SYSTEMIC MULTIMODAL APPROACH TO SPEECH THERAPY TREATMENT IN AUTISTIC CHILDREN

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Summary

Introduction. Conditions in which speech therapy treatment is applied in autistic children are often not in accordance with characteristics of opinions and learning of people with autism. A systemic multimodal approach means motivating autistic people to develop their language speech skill through the procedure which allows reliving of their personal experience according to the contents that are presented in the their natural social environment. This research was aimed at evaluating the efficiency of speech treatment based on the systemic multimodal approach to the work with autistic children.

Material and Methods. The study sample consisted of 34 children, aged from 8 to 16 years, diagnosed to have different autistic disorders, whose results showed a moderate and severe clinical picture of autism on the Childhood Autism Rating Scale. The applied instruments for the evaluation of ability were the Childhood Autism Rating Scale and Ganzberg II test. The study subjects were divided into two groups according to the type of treatment: children who were covered by the continuing treatment and systemic multimodal approach in the treatment, and children who were covered by classical speech treatment.

Results. It is shown that the systemic multimodal approach in teaching autistic children affects the stimulation of communication, socialization, self-service and work as well as that the progress achieved in these areas of functioning was retainable after long time, too. Conclusion. By applying the systemic multimodal approach when dealing with autistic children and by comparing their achievements on tests applied before, during and after the application of this mode, it has been concluded that certain improvement has been achieved in the functionality within the diagnosed category. The results point to a possible direction in the creation of new methods, plans and programs in dealing with autistic children based on empirical and interactive learning.

Key words: Speech Therapy; Child; Autistic Disorder; Combined Modality Therapy; Communication

Sažetak

Uvod. Uslovi u kojima se primenjuje logopedski tretman za decu sa autizmom često nisu usklađeni sa karakteristikama mišljenja i učenja osoba sa autizmom. Sistemski multimodalni pristup podrazumeva podsticanje govorno-jezičkog razvoja putem postupka koji omogućava opuštanje ličnog iskustva u skladu sa sadržajima koji se prezentuju detetu u prirodnom socijalnom okruženju. Osnovni cilj istraživanja je bila procena efikasnosti logopedskog tretmana zasnovanog na sistemskom multimodalnom pristupu u radu sa decom sa autizmom.

Materijal i metode. Ispitivani uzorak činilo je trideset četvoro dece sa dijagnozom iz spektra autističnih poremećaja, uzrasta od 8 do 16 godina, čiji su rezultati na Childhood Autism Rating Scale skali pokazali umerenu i tešku kliničku sliku autizma. Uz ovu skalu za procenu sposobnosti primenjen je i Ganzberg II test. U odnosu na vrstu tretmana ispitanici su podijeljeni u dve grupe − deca koja su bila obuhvaćena kontinuiranim tretmanom i sistemskim multimodalnim pristupom u tretmanu i deca koja su bila obuhvaćena klasičnim logopedskim tretmanom.

Rezultati. Pokazano je da se sistemskim multimodalnim pristupom u radu sa decom sa autizmom utiče na stimulaciju razvoja komunikacije, socijalizacije, samoposluživanja i rada kao i da je postignuti napredak u ovim oblastima funkcionisanja održiv i nakon dužeg vremena. Zaključak. Primenom sistemskog multimodalnog načina rada sa dećom sa autizmom i poređenjem njihovih postignuća na testovima primenjenim pre, za vreme i posle primenе ovog načina rada, zaključujemo da se pokazao napredak u funkcionalnosti u okviru dijagnostikovane kategorije. Rezultati ukazuju na moguć smjer u kreiranju novih metoda, planova i programa u radu sa dećom sa autizmom baziranih na iskustvenom i interaktivnom učenju.

Ključne reči: Logopedski tretman; Dete; Autizam; Multimodalna terapija; Komunikacija

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**Introduction**

Speech and language therapy for autistic children, which is used in many of our institutions, is usually based on the promotion of language skills according to the age, often in conditions that are not conformed to the characteristics of thinking and learning of autistic people. The traditional methods of speech therapy in treatment of autistic children often rely on the exercise of speech, sign language and methods of showing images that require good previous knowledge of specific skills. The focus of treatment is usually on an isolated segment of speech and language structure that must be corrected in a child, without abridging the already trained and adapted contents with other functional structures of the child. An autistic child who has difficulty in understanding and generalization of concepts in such conditions has not been given an opportunity to learn empirically. Classical speech therapy treatment lacks the empirical moment and the possibility of spreading experience into different social and communicational situations that will enable the child to develop speaking linguistic structures in appropriate circumstances, while using communication and modification of these conditions.

The systemic multimodal approach involves encouraging of the development of speech and language structures through a channeled and planned process that enables these children to live out their own personal experience in accordance with the contents that are presented to them in their natural social environment. The content presented to a child in order to encourage the development of speech and language specific structure permeates all areas of life and learning, and all systems of social interaction (school, family, wider social system). This method means working in large and small groups of children with similar abilities of communication, individual encouragement, compulsory cooperation with other members of the professional team and partnership with the parents of the child. The systemic multimodal approach to speech therapy treatment of autistic children requires all the contents presented to the child to permeate as many life and educational training areas (modules) and social situations (the system) as possible, thus enabling the development of certain speech and language structures encouraged by the development of awareness through stimuli coming through all sensory and social systems. By including these children in the social environment, they are given the opportunity to develop speech and language structures through personal experience [1]. Frustration resulting from unknown situations can be reduced by the targeted and gradual introduction of the child into more complex social systems. This is the way to encourage the child’s independence and desire for spontaneous interaction. Having become more aware of the social environment, the child develops the interest and desire to interact with the environment and to become a part of the environment itself [2,3]. To gain the trust of an autistic child our reactions must be appropriate, purposeful and supported by various and concrete examples from life. By dividing the content presented to our child into as many sections as possible, we will enable their proper, more precise and clearer understanding. Thus, we shatter the stereotypical environmental schemes that happen according to the established order [4]. One of the basic rules of success in working with children with autism is to familiarize with them, recognize their desires, needs, preferences, and introduce a tailor-made speech therapy. The generalization of learning is often a problem with autistic children and communication skills must be encouraged in a way that will enable the child to connect and group the terms. If stimulus of speaking language skills is limited to only one location, due to difficulties in the generalization of concepts, children may think that certain rules are applied only in situations related to that place.

The development of speech and language skills should be stimulated gradually through the more complex structure of the child’s functioning. The area being encouraged is extended through various activities during the day and in different situations, so this way of working is called multimodal. This encouraging should be done gradually and systematically from the cabinet circles outwards into wider circles, such as family, in the contact with the closest family members. If we take into consideration that the treatment is tailor-made according to the wishes, needs and interests of the child and that a certain kind of stimulation is thus repeated several times but through situations that get more complicated by introducing new activities, a new person in the interaction, or by applying it in a new situation, then we take a child through a convoluted path of incentives in the field of speech language where each new circle of activities will be on a higher level of request complexity. Such a stimulation treatment of speech language functions that enables the participation and interaction in various life surroundings, where appropriate models, stimulants and natural point are available, encourages the social skills learning at the same time [5].

Development of the ability to use the language for more and more purposes (greetings, questions, statements, information, etc), understanding of others in the communication and adequate reactions, development of the ability to take part in the communication (how to start the communication, how to respond during the interaction, how to maintain the interaction, and so on) depend on the exposure...
to different social models of communication that affect the child during the development.

The complexity of the situation and requirements is being changed as the environment together with the people around child and the ways of communication are changing, all of which encourage the children to use skills acquired and modified according to the situation in which they find themselves. Targeted and focused guidance of a child in the situations that gradually become more complex and go out of the learned patterns enables the child to learn and improve the ability to communicate and establish social interactions based on their own experience. Such an approach will enable the child to raise the abilities in the communication skills to a higher level, and if such a development is presented as a spiral, we can see that a higher level of competence, which is represented by a spiral coil, is constantly expanding by adding a new link to the chain that have just been formed under the influence of factors of various social situations in which the child has been.

The treatments in the natural, social surrounding are also targeted, pre-selected and channeled by the therapist, but the natural social surrounding provides something that is impossible in the cabinet conditions and that is the impact of external factors, which often put and set the pace and course of a situation, such as various limiting, distracting, confusing factors which we can not predict and plan and which require a certain amount of tolerance and accommodation.

In everyday speech therapy work within the treatment of autistic children, both multimodal systemic and classical approach to speech therapy are applied.

The main aim of this study was to evaluate the effectiveness of speech therapy system based on multimodal approach to teaching autistic children compared to the classical speech therapy approach.

**Material and Methods**

Thirty-four children, aged between 8 and 16, diagnosed to have different types of autism disorders were included in the prospective, controlled study whose results show moderate to severe clinical picture of autism on the Childhood Autism Rating Scale (CARS). The study sample was divided into two groups. The study group was divided into two sub-groups with 17 subjects each by the random choice method.

The first group consisted of children continuously treated by systemic multimodal approach. The subjects in the first group were treated in the organizational unit for treatment of autistic people at Primary and Secondary School Centre “Milan Petrović” in Novi Sad.

The other group consisted of 11 children, who were the members of the Organization to help autistic people in Krusevac and 6 children treated by classical speech therapy at Primary and Secondary School Centre “Vuč Karadžić” in Sombor. The groups were matched according to their performance which ranged from moderate to severe autism.

The following instruments were used to assess the abilities of the autistic children: Ganzberg II – the test to assess children’s psychomotor skills and the CARS (Schopler, Reichler 1988), the scale to determine the degree of autistic disorder. Ganzberg II test contains items designed so that responses to the questions give information about the quantity of successful performance of certain tasks. CARS is a qualitative test containing open questions which provides data about the extent of the present difficulties, i.e. the quality of performance of certain tasks. Both tests assess the same areas of functioning since it is possible to group the scales at CARS test in accordance with the Ganzberg II areas such as: socialization, communication, work and general condition. Higher scores on Ganzberg II scale and lower scores on CARS scales show better results and a better clinical picture.

Since the main objective is focused on checking the effectiveness of the treatment, the draft including three repeated measurements was chosen. The measurements were done before the beginning, in the middle and after the end of the treatment with the same intervals of 5 months. The first phase of research lasted a year, with a comparative analysis of the monitored parameters. Throughout the school year, i.e. the period during which the research was conducted, the first group was included in the speech therapy based on the systemic multimodal approach. The topics discussed during the speech therapy treatment correlated with other pedagogical and educational areas included in the special curriculum for children with autism. The emphasis in this study was given to the acquisition of communicative and social skills while gaining personal experience of the subjects. The second group was included in the classical speech therapy administered in the speech classroom, individually, without the correlation with other pedagogical and educational areas or opportunities to acquire communicative and social skills through personal experience.

In order to assess the possibility to retain the acquired skills after 5 years, the repeated measurement using CARS and Ganzberg II test was done. The assessment was made for the first group of subjects treated within the systemic multimodal approach. The group consisted of the same subjects as previously.

The results were analyzed using the appropriate statistic tests, depending on the group size, characteristics or distribution type. The data were processed by using standard descriptive statistic methods. The t-test was used for dependent samples to check the significance of differences.
Results

In order to determine whether the systemic multimodal treatment showed better effects than the classical speech therapy in the development of communication skills, socialization, and general condition of autistic children, the following two factors were studied: the treatment (multimodal system and classical speech therapy) and time (first, second and third measurement) as well as their interaction shown by the values obtained in the tests Ganzberg II and CARS.

The results of the tests done after both kinds of treatment (the systemic multimodal and classical speech therapy) suggest the progress in communication skills in each of conducted measurements (Table 1).

The autistic children, who were included in the systemic multimodal approach, progressed in communication skills. The progress implied a more frequent use of various forms of communication and more intensive use of the existing communication abilities.

In comparison to the observed aspect of socialization, the results obtained by the tests showed that the difference was present when they were observed through the quantitative values obtained by Ganzberg II test, while qualitative changes showed no statistically significant difference (Table 2).

The group of children who were included in the multimodal treatment showed improvements in quantitative terms, i.e. better motivation for work and success in performing the work assignments, self-serving and independence. The results of the achievement in the Ganzberg II test show a statistically significant difference (Table 3).

Further analysis was to discover if the severity of symptoms of disorders within the autistic spectrum and overall functioning of autistic children changed with the acquisition of communication skills influenced by the systemic multimodal treatment (Table 4).

The results of both tests indicate that there was some improvement in the general functioning of children. After a year, the systemic multimodal approach to autistic children enabled them to become more receptive and open to new contents offered to them from their closest environment, and to apply the acquired knowledge and skills in different social situations. By encouraging children to take part in the spontaneous, natural, everyday communication gradually enhanced and consolidated by various systems of social interactions, we enabled them to learn from their personal experience. By expanding their experience, their consciousness was awakened not only in the sphere of communication, but also in being aware of themselves and their own existence in the environment and of opportunities to interact with it. This type of work increases the interest in the environment and the opportunities offered in it.

The CARS test results, which did not confirm the hypothesis in certain areas, indicate that although the symptoms of autism are still present, the general condition of autistic children can be improved by giving them the access to the environment.

The results of measurements repeated after five years show the possibility to retain the acquired abilities and skills in the children included in the systemic multimodal approach to treatment. No deteriorations of certain functions have been observed. The difference was evident only with the results of the Ganzberg II test, while the CARS results showed no difference (Table 5).

<table>
<thead>
<tr>
<th>Sort of test</th>
<th>Treatment</th>
<th>1st measurement</th>
<th>2nd measurement</th>
<th>3rd measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1. merenje</td>
<td>2. merenje</td>
<td>3. merenje</td>
</tr>
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<tr>
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<td>7.82</td>
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<tr>
<td>CARS</td>
<td>Classical speech therapy/Klasičan logopedski</td>
<td>12.26</td>
<td>11.62</td>
<td>11.26</td>
</tr>
</tbody>
</table>

Table 1. Average scores of the variable Communication in three measurements

Table 2. Average scores of the variable Socialization in three measurements

Table 3. Average scores of the variable Achievement in three measurements

Table 4. Average scores of the variable Symptom severity in three measurements

Table 5. Average scores of the variable Overall functioning in three measurements
It can be concluded that not only there was no deterioration of certain functions but there was an obvious improvement in all areas assessed by Ganzberg II test: communication, socialization, and self-service and work, all proved by statistically significant differences in the results from the previous period and after five years.

Discussion

Many different forms of treatment have been promoted as the ones that make significant improvements in the function of autistic children. There have often been doubts about the choice and intensity of treatment to be applied as well as the age when to apply it. According to the previous research, not a single approach has proved to be either superior to the other or equally effective for all individuals. Given the complexity of the condition of autism, interference levels and skills displayed by these children, the expectations that a single treatment will have the same effect on all are unrealistic [6]. The results of our study suggest that the development of speech and language skills are encouraged more efficiently in the natural social environment and the acquired communication skills are used more intensively. The treatment designed on the basis of an interactive approach to support autistic children enables them to relive their personal experience at all levels of communication, which in addition to our support makes them more functional, gives them directions and motivates them to achieve social inclusion. The results of our research show that the children who were included in the systemic multimodal approach have advanced in the area of socialization in terms of quantity and that social interactions have been established much more frequently.

The starting points when designing programs for the treatment of autistic people should be a combination of different sources: theoretical knowledge, the results obtained by the scales for evaluation and tests for the assessment of the child, the empirical data obtained on the basis of well-formed small groups and on the basis of individual studies [7]. The components of treatment must be tailored to each individual and their family. The program should be individualized according to the cognitive level of the individuals, their age, needs and manifested symptoms and temperament [8,9]. The clear structure of the educational and daily life provides an autistic person with a predictable and easily understandable surrounding, thus decreasing confusion and minimizing frustration [10,11].

It is necessary to ensure that communication is in accordance with the individual abilities of the user, and that verbal messages should often be accompanied by visual signs. According to Rogers, programs focusing on the weaknesses of social communication can have significant effects [12]. Our experience also confirms this fact, which can be seen by the progress in the frame of quantitative assessment, which shows that the multimodal system method allowing children to gain knowledge and skills in the natural and social environment encourages children to participate in activities. When these children are gradually introduced into more complex social situations, they get to know their environment and gain confidence in people around them and start to feel safe and accepted. Since the systemic multimodal approach stimulates the development of all segments of functioning and encourages these children to make choices and decisions, to express their needs, thoughts and desires and to show anyhow that they have made contact with others, they get

### Table 3. Average scores of the variable Work in three measurements

<table>
<thead>
<tr>
<th>Sort of test</th>
<th>Treatment</th>
<th>1st measurement</th>
<th>2nd measurement</th>
<th>3rd measurement</th>
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</thead>
<tbody>
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<td>17.12</td>
<td>24.00</td>
<td>30.06</td>
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<td>Ganzberg II</td>
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<td>6.47</td>
<td>8.47</td>
<td>10.71</td>
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<tr>
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<td>11.29</td>
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<td>13.82</td>
<td>13.26</td>
<td>12.56</td>
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### Table 4. Average scores of the variable General Condition in three measurements

<table>
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<th>2nd measurement</th>
<th>3rd measurement</th>
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<td>90.53</td>
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<td>Ganzberg II</td>
<td>Classical speech therapy/Klasičan logopedski</td>
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<td>3.24</td>
<td>3.18</td>
<td>3.18</td>
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</tbody>
</table>
to know their environment and develop the feeling of satisfaction through inter-personal relations. Children become aware of their environment and they are encouraged to get interested in the world around them and to perform various activities offered to them. When children are given the possibility to gain knowledge about the environment around them by gradual and planned introduction into it by experiencing various situations in accordance with the individual plan of support, they are stimulated to feel the need to become a part of that environment. By performing various assignments, the children are taught the causal relationships in the work procedures, as a reaction caused by the results of their activities. It has been noticed that when the children are introduced to their surrounding gradually and purposefully, they perform certain work assignments and self-service activities more frequently and more independently, which indicates an improvement in the general condition of children.

Many undesirable ways of behavior are a reflection of the limited behavioral repertoire or poor communication skills. The treatment based on encouraging the development of communication skills often contributes to the reduction of destructive and aggressive behavior [13]. Treatment approaches centered in the family result in greater generalization and consolidation of acquired skills. Designing a program that can be implemented at any time, but in a way that does not require additional sacrifices in terms of time, money, or other aspects of family life is the most beneficial for all involved [14]. Practical support from experts can be crucial for the family, especially at an early age of the child.

When children with disabilities characteristic of autism acquire communication skills in isolated social situations, they can hardly be expected to generalize and apply these skills in different contexts and modify them accordingly. Such children should be enabled to acquire communication and socialization skills in natural situations. Systemic multimodal approach is based on this idea and its structure makes it possible for the child to learn empirically and link situations at that particular level. It is tailor-made to fit the individual characteristics of the situation, interests, needs, child's age and the conditions in which s/he lives.

Gradual expansion of the social situation and the environment, where the treatment is carried out, is meant to avoid rote learning and stereotyped behaviors, and the involvement of family and wider environment is essential for achieving the best possible results.

**Conclusion**

By applying the system of multimodal approach to children with moderate and severe clinical manifestations of autism and by comparing their achievements with the relevant tests applied before, during and after the application of this method, we can conclude that it was not possible to influence the change in terms of categories, but it has shown some progress in the functionality of diagnostic category. This shows the lack of statistically significant differences in the Childhood Autism Rating Scale, as well as the level of symptoms, and statistically significant differences in Ganzberg II test that tells us about the level of skills in quantitative terms, i.e. the frequency of performing ac-

### Table 5. Socialization, Communication, Work, General Condition

<table>
<thead>
<tr>
<th>Scale/Skala</th>
<th>Measurement/Merenje</th>
<th>Arithmetic mean/Aritmetička sredina</th>
<th>T-test/T-test</th>
<th>DF</th>
<th>P</th>
</tr>
</thead>
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<tr>
<td>Socialization (Ganzberg II)/Socijalizacija</td>
<td>3rd measurement/3. merenje</td>
<td>16.94</td>
<td>-3.00</td>
<td>16</td>
<td>0.01 *</td>
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<tr>
<td>Socialization (CARS)/Socijalizacija</td>
<td>3rd measurement/3. merenje</td>
<td>18.53</td>
<td>-0.91</td>
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<td>0.38</td>
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<tr>
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<td>3rd measurement/3. merenje</td>
<td>8.09</td>
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<td>16</td>
<td>0.03 *</td>
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<td>1.07</td>
<td>16</td>
<td>0.30</td>
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<tr>
<td>Work (Ganzberg II)/Rad</td>
<td>3rd measurement/3. merenje</td>
<td>4.12</td>
<td>1.07</td>
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<td>0.30</td>
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<td>Work (CARS)/Rad</td>
<td>3rd measurement/3. merenje</td>
<td>30.06</td>
<td>1.07</td>
<td>16</td>
<td>0.30</td>
</tr>
<tr>
<td>General state Ganzberg II total/Opšte stanje Ganzberg II ukupno</td>
<td>3rd measurement/3. merenje</td>
<td>9.79</td>
<td>1.65</td>
<td>16</td>
<td>0.12</td>
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<tr>
<td>General state CARS total/Opšte stanje CARS ukupno</td>
<td>3rd measurement/3. merenje</td>
<td>111.24</td>
<td>3.09</td>
<td>16</td>
<td>0.01 *</td>
</tr>
</tbody>
</table>

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tivities covered by the test and independence in the domains of functioning.

The results of both tests indicate that there has been some significant progress in the general state of children functioning. Having been treated by systemic multimodal approach for a year, the autistic children became more receptive and open to accept new contents offered to them from their immediate surrounding and to apply the acquired knowledge and skills in different social situations. Encouraged to enter spontaneous, natural, everyday communication, which was getting more complicated and consolidated by the variety of systems of social interactions, children were enabled to learn from their personal experience. By expanding the experiential circle, we encouraged the children not only to acquire the communication skills but also to gain knowledge about themselves and their environment as well as the opportunities to interact with it. Such a way is good for encouraging the development of interest in the environment and the opportunities offered by this environment.

The results of this study indicate the likely direction in designing new methods, plans and programs to work with children with autism. Systemic multimodal approach to autistic children as a form of targeted experiential and interactive learning is a form of treatment that, with the appropriate adjustments and adaptations, can be used as the primary or adjuvant treatment in all segments of the educational work and during all phases of life, regardless of age and the clinical picture. Detailed research towards the implementation of treatment and possibility to retain its effects as well as the impact of factors of maturation and the treatment itself on the development of certain functions would contribute to the promotion of the systemic multimodal approach and its correction in order to achieve better results.

References