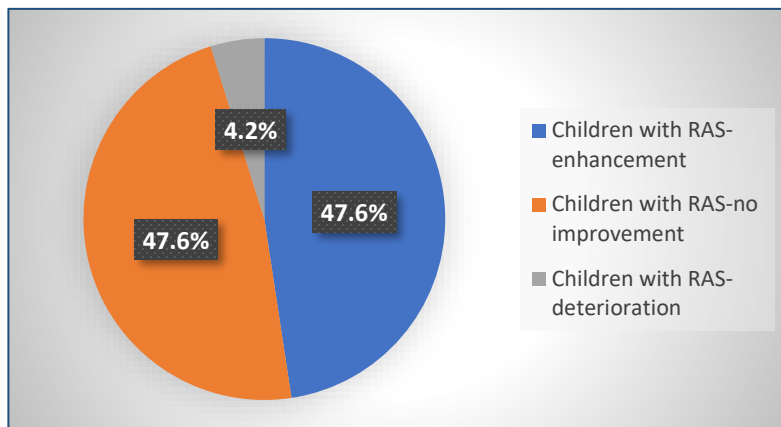


Figure 7 illustrates the dynamics in **FO-CI-Readability**. In absolute terms, for 47.6% of children we find no improvement after the program, for the same percentage of children we have dynamics with improvement in these abilities. In 4.2% of children we observe worsened performance in this component.

Comparative analysis of the FO-CI-Expressive Scale

We obtained a similar result in the comparative analysis of the children's expressive language subscale on absolute data. There is almost no dynamism, again there is one child who shows a lower score after the intervention, and the number of children who showed improvement is again 10 out of 21, with a percentage distribution consistent with the previous subscale.

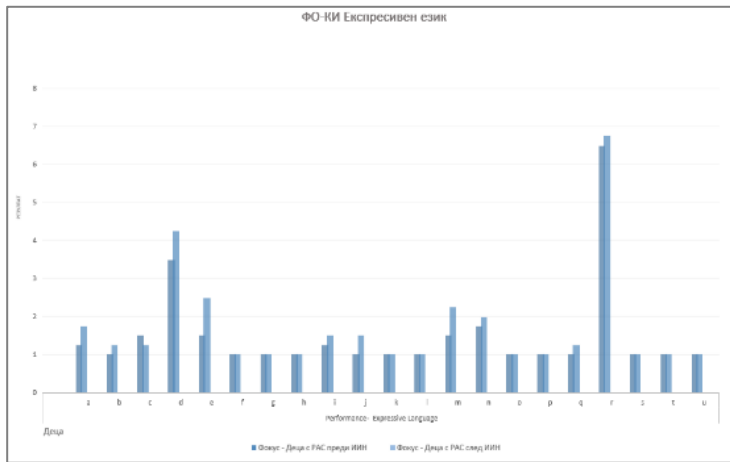


Diagram 6. FO-CI-Expressive language; comparative analysis of children with RAS before and after IIN

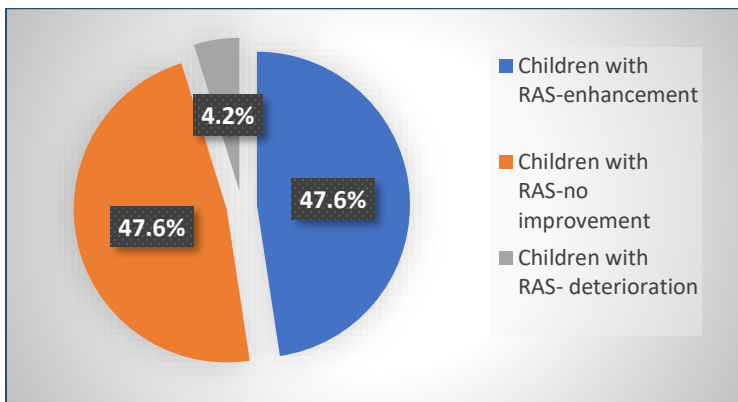


Figure 8 illustrates the dynamics in **FO-CI-expressive language**. In absolute terms, for 47.6% of children we find no improvement after the program, for the same percentage of children we have dynamics with improvement in these abilities. In 4.2% of the children we observe worsened performance in this component.

Comparative analysis of the FO-CI-Social play scale

The next subscale of our study provides information about the influence of IIN on children's desire for communication in the form of play, verbal or nonverbal. Here we see that a large proportion of the group have an improvement, statistically confirmed by the data analysis.

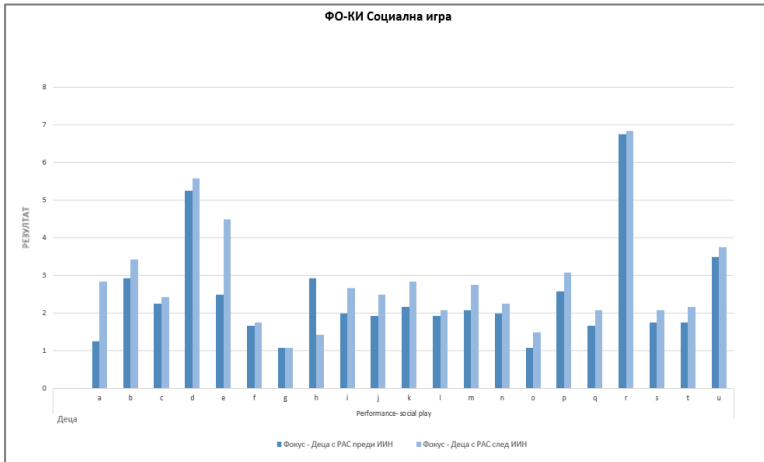


Diagram 7. Comparative analysis of the FO-CI-Social Play scale in the studied children before and after the program implementation.

When analyzing the data of this subscale, we can note that only one child had no dynamics in absolute values. This fact confirms once again that in children with autism emotional-behavioural manifestations are indeed significant and important, but clearly intelligible speech is an extremely important element of the clinical picture.

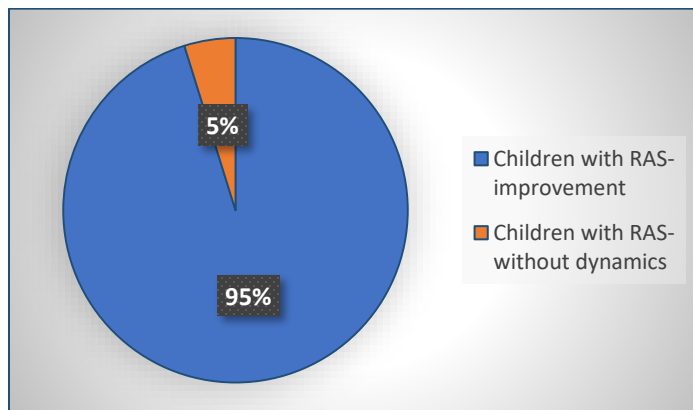


Figure 9 illustrates the dynamics in **the FO-CI-Social play**. In absolute terms, in 5% of children we find no improvement after the program, but in 95% of children we observe improved performance on this component.

Comparative analysis of the FO-CI-Independence scale in the studied children before and after the application of the program.

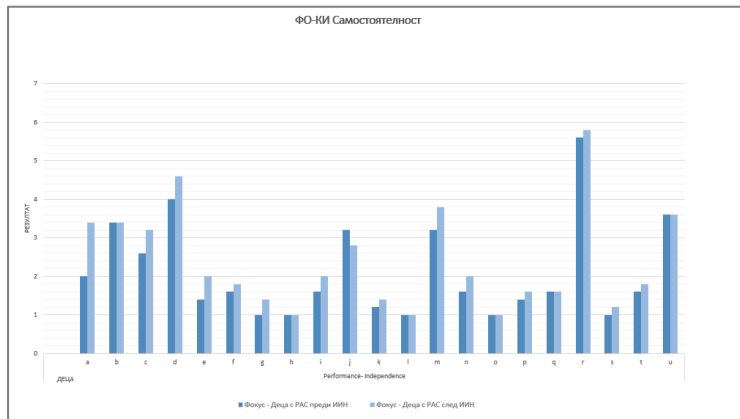


Diagram 8. Comparative analysis of FO-CI - Independence in the studied children before and after the program implementation.

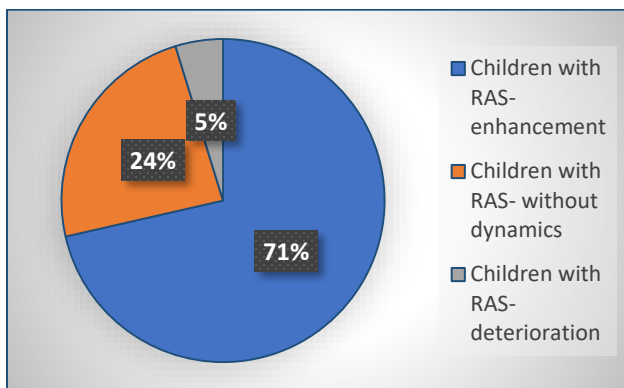


Figure 10 illustrates the dynamics for **FO-CI - Independence**. In 71% of the children we report an improvement after the program, in 5% we have a negative dynamic and in about 24% of the children there is no change.

Comparative analysis of scores on the FO-CI subscale - Coping Strategies for Challenges/Emotions in the children studied before and after program implementation.

The strongest positive impact of the use of IIN is in this segment of the child's behaviour and performance. According to the data from this subscale, all but two children showed significant improvement in coping with challenges in everyday communication with both adults and children. Irritability when communicating with other children decreased, willingness to participate in group activities increased.

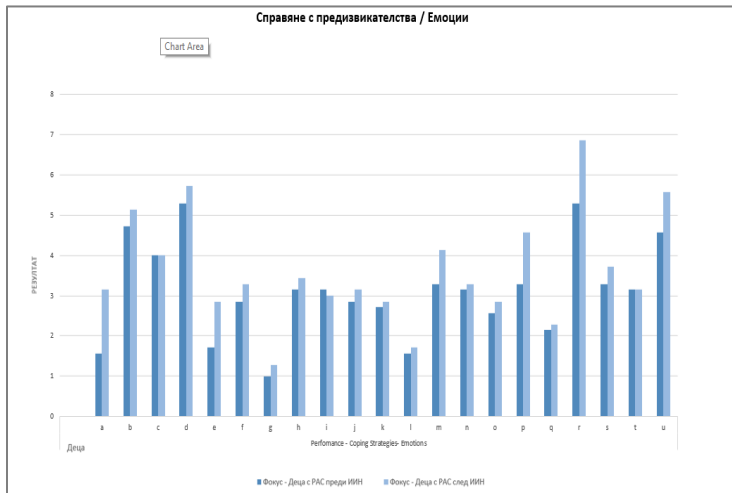


Diagram 9. Comparative analysis of the FO-CI-Coping Strategies for Challenges/Emotions in the studied children before and after program implementation, by absolute values.

The last chart in this element of the present study shows data that indicate that the positive results compared to the initial, baseline items are high and have a strong statistical significance and reliability of $p < 0.001$ (See Table 2). This result corresponds with the data from the other scales, which assess emotional-behavioral elements of children's performance rather than those related to speech activity and verbal communicativeness.

According to **Fig. 11**, only 3 children did not show positive dynamics of this process from the beginning to the end of the therapy program.



Cluster analysis of the characteristics of the results of the participants in the IIN

The statistical data showed that there was a significant improvement in all scales of the study before and after the application of the program, which was one of the main objectives of our work. In practice, this supported the main hypothesis of the study: the indirect intervention by involving the parents in a structured program showed a significant improvement in the child's communication abilities. This improvement was also statistically proven by analyzing the averaged scores of the whole sample of 21 children - scores before and after the therapeutic intervention. In the course of the analysis, however, it became apparent that for some children the input values on the nine subscales were high, but the dynamics during and after the program were insignificant. A second group of children emerged in whom the initial input values on the subscales were low, but the final outcome of the therapeutic work in these children was very good, with very noticeable positive dynamics. A third group of children in whom both input and output values were almost the same - in whom there was neither improvement nor deterioration in communication skills and abilities.

Comparative analysis of the results of children with low input indicators by absolute values showed high positive dynamics of the results of the therapeutic program.

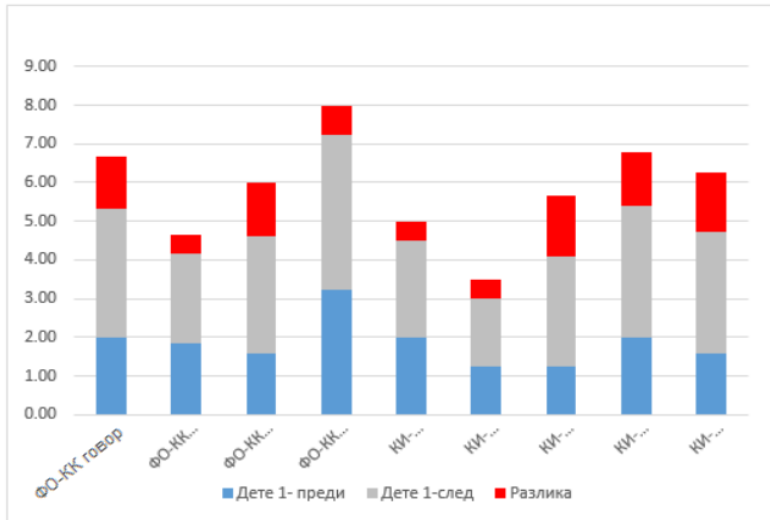


Diagram 10. Results child №1 after applying the program on subscales

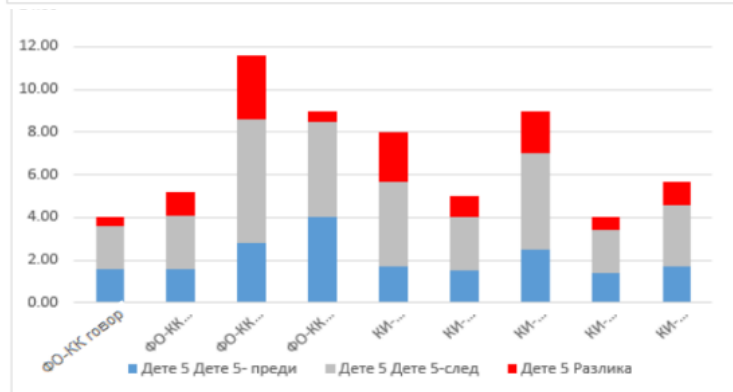


Diagram 11. Results child №5 after application of the program by subscales

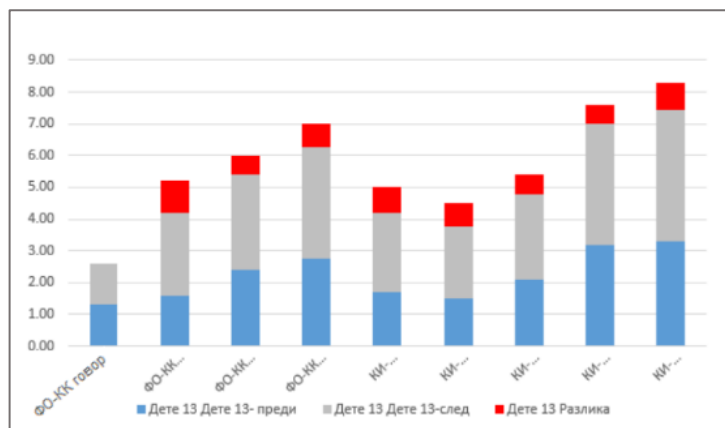


Diagram 12. Results child №13 after application of the program by subscales

From the charts, it can be seen that these children have the most dynamic positive results in the Receptive Speech and Pragmatics scales. Of course, these are children in whom almost all scales show positive values, but the most prominent are the aforementioned as

well as Social Play. In all five children, scores on the Social Play subscale showed the greatest improvement following the IIN.

Comparative analysis of the results of children with high input scores and minimal positive dynamics in absolute values. In the course of the study, this was a surprise to us. It can be assumed that a child with good speech and language skills will be much more active and effective in learning new skills related to communication. In practice, however, for 6 children, despite good input data, the effect of the therapy programme was minimal, although positive. The most characteristic and typical example is child No. 18, as well as child No. 14.

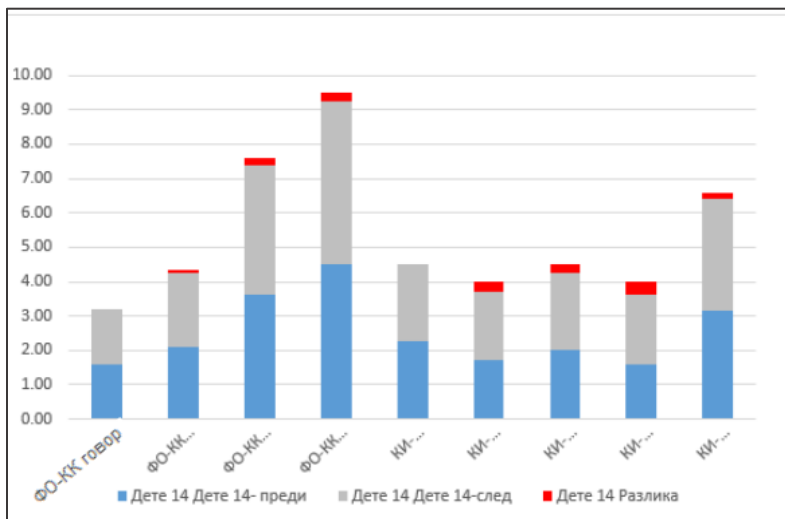


Diagram 13. Results child№ 14 after applying the program by subscales

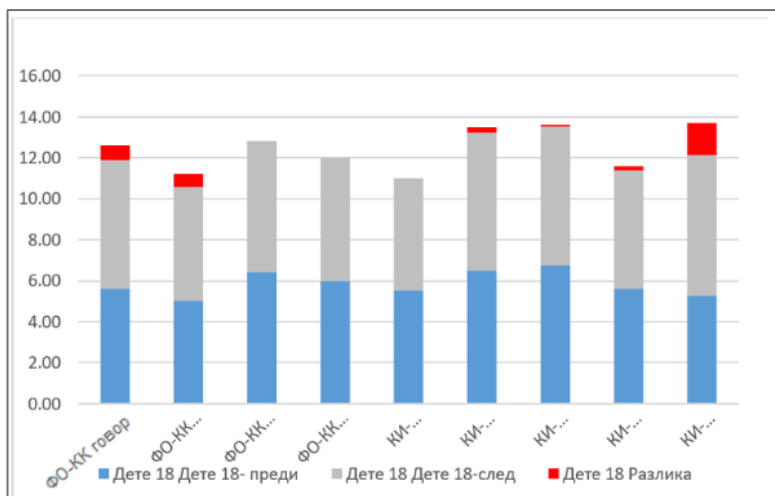


Diagram 14. Results child №18 after application of the program by subscales.

It is clear from the charts that the input values of the communicative ability subscales have relatively good values, but the improvement is minimal, for example child 18 has values with a change of 6.5 - 6.75; 6.4 - 6.4; 6.75 - 6.8. The situation is similar for child #14, as well as child #20 and #21. Conditionally, we place two more children in the same group, in which positive dynamics is still observed as a result of the therapeutic influence. For example, in child No. 20, the score on the Social Play subscale went from 1.75 to 2.21, and the Receptive Language/Attention subscale went from 2.75 to 3.5. This means that we see a positive dynamic, but not one that meets our expectations with such high initial parameters. The analysis is similar for child № 21, where we observe good input values with minimal improvement.

Comparative analysis of the results of children who did not show a large difference in absolute values before and after the therapeutic program.

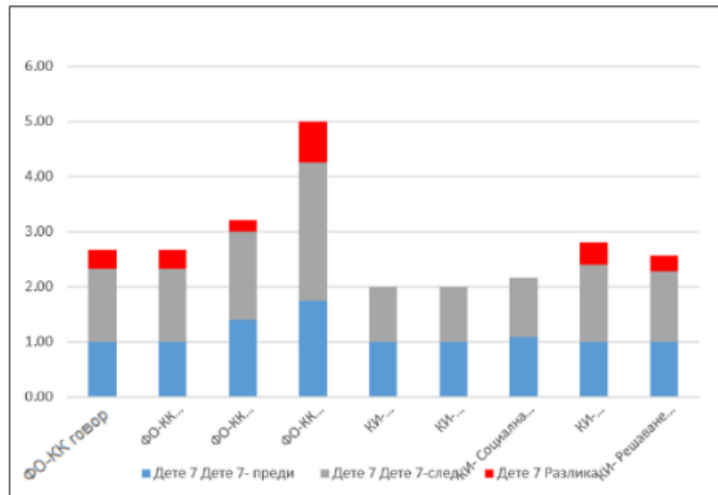


Diagram 15. Results child №7 after application of the program by subscales.

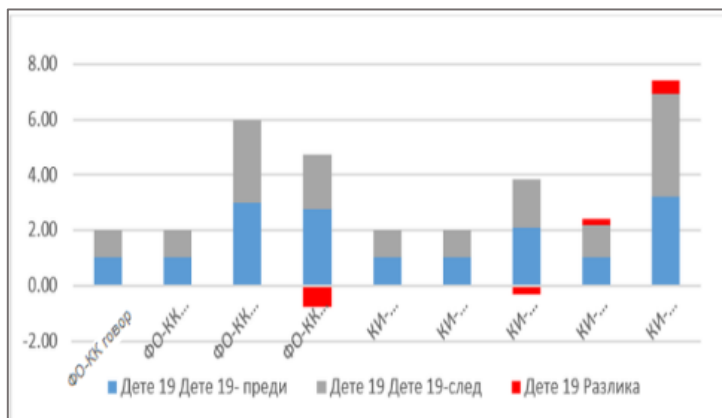


Diagram 16. Results child №19 after application of the program by subscales.

There is no movement here, on the contrary, in child 19 there is a deterioration of some abilities. This negative result for us could be explained in several ways, which we will discuss in Sect. Discussion.

Comparative analysis of CBCL questionnaire results

All authors studying children with ASD note that in addition to communication problems, they have multiple emotional-behavioral disorders that can be systematized as internalized and externalized. Although there are several items in the FOCUS that illustrate these behavioral manifestations, in the present study we decided that we should use another instrument to assess these emotional-behavioral components. We used the CBCL questionnaire, translated and standardized from the one translated and adapted for use in Bulgaria by Assoc. Prof. M. Stankova, NBU.

This set of questions to parents of the children with RAS studied contains two parts: one oriented towards internalized behaviors; and a second oriented towards externalized behaviors. This instrument was also used at the beginning of the implementation of the therapeutic program and at the end of it to assess the impact of the program on the emotional-behavioral elements in the child's functioning. We performed two types of statistical analysis: the first, descriptive, with the analysis of the results of the group with RAS only; the second, mathematical-statistical analysis, which compared the development of a control group of normal children, formed according to the same age and sex characteristics. For the mathematical-statistical analysis, due to the small sample size, a permutation test corrected by the Benjamini-Hochberg procedure was used

Table 5 presents the values from the statistical analysis, which show that our program positively affected children as a total of the subscales.

In summary, the comparative analysis of pre- and post-program outcomes showed statistically significant improvement, supported by $p < 0.000$. Less significant is the impact on internalized behaviors, where we can note the result obtained on the Anxiety/Depression subscale, which is statistically supported with $p = 0.021$. More noticeable and statistically supported is the influence on externalized manifestations, where the strongest positive influence is attention ($p < 0.001$), something that is also noted in the questionnaire to parents, which we will analyze later. Results on the Aggressive Behaviour and Other Problems subscales are also positively supported statistically with $p < 0.05$. For the DSM-oriented scales, we also have positive support for the DSM-HADV ($p < 0.000$) and Oppositional Problems ($p < 0.015$) scales.

Table 5: Comparative analysis of CBCL scores of children with RAS before and after the intervention.

CBCL		Преди интервенцията						Median	След интервенцията						p-value
		Mean	SD	Std. error	Min	Max	Mean		SD	Std. error	Min	Max	Median		
Интерна- лизирани	Емоционална Реактивност	6.428	3.279	.715	1.00	12.00		6.285	3.318	.724	0.00	12.00		p = .679	
	Тревожност/ Депресивност	5.857	2.833	.618	1.00	11.00		5.381	2.906	.634	1.00	11.00		p = .021	
	Соматични оплаквания	3.142	2.475	.540	.00	10.00		2.904	2.508	.547	.00	10.00		p = .056	
	Оттеглениост	5.809	2.839	.619	0.00	11.00		5.571	2.749	.599	0.00	12.00		p = .234	
	Проблеми със съня	3.952	2.729	.595	0.00	9.00		3.809	2.768	.604	0.00	9.00		p = .083	
Екстерна- лизирани	Проблеми с вниманието	6.142	2.151	.469	1.00	10.00		4.714	1.585	.346	1.00	7.00		p < .000	
	Агресивно поведение	14.094	7.974	1.740	4.00	38.00		13.142	7.926	1.729	2.00	37.00		p = .002	
	Други проблеми	2.142	9.112	1.988	4.00	40.00		19.285	9.022	1.968	4.00	38.00		p = .014	
ДСМ орнентира ни	ДСМ- афективни проблеми	2.619	2.201	.480	0.00	8.00		2.190	2.182	.476	0.00	8.00		p = .035	
	ДСМ Тревожни проблеми	4.904	2.427	.529	2.00	10.00		4.619	2.376	.518	2.00	10.00		p = .083	
	ДСМ Первазивни проблеми	11.476	5.065	1.105	2.00	22.00		11.00	4.785	1.044	2.00	22.00		p = .162	
	ДСМ- ХАДВ	10.523	3.600	.785	1.00	16.00		8.571	.685	3.139	0.00	14.00		p < .000	
	ДСМ- Опозиционни проблеми	5.666	3.038	.663	1.00	14.00		5.095	3.015	.657	0.00	13.00		p = .015	
	Интернализирани	21.238	8.566	1.869	7.00	38.00		20.142	8.929	1.948	6.000	37.00		p = .070	
	Екстернализирани	20.238	9.622	2.099	5.00	48.00		17.857	9.079	1.981	4.000	44.00		p < .000	
	Общо	61.619	25.765	5.622	16.00	125.00		57.285	25.217	5.502	15.00	119.00		p < .000	

The table shows that the internalized problems do not have as significant a positive impact as the differences found are not statistically significant. Only the Anxiety/Depression problem appears to be positively influenced, where the statistically significant difference is $p=0.021$. Most likely this is due to the complexity of these processes, which in children with RAS are very pronounced as manifestations of the classic clinical picture - withdrawal, emotional reactivity, etc.

Supervision and feedback

One of the important elements in the program is not only the participation of the parent, but also the mastery of the principles of program implementation, for which a Supervision and Adherence Protocol was specifically developed based on several criteria.

When participating in the IIN, parents were asked to submit 9- to 15-minute videos at the beginning, middle (weeks 5-7), and end of the program that showed parent-child interactions implementing the IIN. It was evaluated by a supervisor according to predefined criteria, and the results were plotted on online Google forms and analyzed. Each skill corresponding to a criterion was rated on a scale of 0 to 4, reflecting the degree of mastery of the skill.

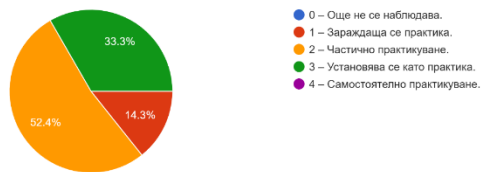
The weight of each criterion was assessed as follows:

- 0- The skill/strategy is not applied or is applied incorrectly;
- 1- Beginnings of strategy/skill use but needs adjustments/guidance;
- 2- The strategy/skill is partially mastered and applied;
- 3- Correct execution of the strategy/skill nearly 80% of the time;
- 4- The strategy/skills are applied correctly 80-100% of the time.

Supervision criteria assessment and supervisor feedback

Fig.12. Criterion 1. Task position - the parent's position should be face-to-face with the child to encourage engagement

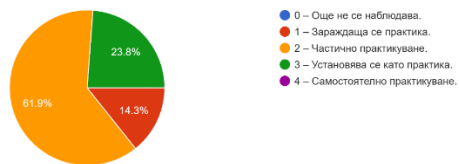
1. Позиция -винаги застава така, че да остане лице в лице с детето с цел насърчаване ангажирането му с участието му в интервенцията.
21 responses



In this criterion, in 14.3% of parents do not take the right position when working with the child, in 52.4% we have partial practice and 33.3% master the right position when working with the child.

Fig. 13. Criterion 2. Adequate level of task assistance - encouraging new routines through the minimum level of assistance the child needs.

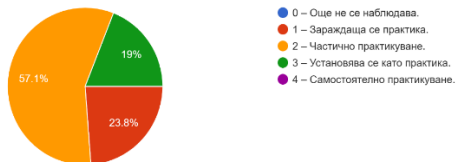
2. Подкрепяне на нови стъпки в рутинна практика чрез предоставяне на помощ в различна степен. Стимулира способността на детето да у...а самостоятелно и спонтанно даденото умение
21 responses



In meeting this criterion, 61.9% of parents were able to adequately support their child, 14.3% gave either untimely, too much or too little help, and 23.8% found adequate support to be the practice.

Fig.14. Criterion 3. Environmental organization - ensuring an environment without distractions and too many objects

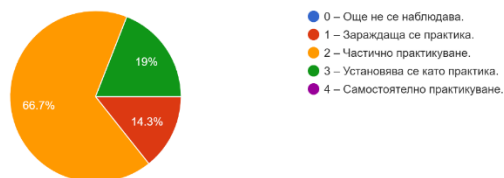
3. Организира средата по оптимален за провеждане на дейността начин.
21 responses



Optimal organization of the environment was observed in 19% of parents during the implementation of the program, 57.1% had partial practice in this criterion, and for 23.8% it was an emerging practice.

Fig 15. Criterion 4. Providing "communicative space" on the part of the parent - enabling

4. Пространство за общуване. Прави паузи, за да създаде пространство и очакване, в което детето да иницира комуникация
21 responses

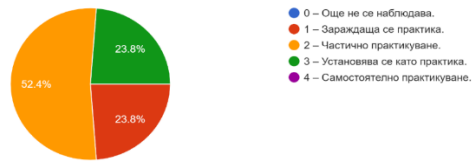


the child to initiate communication;

On this criterion, 14.3% of parents fail to fully provide "communication space" for the child, 66.7% succeed to some extent, and for 19% parents provide "communication space" to a great extent.

Fig. 16. Criterion 5. Noticing the child's communication and responding to it by trying to extend it - by imitation, addition, etc.

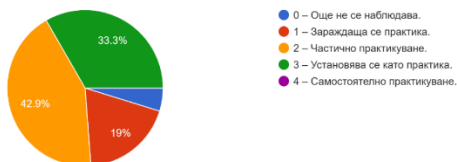
5. Забеляване и откликване. Забелязва комуникирането от страна на детето и му откликва своевременно, като го доразвива (чрез имитация и създаване на езикови и жестови модели)
21 responses



On this chart we notice that more than half of the parents partially manage to notice their child's communication attempts and respond to it, with 23.8% doing so frequently, and the remaining 23.8% too often missing these communication situations as an opportunity.

Fig.17. Criterion 6. Provision of communication models tailored to communicative objectives of the child.

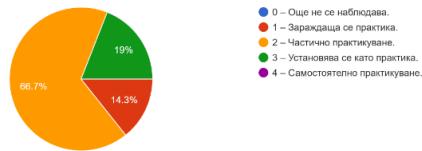
6. Комуникационни модели. Осигурява комуникационни модели (коментари, основно насочени към общата за тях дейност), които от...уникационните цели на детето (жестове и реч)
21 responses



On this criterion, a minority of parents do not provide communication models to their child, 42.9% do so partially, and in 33.3% this is found as a practice.

Fig.18. Criterion 7. Creates opportunities for on-demand communication

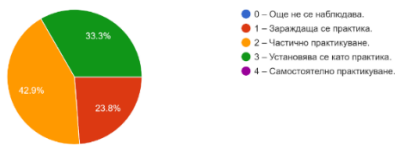
7. Поискване. Организира средата така, че да създава възможности за комуникация с цел поискване.
21 responses



In 19% of parents implementing the program a good level of creating communicative situations with the purpose of requesting was observed, while partial practice was observed in 66.7%. 14.3% of parents do not create sufficient and effective communication situations for the purpose of request.

Fig. 19. Criterion 8. Creates opportunities for sharing communication;

8. Споделяне. Организира средата така, че да създава възможности за комуникация с цел споделяне.
21 responses



For 42.9% of parents, communication for sharing purposes is a partial practice, 33.3% of parents create enough communicative situations for sharing purposes, and for 23.8% such communicative situations are not created often enough.

Fig 20. Criterion 9. Maintain and promote child engagement and self-regulation during interaction;



9.5% of the participants here managed to keep their child engaged during the program, but for 23.8% of the parents, the child did not remain sufficiently engaged in the work. 66.7% practiced this criterion partially.

Fig. 21. Criterion 10. When implementing the program, the parent uses an adequate level of language and speech, rate of production, and articulates cleanly and clearly during the intervention.



From the visualization of program performance on this important criterion, we see that a large proportion of parents, 47.6%, use appropriate rate, articulation, and tone of voice during program performance, a small proportion fail in this component, and for 33.3% we have partial practice on the criterion.

QUALITATIVE SURVEY - Results of feedback received from parents of children with ASD who participated in the program.

At the end of the program, parents of children with RAS who participated in the program were asked to give feedback and complete a two-part survey. 2.

The questions we asked the parents and the answers we received were:

1. In your opinion, is the choice of text and the level of complexity and richness of the story text in the Program appropriate for your child?
2. In your opinion, is the choice of themes of the fairy tales in the Programme appropriate for your child?
3. Do you think the length of the stories in the programme is appropriate for your child?
4. In your opinion, is the choice of visual materials (photos, images and story pictures) in the Programme appropriate for your child?
5. Do you think the exercise schedule is appropriate?
6. Do you think the duration/timing of the exercises is appropriate?
7. Do you think the duration of the Programme (12 weeks) is appropriate?
8. In your opinion, is the child happy to do the programme?
9. In your opinion, does the programme provoke the child's interest?
10. Do you notice changes in your child's desire to communicate and socialize?

The responses of the participants are visualized in the following **Chart 17**

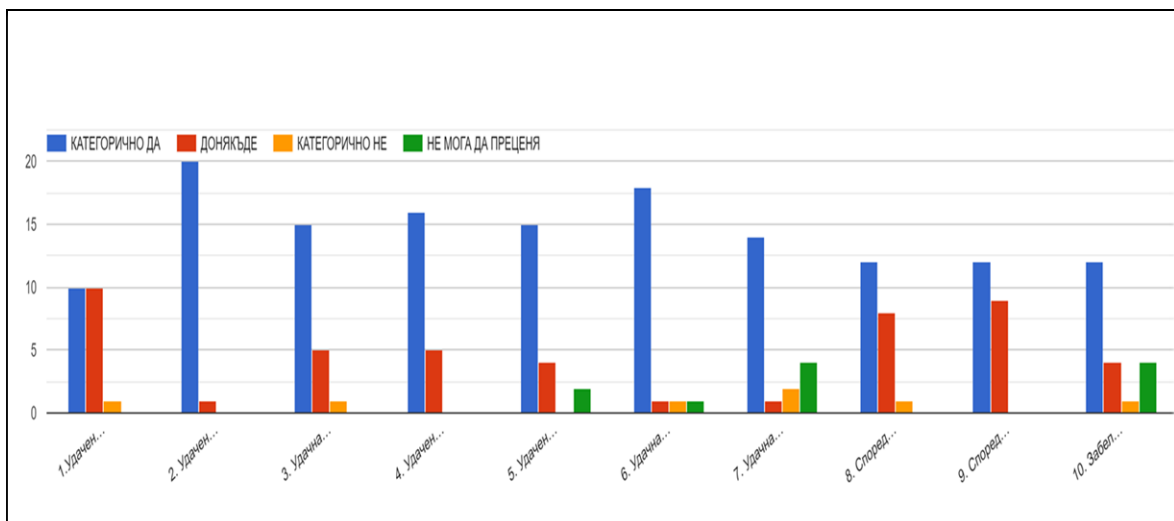


Diagram 17. Results of a post-program feedback survey of IIN participants.

Table 6. Some comments related to the program questions, as well as responses to open-ended questions to the post-program feedback survey from IIN participants.

Number	Q ue sti on	Comments
Additional comment questions 1-10	1-10	<p>"Some of the images chosen are confusing and sometimes frightening to her, but these words are permanently remembered by her"</p> <p>"The fact that he doesn't speak prevents me from judging whether there is a change"</p> <p>"The child really likes the visuals and I hope he gets the messages and the moral of the story. As a suggestion, the text should be written in a larger font so it can be read by children who are now beginning to read. And the commas, which are very apt and directive, could be displayed in a second column next to the text"</p> <p>"A child learns words very quickly from pictures and loves to guess them"</p> <p>"The child has highly opportunistic behavior. It is extremely difficult to accept us in the role of teachers"</p> <p>"He listens to the stories willingly, shows the pictures and I like it very much"</p>
<p>Question 11 Do you notice any changes in the child's verbal/non-verbal behaviour during the programme - echolalia/ automatic repetition; imitation; vocalising/ making sounds etc. What are they, please describe:</p>		<p>"He developed the habit of sitting and listening to the stories, learned new words, improved comprehension"</p> <p>"Repeats more easily and imitates animals instead of naming them, looks for similar pictures in her books"</p> <p>"Desire for imitation. On film there is a slight form of imitation. Already says "I, you..."</p> <p>"Yes, echolalia occurs sometimes"</p> <p>"Yes," he began to point out more often.</p> <p>"Begins to repeat the words during the exercise and uses them correctly in everyday life"</p> <p>"Yes, he's repeating more and more words. He names objects with an adjective, e.g. instead of saying he wants the trowel - he says 'green' (note - the trowel is green; he cannot say 'trowel')"</p> <p>"During the program the child was answering questions"</p> <p>"Yes, he started using more question sentences and became more interested in the world around him" "Curiosity awakened"</p> <p>"Repeats, makes sounds"</p> <p>"Repeats some of the words, though vaguely."</p>

	<p>"Imitate, intone, copy"</p>
<p>Question 12 During the implementation of the programme, do you notice any changes in the child's language expression - active or passive - learning, using, understanding new words and expressions, etc.? What are they, please describe:</p>	<p>"Yes, learn, understand and use some of the words in the stories" "It is easier to start repeating by repeating the words that impress her in everyday life" "Sometimes he understands a funny situation" "There are certain words he likes and uses more often. Learn to wink" "Thanks to one of the exercises, with which we learnt the words and actually practised them, the child now knows and shows them" "During the stories and quite distracted not wanting to listen to them I can't hold his interest. But when we start showing pictures and guessing what is on them he is quite active and enjoys it" "Answers in complete sentences" "He has a rich vocabulary, but I expect him to use new words every time" "She understands new words and when she finds it interesting she starts repeating and imitating animals."</p>
<p>Question 13 Please list any difficulties you have encountered in working with the program.</p>	<p>"My son finds it difficult to tell in more than two words and abstract concepts" "Accompanying visuals that are confusing and different from her perceptions (e.g. "tasty") are removed from the games, because it stops working with the others. She finds it most difficult to point her finger and listen to even the shortest text" "Holding Attention. Explanations such as: hungry, shining, glowing, bad, etc. Consistently set tasks: monday, exercise 1, 2 and 5; tuesday 2, 3, 5....never learned them" "The difficulties were in wanting to listen to the whole text of the story, and the exercise of pronouncing the new words, which the child was decidedly unwilling to do" "The child often wants to go back to an old story or picture. We used to have to read 2 stories at a time to get through". "The text is complex for the age, but a child without developmental delays perceives and repeats most of the words on the cards. There is difficulty in perceiving verbs. Does not yet understand opposites e.g. small-big, warm-cold" "It's kind of easy to do"</p>
<p>Question 14 What do you like about the Indirect Intervention Program for developing language and communication skills in children on</p>	<p>"I think the program is a great tool for a child to get them in the habit of sitting, listening and concentrating on the story as well as improving comprehension, active and passive vocabulary" "This way of presenting words makes her memorize them and look for the pictures a lot and mostly the drawn images" "The approach through pictures and cards, the child takes it as a game"</p>

<p>the autism spectrum?</p>	<p>"What I liked most was the way the new words were illustrated in the cards. At first they seemed strange and difficult, but the child got used to them and so recreated the words himself by seeing them and using them in reality."</p> <p>"We learn the meaning of new words and visually memorize them"</p> <p>"The combination of picture and text is very nice. The pictures are very beautifully painted". "The texts are short. The questions are very guiding. Great idea and execution. Very supportive of beginning speaking and understanding. Good set for parents".</p> <p>"The approach of visualising the words with pictures is great and really helps the children especially when it is in the form of a game with rewards"</p> <p>"Visualizing and supporting child observation"</p> <p>"The daily repetition and so the words are reinforced"</p>
<p>Question 15 What do you NOT like about the Indirect Intervention Program for the Development of Language and Communication Skills in Children on the Autism Spectrum ?</p>	<p>"I like everything! There were difficulties, but it's very nice"</p> <p>"The complexity of some of the texts"</p> <p>"I don't think there's anything I don't like"</p> <p>"I don't like that it ends, hopefully there's a sequel - part two, even part three. Even for a fee"</p> <p>"I think it would be more interesting if the pictures were three-dimensional. I read and watch three-dimensional tales outside of the program and notice that he looks forward to them eagerly. Many of the questions are not age appropriate for the child"</p> <p>"The fact that the exercises are on specific days and in a specific order which may not always be doable by the child"</p> <p>"The text is a bit complicated for my child's abilities"</p>
<p>Question 16 Has using the Doolee e-platform made your work with the Programme easier?</p>	<p>"It gave an initial idea of how the exercises were going. Yes the platform is useful pro start of the program"</p> <p>"Yes, with the videos that were uploaded initially, it was easier for me to build the way of working with the child as well"</p> <p>"Somewhat"</p> <p>"The program is pretty well explained on paper and we don't have to use the platform"</p> <p>"Yes - I watched the videos you made related to how to do the exercises"</p> <p>"To some extent, it was useful to see how the exercises were performed"</p>
<p>Question 17 Please share your general impression of the program:</p>	<p>"At work on most days, exercise calms the child"</p> <p>"The program is wonderful. It gives parents the opportunity to be therapists."</p> <p>"The program is definitely very interesting for me and for the child, something different and by diversifying his daily routine with the exercises, the child learned new words"</p>

	<p>"We enjoyed it very much, spent time together, had fun and enriched our passive vocabulary"</p> <p>"A very nice inclusion and a good alternative for parent-child bonding and for getting the attention of a child with a deficit"</p> <p>"The program is a great way to stimulate a child with a little progress every day"</p> <p>"It has a stimulating and motivating effect"</p>
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The results of the qualitative survey showed that most of the parents as well as the children like and enjoy working with the program and have a better level of communication. Of course, this survey also acted as a good feedback for us as parents gave their detailed opinions on both the positive and some aspects of the program that they did not like. Giving such feedback, willingly and with lots of detail and recommendations, in itself indicates a positive attitude towards the subject of the comment.

DISCUSSION

The use of ICF-CY-based tools to measure the effects of therapy are recommended, especially in the context of inclusive education (Guichard & Grande 2018). The FOCUS instrument measures the therapeutic effect in children with language and/or speech disorders by 'noticing' changes in independent communication, speech intelligibility, socialisation and play (Thomas-Stonell et al. 2013). Such support, resting on a solid empirically evidenced base, would be of indispensable help to speech therapists in this country because, due to the lack of such tools, it is difficult to quantify and visualize the progress of the young patient as a result of therapeutic intervention.

From the statistical processing and analysis of the results of the **first part of the FOCUS-Capacity Components tool**, it is clear that the implemented IIN has a markedly positive effect for the actors in this area. The comparative analysis of the data before and after the implementation of the programme shows significant differences in the direction of improvement, which are supported and demonstrated through statistical analysis of the data. The dynamics are most evident when comparing the values of the speech component - with a baseline maximum value of 5.67, at the end of the intervention this value is now 6.33, with $p < 0.001$, i.e. the difference is significant and has statistical significance.

Similarly, for the remaining three subscales, $p < 0.001$, showing us the positive effect of the implementation of the Program.

In absolute terms, in the **first part of the FOCUS-Capacity Components**, we also report improvement for a large proportion of children, with the most marked improvement in the **Receptive Language/Attention** subscale (**81%**) and the least for the **Expressive Language** subscale (**62%**).

From the statistical processing and analysis of the results of the **second part of the FOCUS-Components of Performance tool**, it is clear that here too there is an improvement in the processes examined in the participants. This improvement is supported by a **p that is < 0.05** . For the subscale Coping Strategies Challenges and Emotions, there is a strongly marked and statistically evidenced difference with $p < 0.001$.

In absolute terms, in the **second part of the FOCUS- Components of Performance** we also report positive dynamics, being most noticeable in the **Social Play** subscale (**95%**), and being most insignificant for the **Expressive Language** subscale (**47.6%**). We believe that this result, together with the result of the **Comprehension** subscale, where the dynamics reflect the same value (**47.6%**), is indicative of just this feature of children with RAS. Difficulties in realizing their speech, of course, lead to difficult intelligibility for others. Clearly, this is one of the most difficult elements in working with children with RAS. It is also one of the main characteristics of the clinical picture of these children, as they are not only not interested in the communicative act, but even when attempting to communicate, verbal or non-verbal, it is difficult for them to be understood by their interlocutors. The positive movement on the subscale '**Independence**' in absolute terms (**71%**) again indicates that beyond speech and verbal communication children respond well in areas such as independence, social and play and coping with challenges .

Parents of children with ASD often expect their children to demonstrate behaviors similar to those of their peers. The relatively large difference in pre- and post-intervention effectiveness on the Coping/Emotion Strategies and Social Play subscales is remarkable, as we hypothesized that conducting the IIN could improve parent-child relationships. The intervention could help children express their emotions, teach them to be more sensitive to other people's emotions, and make them more skilled in cooperative activities. Coping

strategies as a parameter of overall functioning can also be accounted for here as a marker of improved communication, especially if we consider that during the intervention parents spend more time with the children performing shared tasks. The IIN is likely to be successful in providing parents with guidelines for improved communication with their children, which is difficult in many cases when children have developmental problems, especially if they are nonverbal or use very few words and expressions. On the other hand, when a child is unable to speak, adults often do not find appropriate strategies to improve overall communication.

I would like to note that in Bulgaria, and around the world, specialists from different professional fields are involved in autism therapy - doctors, psychologists, occupational therapists, speech therapists, etc., but their focus is mainly on communication. Evidence shows the need for specialized speech therapy, although many professionals find it particularly difficult to apply classical speech therapy techniques to elicit and stage speech sounds.

Overall, the results suggest that the programme positively affects capacity more than performance. In principle, increased capacity precedes the opportunity to perform, but the three-month implementation period of the programme is clearly too short to produce more illustrative results. The data analysed are only from changes in children, but there is also too strong an impact on parents, specifically mothers, over the course of programme implementation. We believe that they are also likely to have changed as a result of the programme, both in terms of their perception of their own child and their ways of communicating with them.

According to a number of authors (Zwaigenbaum, 2009; Baio, 2018; Lai, M. C., Lombardo, M. V., & Baron-Cohen, 2015; Fombonne, 2009), autism manifests a 4:1 ratio of boys:girls. In our group of children with autism, there were only 4 girls in a population of 21 children. Our assumption that things would be more dynamic in girls was not confirmed. However, there was some improvement in 3 of them, and one of the girls was in the group of children with very good input and almost no improvement in any of the nine scales examined. This result, as well as the small number of girls, does not warrant us to report gender dysmorphism in the effect of the treatment program.

In the course of data collection and analysis, 3 groups of participants emerged in terms of their dynamics: children with low input indices in absolute values, who showed high positive dynamics of the results of the therapeutic program; children with high input indices in absolute values and lower dynamics; and those who did not show much difference in absolute values before and after the therapeutic program. In some - child 19, for example - we also observed worsened indicators. Of course, these could be due to a variety of factors or events such as an accident, illness, an event with a negative overall effect that reduces the child's willingness and ability to communicate. Secondly, this negative outcome could be due to insufficient activity and adequate skills on the part of the parent in implementing the program. This was one of the reasons to conduct a parent feedback survey. We could assume that the program is not effective enough and/or the period of its implementation is too short, and that some children with RAS have a regression in abilities. The implementation period of the programme coincided with the start of the quarantine period during COVID-19, which had an effect on both children and parents

We believe that this fragmentation within the group would be an interesting subject for future in-depth study and analysis of the possible factors that influence this particular dynamic, which in turn would expand our knowledge regarding the development and dependencies in communication abilities and language skills in children with ASD.

In addition, it is also possible that learning how to implement the Programme correctly may be particularly difficult for some parents and they may need more time, feedback and guidance. This is a likely factor in the success rate of the children and the effect of the Programme on them. It would be interesting to do a study that links the level of the indicator of parents' uptake of the principles of the Programme and its effect on children's development.

The feedback - the data from the parents' questionnaire was especially valuable for us: it turned out that, besides communication and language, it supports the relationship, as well as teaches parents the principles of communication with children with ASD and better understanding of them. Adequate visualization in terms of work materials as well as demonstration videos is particularly important to involve parents and facilitate their involvement in therapeutic work with the child.

It is important to note here that a factor that directly influences parents' satisfaction is their personal motivation to work with the child at home: some parents are very involved and diligent and want to participate in therapy, cultivate the necessary patience and tolerance, are well informed and do not stop learning so they can help their child.

There is another type of parent who thinks that working with specialists is enough, and having them take on the role of co-therapist and work with the child at home is frustrating and overwhelming. It is possible that this attitude is the result of a lack of confidence in one's own abilities, but in such cases it is important to work with the parent and stress the great importance of her/his support. It is possible that the provision of such structured programmes may have a beneficial effect on this type of parent, helping them to deal with their insecurities and fears.

FINDINGS

Based on the results obtained from the research we can draw the following conclusions:

- The developed indirect intervention program with parental involvement is applicable to children with autism and yields statistically reliable positive results.
- The validation process of the FOCUS clinical tool showed that it can be used for Bulgarian children.
- The therapeutic intervention showed better results in speech-language competence, where the statistical significance of the difference at baseline and endline was significant.
- The therapeutic intervention also showed changes in language expression, which were also statistically confirmed.
- It was found that at high input values of the studied components, the dynamics of improvement is relatively small, while at low input absolute values, a prominent dynamics, i.e. improvement, is observed.
- Hypotheses 2.4.1, 2.4.2, 2.4.3 and 2.4.4 were proved after the statistical analysis of the results.
- Analysis of the data showed that we noted a statistically significant impact of the therapeutic intervention in reducing aggressive as well as oppositional behavior.

CONCLUSION

The application of the therapeutic program we have developed for working with children with RAS is scientifically based in several main aspects:

1. Tools were found, applied and validated to track the dynamics of the main processes characterizing children with ASD. In the course of the work, a large number of both normal and autistic children were studied.
2. In addition, in the present study, the modes of communication and influence between parents and their children with RA were followed for 3 months.
3. The children's abilities were analyzed at the beginning and at the end of the IIN.

After the completion of the therapeutic program and statistical analysis of the results obtained, we can say with conviction that the program has positively affected mostly the communicative competence of children with autism, but also elements of certain of their behaviors. The aggressive and oppositional behaviors of children with ASD were also statistically significantly influenced. We believe that the positive effect was also a result of the structure of the program itself, since the main elements that we adhered to in the course of the work were systematicity, step-by-step, ontogenetic, individual approach, etc., characteristic of specialized speech therapy. In spite of the general feeling of positive dynamics of both language and speech competence and emotional-behavioral aspects, in some children there was not the desired positive effect. This is probably due to the short period of impact of the program, insufficient preparation for specialized work on the part of parents, and the many question marks regarding autism as a disorder/condition. The results of the present study showed that it is the language and speech ability elements of these children that are the most difficult to influence. The diverse view of autism provides a rationale for professionals with different profiles to carry out therapy - psychologists, physicians, occupational therapists, etc. Our study has shown that it is necessary to focus

on specialized speech therapy work, as on the one hand this is the most difficult process to influence, and on the other hand it has established an interrelationship between improved communicative and emotional-behavioral elements.

CONTRIBUTIONS

The main contributions of the dissertation stem from the scientific and practical applicability of both the results of the research and the developed Indirect Intervention Program to support the language and communication development of children with ASD:

1. A detailed literature review of etiological factors, characteristics, diagnosis and classifications of RA was performed.
2. A detailed review of existing therapeutic interventions and practices for working with children with ASD and their families in Bulgaria and worldwide was made.
3. The FOCUS tool was translated and validated for use in Bulgaria to measure the dynamics in the communicative development of children from 2 to 6 years of age, as well as the effect of speech therapy, which is helpful for Bulgarian speech therapists.
4. A therapeutic program specialized for working with children with autism spectrum disorders and their parents was developed and put into practice by analyzing and following the global example in the field.

The programme is characterised by several key innovations:

- Active involvement of parents in the therapeutic process;
 - The focus of this comprehensive program is speech therapy;
 - The program can be implemented remotely, under the supervision of specialists;
 - The program also assumes guidance from a specialist based on parent input;
5. The program developed would be appropriate for a number of categories of communication disorders as well as some behavioral problems.
 6. Evidence has been collected on the effect of implementing the author's therapeutic intervention, supporting the Practices Based on evidence paradigm of collecting scientific evidence to support therapeutic interventions.

7. A pilot implementation of training of parents not only in working with the Program, but also in the basic principles of working and communicating with these special children was done.