

Development of Adaptation Tools for Pupils on the Autism Spectrum in Microsystems

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Abstract

This research investigates the possibilities for the development of adaptation tools for pupils on the autism spectrum (AS), studying in the first and second forms, within their microsystems. Five mothers and five teachers of children on the AS participated in the research, and their insights help reveal the process of moving from one microsystem to another for a child on the AS. Children studying in the first and second forms were chosen because children experience a particularly significant social turning-point during this period. The following question is raised: How do synergy-driven processes taking place in the microsystems of pupils on the AS contribute to the development of the adaptation processes in these children? The research data was collected via semi-structured interviews and underwent qualitative content analysis.

The research results reveal that the development of adaptation tools in children on the AS is determined by a mesosystem that covers various combinations of microsystems, and the synergy between the factors of the microsystems creates conditions for a child's gradual transfer from one microsystem to another, perceiving the mechanisms of its functioning, and adapting within them. A mesosystem, which evolves on the school campus, within a family, and with specialists, not only encourages the development of adaptation tools in a child on the AS but also helps mothers to restore their inner harmony and actively engage in their children's education process. In the microsystem of their peers, children on the AS acquire fundamental instruments for participation in community activities.

Keywords: Autism spectrum, adaptation tools, microsystem, mesosystem

Introduction

Adaptation is the process of adjustment of interlinked human functioning systems (biological, psychological, and social) through changes in cognitive structures and behavioral expression, with the aim of restoring balance with an environment that has new requirements by mutually interacting with it and causing mutual impact. The manifestations of a child's adaptation are considered adjustment to changing social conditions (Rotheram-Fuller, Kasari, Chamberlain, & Locke, 2010). Biological factors that are important for the success of adaptation include the child's development level at the moment of the social turning-point (Vygotsky, 1991), the quality of biologically determined social functions in the brain (Cozolino, 2014; Richardson, 2019) such as neuroplasticity, which is the ability of the human brain to change and regenerate even after organ damage, and the ability to adjust to changing situations and states of being as the person consistently and continually learns new skills or repeats existing skills (Doidge, 2007). Psychological processes that contribute to successful adaptation are linked to self-regulatory functions, the essence of which is the ability to adapt positive and negative emotions caused by a certain experience and to respond in a socially acceptable manner to daily life requirements by employing emotions ranging from happiness to sadness, from nervousness to tranquility, and from anger to joy (Hamlin, 2016).

The social dimension in the process of adaptation includes the personal ability to independently function in society using daily life skills (Hill, Gray, Kamps, & Varela, 2015), particularly the ability to initiate, maintain, and build friendly relationships with one's peers. These abilities facilitate the process of fulfilling school requirements and adjusting to them (Gresham, Van, & Cook, 2006).

The success or failure of adapting oneself in a social environment also depends on the package of adaptation tools that the child has at their disposal. Autism spectrum disorder is a developmental disorder with clear neurological symptoms (Stampoltzis, Defingou, Antonopoulou, Kouvava, & Polychronopoulou, 2014) that continue throughout the entire lifespan (Hamlin, 2016). The inability of pupils on the AS to adequately and flexibly interact with the environment reflects the lack or inadequacy of tools vital for adaptation (Preis, 2007). When examining this issue, focus is placed on the level of mental development (Mouga, Almeida, Café, Duque, & Oliveira, 2015), the person's age, the extent of AS symptoms (Hill et al., 2015; Kenworthy, Case, Harms, Martin, & Wallace, 2010), abstract reasoning skills and flexibility of thoughts (Williams, Mazefsky, Walker, Minshew, & Goldstein, 2014), perception of facial expressions (Wallace, Case, Harms, Silvers, Kenworthy, & Martin, 2011), executive function (McLean, Harrison, Zimak, & Morrow, 2014; Pugliese, Anthony, Strang, Dudley, Wallace, & Kenworthy, 2015; Pugliese, Anthony, Strang, Dudley, Wallace, Naiman, & Kenworthy, 2016), specificities of sensory processing (Lane, Young, Baker, & Angley, 2010), and having attention deficit/hyperactivity disorder (Ashwood, Tye, Azadi, Cartwright, Asherson, & Bolton, 2015).

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Researchers have established that the state of chronic stress is characteristic of children on the AS (Hamlin, 2016; Kushki, Drumm, Mobarak, Tanel, Dupuis, Chau, & Anagnostou, 2013). Response to stress differs in children with and without AS. In stressful situations, children on the AS experience stronger reactions to stress. An important circumstance has been established, namely, that children on the AS with higher IQ values experience prolonged stress, and the stress levels of seemingly calm children never reach zero (Kushki et al., 2013). According to Attwood (2006), the high intelligence of a person on the AS still does not guarantee efficient application of stress management strategies. Therefore, if the means of reducing stress are not applied, the stress significantly reduces the adaptation abilities of children on the AS despite their intelligence levels (Hamlin, 2016).

It is considered that people on the AS have a damaged mirror neuron system, which causes obstacles in learning through observation and disturbs verbal and non-verbal communication, emotional stability, and empathy. It has been established that the brains of persons on the AS function more actively when observing and analyzing objects yet show little or no activity in face recognition. When asked to recognize emotions on a face, they analyze separate features but not the whole. These brain activity characteristics might result in anxiety and misunderstandings during interactions (Cozolino, 2014). Nevertheless, resources facilitating adaptation have an important role in the adaptation process. In most cases, these resources include the children's excellent visual and spatial memory, inclination towards adhering to structure, and special fields of interest (Tender, 2009). Importantly, persons on the AS might be characterized by different levels of autistic symptoms, various cognitive abilities, and behavioral adaptivity (Iovannone, Dunlap, Huber, & Kincaid, 2003; Kanne, Gerber, Quirnbach, Sparrow, Cicchetti, & Saulnier, 2011).

Brain neuroplasticity is considered an important adaptation resource for children on the AS. The brain is capable of changing its structure and function according to reasoning and activity. The formation of synapses is the grounds for any type of learning. These synapses are preserved according to the principle of "use it or lose it." Continuous work and repetition that helps form new connections between neurons also helps instill obtained skills. It is not only the effect of the action but also the imagination that might affect the brain (Doidge, 2007). There is no coincidence in the fact that along with the growing volumes of research in neurology and neuropsychology and their publications came an increasing popularity of education programs focusing on the development of social skills and competences in children on the AS, both through specialists' individual work with the child on the AS and by involving peers in the process (Reichow & Volkmar, 2010). These researchers established correlations between certain brain functions and social communication issues. Regardless of how biologically determined the reasons for AS are, brain neuroplasticity theory confirms the universal potential in the brain to change and adapt by learning various new or lost skills (Doidge, 2007). The adaptation of children on the AS occurs in close interaction with the surrounding environment. The social environment affects the child's cognitive and emotional spheres and their behavior, while at the same time the system is influenced by the child's behavior. Therefore, the quality of adaptation depends not only on the person's efforts and characteristic

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traits but also on the effect caused by their surrounding environment (Steinbrenner & Watson, 2015). The child's education environment includes the interacting participants in the educational situation who form specific systems. Microsystems are the closest ones to the child. Here, the child participates via direct interaction. The child's fundamental surrounding microsystems include their family, school, and peers. Education in individual environments differs due to the varying grades in which they exert influence; however, as both microsystems co-operate, the relationships between them result in a mesosystem that follows similar principles (Sheridan & McCurdy, 2005). Relationships between parents and teachers and between parents and the child's friends are of particular importance to the children. Firm and positive connections within microsystems create a favorable context for children's development (Buzaitytė-Kašalynienė, 2015; Kato, 2018; Liu, 2019). The participation of a person with insufficient adaptation tools in these systems is limited and continuously causes feelings of insecurity. A solution is the elimination of social barriers from the environment and the development of the person's system of adaptation tools.

In summary, it can be claimed that science provides substantiation for the effect of the biological, psychological, and social systems of human functioning on the adaptation of children on the AS. However, in order to facilitate the process, it is important to understand the mechanisms of interaction, which impact the development of adaptation tools.

The aim of the research is to examine the factors of the microsystems the child participates in and analyze the significance of the interaction between the systems for the development of adaptation tools in these children. This research is based on Vygotsky's Cultural-Historical Theory, in which he explains the diversity among children and substantiates disability-caused situations of "social dislocation" (Rieber & Carton, 1993). According to the theory, the adaptation of a person with a disability in society is more successful when social interaction favorable to the person is created and the environment is adjusted accordingly, rather than when attempting to overcome the biological basis of the disability.

Research Question

How do synergy-driven processes taking place in the microsystems of pupils on the AS contribute to the development of the adaptation processes in these children?

Methods

Research Design

In order to answer the research question, a qualitative research approach (Harding, 2018) was chosen. Qualitative Content Analysis, a version of deductive category development (Mayring, 2014), was applied for data analysis. The conceptual framework of the research organization is provided in Figure 1.

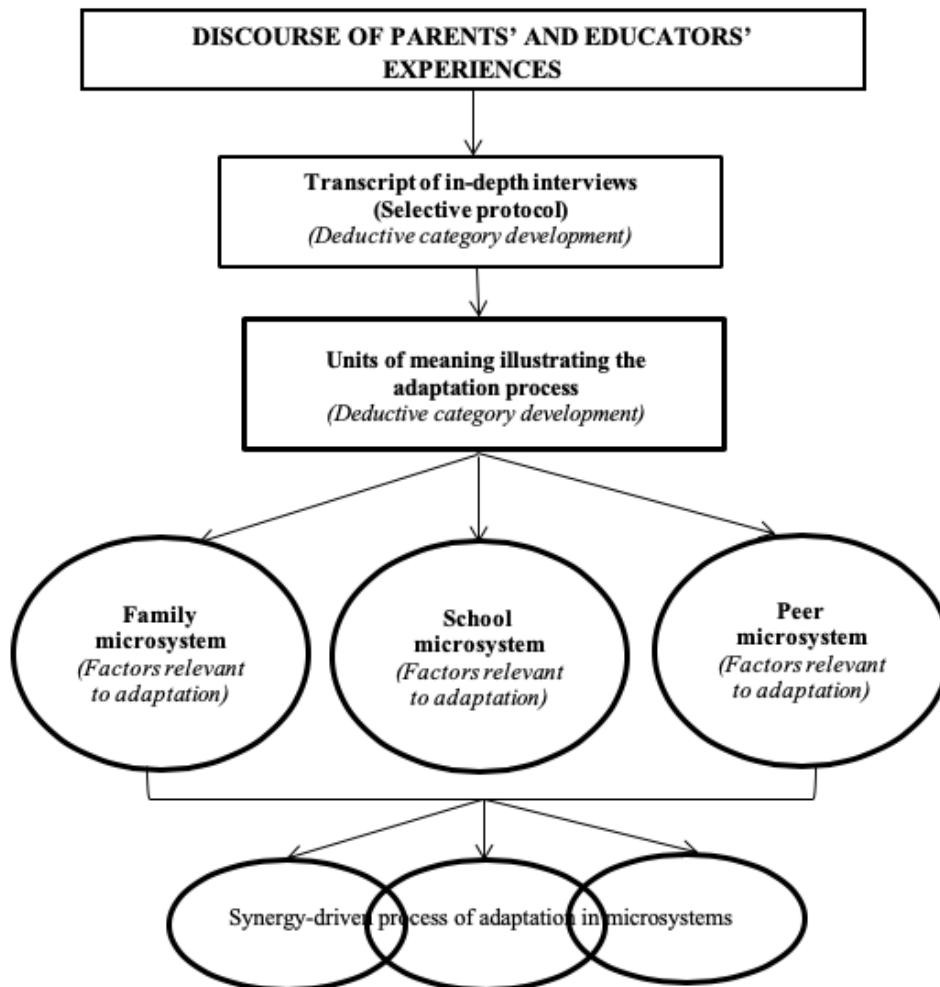


Figure 1. Conceptual framework for the research

When analyzing the discourse of parents and teachers of children on the AS on their personal experience, units of meaning are identified which illustrate the children's adaptation process. The units of meaning are attributed to one of the microsystems. The microsystems that are significant in the adaptation process were identified based on the results of scientific research analysis. While analyzing the microsystem factors that affect adaptation, we looked for features that indicate links with other microsystems, which build the mesosystem around the child. The expression of factors encouraging adaptation was investigated in terms of the course of the child's adaptation and the development of their adaptation tools as well as the experience of other participants of the mesosystem.

Research Participants

The research participants were five mothers raising children on the AS and five teachers that educate these children (Table 1).

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Table 1. The characteristics of research participants

Participants	Age of participants	Work experience of the teachers	The class in which the child learns	The school the child attends
Mother	37	-	First	
Mother	38	-	Second	Mainstream classroom in a mainstream school
Mother	42	-	Second	
Mother	40	-	First	Specialized classroom in a mainstream school
Mother	46	-	First	Special school
Teacher	49	27	First	
Teacher	58	30	Second	Mainstream classroom in a mainstream school
Teacher	29	2	Second	
Teacher	61	39	First	Specialized classroom in a mainstream school
Teacher	23	2	First	Special school

Note: All the teachers had fewer than two years of experience working with children on the AS.

All the mothers who participated in the research had degrees in higher education. The average age of the mothers was 40.6 years (from 37 to 46 years of age). The children of three mothers attended mainstream schools. One of these children attended the first form, and the other two were in the second form. The child of the fourth mother learned in a specialized classroom (designed exclusively for children on the AS) at a mainstream school; he was in the first form. The child of the fifth mother attended the first form at a special school. The children's age varied from 7 to 8 years. The average age of the teachers was 43.9 years, ranging from 23 to 58 years of age. The average work experience of the teachers was 19.8 years (ranging between 1 to 39 years).

Sampling

The purposive sampling method was used when designing the research. Families that belong to a parent support group on the Facebook social network were invited to participate in the research. Invitations to participate were extended to parents of children on the AS learning in the first or second grades because at this stage, the children go through a particularly significant social turning-point. Mothers of five children expressed willingness to participate in the research, but not a single father responded to the call. Through cooperation with the children's mothers, the children's teachers (five) were also invited.

Data Collection and Data Analysis Technique

Qualitative research was carried out. An in-depth interview method was applied for data collection. Once the fundamental question was posed to the interviewee, the conversation was further developed in a way to create conditions for her to reveal her personal experience. The duration of interviews with each interviewee was 1.5 - 2 hours.

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Data analysis was carried out with the help of latent content analysis (Mayring, 2014) and involved four phases following the data coding agenda (see Table 2). The first preparatory phase covered transcribing the interview material, preparing a selective protocol, identifying and defining units of meaning, and illustrating the process of adaptation. In the second phase, categories were developed in a deductive way. In the third phase, the units of meaning were selected and attributed to categories according to set characteristics. Finally, in the fourth phase, links were identified between factors from different microsystems. The links within the microsystem as well as their impact on each child's adaptation were analyzed.

Table 2. Data coding agenda

Categories	Features of units of meaning	Features of cross-section analysis
Family microsystem	Prevalence of factors related to family members or family environment	Prevalence of links between the factors of family microsystem with factors of other microsystems
School microsystem	Prevalence of factors related to school actors or environment	Prevalence of links between the factors of school microsystem and those of other microsystems
Peer microsystem	Prevalence of factors reflecting the child's or their peers' activity	Prevalence of the factors of peer microsystem, interrelated or linked to factors of other microsystems

Research Ethics

Research participants were invited to voluntarily participate in the research and were ensured complete anonymity. The aim of the research and its implementation were clarified to all participants. The teachers' participation in the research was arranged with school leaders. With prior agreement, the interviews were recorded on a voice recorder to be transcribed later. The names of the research participants were encoded in the following manner: mothers: M1-M5; teachers: PM, GM, SK, and SM. The names of children mentioned in the article were changed.

Findings

The data was analyzed in accordance with the main research question, "How do synergy-driven processes taking place in the microsystems of pupils on the autism spectrum contribute to the development of adaptation processes in these children?" The units of meaning in the discourse of the interviewees are grouped into categories and analyzed in terms of their impact on the adaptation of the child on the AS.

Family Microsystem

In the adaptation process of a child on the AS, the factors within the family microsystem constitute a fundamental condition ensuring the child's safety and creating conditions for his or her launch into other microsystems.

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The social turning-point that the families were preparing for and that took intensive effort encompassed the child's joining activities in the school microsystem. Research results revealed school selection criteria used by families with children on the AS. Evidently, the families did not follow their right to educate their children at a school close to home but attempted to find a school that would constitute the most favorable environment that would best meet their needs. The search criteria differed.

... I saw the good-natured attitude of the principle and thought the teachers should share the same. In addition, I said: "See, they're waiting for us here. Do you understand? We are welcome here. We will come here on the 1st of September." (M3)

The attitude and approach I felt from the school administrator sold me. I will be heard here. (M5)

... we decided we should try and send him to a mainstream school. If it doesn't work, then we will go to specialized classrooms. Because currently, integration into mainstream classes in higher school years is not fully ensured. ...The child will not have special conditions all his life. Otherwise, he will be with disabilities all his life then. (M1)

We chose the place with more assistance from a speech therapist available. (M4)

The results of the research show that when making decisions at the sensitive moment of choosing a school, families assign great emphasis to potential psychological and educational environments that might help their children adapt in the new microsystem. Interestingly, in many cases, the determining factor in the families' decisions was the attitudes of school leaders, which allowed prediction of interpersonal relationships within communities. The families of M3 and M5 chose different types of education institutions after conversations with their leaders. The family of M3 decided to attend a mainstream school, as they believed in the school community's openness to pupils with special needs, while M5 chose a specialized education institution expecting understanding and support. When considering the criteria for adapting in society, the families laid out a path to adult life. The family of M1, predicting significantly more challenges for their child to adapt in a mainstream school, nevertheless choose the latter as they believe the ultimate goal of adaptation is involvement in life in open society. In the family of M4, the possibility of assistance in the present moment was the criterion for their choice. Their goal was to solve the problem of limited communication as a fundamental tool for adapting in society.

School Microsystem

Research results show that families assign particular importance to the relationship with the people closest to their children, namely, their teachers, as the main actors in the child's adaptation process.

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... we have been very lucky with the teacher. ... she accepted our child not as a problem but as a challenge for herself as a teacher, to see that she can work with such a child. I would go as far as to say this is the absolute secret of success. (M1)

The teacher is very empathetic, and has right insights. I don't even know how to thank that person. It is a gift... (M5)

The parents did not consider the teacher's experience working with such children important. The main criterion is the attitude of accepting the child and building a favorable relationship with him or her. In cases when the teacher succeeded in creating a trust-based relationship with the family, the family might be expected to try to pass their child's successful experience and thus facilitate the child's adaptation in the school, while at the same time helping the teacher experience professional success in educating a child on the AS.

... I began my story not talking about his difficulties but about his strong sides: that he himself learned to read, he first learned the letters and then to talk and that he has a fantastic memory and is great in logical matters. (M1)

On the first days, I wrote down everything that works for him and that he likes and gave it to them. (M5)

Fully aware of their children's difficulties, the mothers (M1 and M5) tried to equip the teachers with tools that would allow creating situations that produce success for their children at school. First, they provided the characteristics of their children, including their strengths and preferences, since these features would naturally unfold only once the child was settled in the school and when favorable circumstances were present. On the other hand, in the first stage of interaction, the teacher's pre-formed attitude determined the search for the pre-formed image and postponed the first spontaneous impression.

Interaction of Family and School Microsystems

Research results show that the methods of developing adaptation tools in children on the AS for teachers included bringing school and family activities together. The transposition of activities or elements of interaction common in the family microsystem to the school helped avoid the child's destructive behavior in changing social circumstances.

... the girl carried that apple around all day. It made her feel much calmer. Later, we discovered that at home she also likes to keep some fruit or vegetable in her hand. On some days, she kept carrying the fruit or vegetable around. This is the link to the fact that home is safe. "I will make this classroom similar to my home and I will feel safe." (SK)

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When under stress, he said: "To mum, to dad." Then, I said: "OK, let's call your dad." When he calmed down, I repeated it several times. With hope and surprise, he turned to me: "To call?" When he heard his dad's voice, the child's eyes changed. A new space opened up. Not that of anger about what had happened but that of a chat with dad. (SM)

The teachers' remarks demonstrated that it is not only the imitation of the home situation in the school environment but also the development of social and psychological skills that are significant for the development of adaptation tools. When working towards adaptive behavior for children on the AS, teachers develop skills that, under usual conditions, are formed in the family.

... Now, I teach the child to cover his mouth when sneezing. He does not want to. Then, I show it with an imitative gesture: "Achoo." Then, he repeats it. If he repeats it, you are happy. Through social acts, the child himself focuses on my actions and speech. In addition, tries to do it. (SM1)

He takes a card himself and goes there. He has to have his diaper changed. However, he already goes to the toilet with no aggression. He attaches the card and changes his diaper himself. (SM2)

He used to put things into his mouth. He used to chew shoes. Therefore, we had an idea that he should chew chewing-gum. And, it worked. He no longer chews his shoe. (GM)

The child's acceptable behavior is a highly important instrument for adaptation in social environments, and without mastering it, any positive interaction with peers or other social groups is not possible. Teachers develop such behavior through imitation (SM1), alternative communication (SM2), and providing an acceptable model for the child's behavior (GM). In a well-functioning mesosystem of school and family, the microsystems are mutually supportive. Not only does the teacher teach the child skills to be trained in the family, but the family adopts the functions of the school.

Sometimes it happens that the biggest learning happens at home. He likes it. (M3)

... when we study the Lithuanian language, his focus weakens; then I say to him: "What's 18+24?" He immediately wakes up. And calculates it. Then, I ask him something else. He comes alive immediately when I ask him to calculate something. (M3)

In some cases, individualizing a learning activity and carrying it out in the most familiar environment and with the people whom the child trusts the most reduces stress factors that impede the development of adaptation tools in a new environment. In other cases, the family encourages the child to discover opportunities important to him in the school microsystem.

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“Do so that I have no English lessons.” I then started motivating him saying that all computer terms are English. He wants to be a computer specialist. I told him he would need it. And now, he’s in seventh heaven, learning English. (M3)

I tell him: “I will give you two euros every day, and you can buy what you want for lunch.” He says: “To me, and I can buy whatever I want? They will not give me food?” I tell him: “They will not give you food. You have to go and order yourself.” Thus, he first started to enjoy school because he could choose the food. Since it is very important for him to eat. (M3)

Aware of their child’s expectations, the family helps him find meaning in various activities in the new microsystem and relates them to the realization of his expectations. Thus, the understanding of meaning acquires the shape of an adaptation tool. Activities at school are not limited to learning. It is a complex system based on socio-psychological links. The needs of the child as a fully-fledged participant in that environment are not limited merely to active synergy between the teachers and the parents. Therefore, the microsystems of peers and specialists are brought into the mesosystem of the school and family, expanding it and adopting an important role in it.

Peer Microsystem

Although autism implies an inclination to solitude in children with the syndrome, relationships with peers nevertheless constitute an important adaptation element. A child on the AS has encounters with their peers that begin immediately upon joining school activities. However, for the interaction between children to emerge, a lengthy and complex adaptation period is needed. Research results show that introducing the child to their classmates and explaining his or her needs does not suffice. Interpersonal relationships are formed gradually, in various situations, and with various participants involved. Research shows that the teachers’ attempts to encourage interaction between pupils externally has little effect.

We suggest that other children should invite him to play together. He does not come. And so, they walk away, they do not invite him again. (M2)

However, Lukas refused to work in teams and worked on his own. (M3)

Mothers shared their children’s unsuccessful experiences when effort was made to involve their children in other children’s ongoing activities through external acts but without providing adaptation tools. The attempts failed. However, when providing targeted training to the child on the AS to communicate, a different result might be expected.

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In ABA sessions, the therapist would invite our neighbors' children and play games outside together with them. He would teach my child to join in to common play together with other children. (M2)

... she (the ABA therapist) says: "Look them in the eye. And ask: please let me take some." She teaches ways to talk to children, and what not to do. (PM)

When adjusting to the child's situation and participating together with him or her, adaptation tools gradually emerge. Teaching occurs in different microsystems, including the school and the neighborhood. Research shows that children on the AS are not indifferent towards relationships with other children.

"I do not want to go to school. Because I have no friends there." (M2)

However, the acquisition of tools for adaptation in a community is gradual. The material in the interviews with teachers and mothers reveals the taxonomy of the process of adaptation amongst one's peers (see Table 3).

Table 3. Taxonomy of Adaptation Processes of Children on the AS amongst Peers

Stages	Substantiating evidence
1) Observation	<i>That child takes pencils and colors that detail. And so, he does the same. He copies. ... He sees what other children do. (PM)</i>
2) Interest	<i>... for a long time, he did not truly need any interaction with children. And now, I think he would already like to make friends, and he has two imaginary friends. I think this is a step towards finding friends at school. (M1)</i> <i>... they started playing hide-and-seek with his sister. They agree between themselves that they're going to play. This is a very special activity of theirs. If one of them proposes it, they both agree. This is their first game together as such. (M1)</i>
3) Communication	<i>In the second form, he found some girl as his friend who talks to him a little. Now, he feels a little better. Sometimes I find him talking to some child. The assistant sees me and says: "You know, some child came and said: 'Let's go play.' And they left." This is magical news for me in the middle of the second form. (M2)</i>
4) Friendship	<i>... he already has friends. He lists all the children, tells me who is ill, and who wanted what. He tells me. (M4)</i>
5) Empathy	<i>"I wish to invite them to the cinema." All of them... "OK," I say, "let's try." Everyone was happy about it and we went to the cinema... together with the whole class. All the children said "Thank you" to him. Therefore, he was very satisfied. (M3)</i>

The results of the research allow identifying the taxonomy of the adaptation of children on the AS in their peer microsystem. The taxonomy includes five stages: 1) observation, 2) interest, 3) communication, 4) friendship, and 5) empathy. The taxonomy corresponds to the sequence of the regular development of interpersonal relationships within a community. However, the interesting fact is that in this process, the initiative to communicate comes from the child on the AS. This initiative naturally evolves from the child's needs and cannot be imposed from the outside. In the education process, it is important to encourage this initiative, to "awaken" it,

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but as long as it is absent, a fully-fledged adaptation and interaction in the community is impossible. This result of the research unveils the particular importance of the peer microsystem for the adaptation of a child on the AS. It is in that microsystem that the main tools for independent participation in a community are acquired.

Specialist Microsystem

Although the factors related to specialist activities were not separated into an individual microsystem when designing the research, in the research itself they are nevertheless described as factors of a separate microsystem that interact with factors of other microsystems. To achieve full adaptation, the child on the AS is brought into the microsystem of specialists as well.

Thank you to our ABA therapist... She turned letters and numbers into one of his interests. For instance, he says: "No, I don't want to do homework." And once we finish it, he takes his little book where he also has to write letters. In addition, during the break, he writes letters for his own pleasure. His greatest tragedy is if we forget to take his exercise booklet. Because he then cannot write letters. (M1)

The specialists work directly with the child, solving their specific problems and forming skills that facilitate the process of adaptation. In other cases, they collaborate with the teachers, thus indirectly helping to build an educational environment favorable to the child's adaptation.

... the teacher collaborated strongly with the ABA therapist. Because the ABA therapist comes to the school after the lessons are over. (M1)

In the specialist microsystem, specific education models based on scientific research and successful practice prevail, which are applied to the education of an individual child. The research participants revealed that in the education of their children, Applied Behavior Analysis is often applied, otherwise referred to as ABA. This analysis is based on the analysis of functional links between a specific behavior and its consequences. According to the research participants, to develop adaptation tools in children on the AS, the specialists apply art therapy, theatre therapy, and hippotherapy programs.

Results and Discussion

The results of this research show that the development of adaptation tools in children on the AS is not limited merely to activities in the school or family microsystems. The connection of these two microsystems results in a mesosystem where fundamental mechanisms of adaptation processes are active. The efficiency of a child's education in a mesosystem of the school and family was proven in research results from Iovannone et al. (2003), Charman et al. (2011), and Lilley (2019). However, satisfying the need to develop adaptation tools in children on the AS calls for interaction with other mesosystems as well. The results of this research

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reveal that determining the mesosystem in the development of adaptation tools encompasses the interaction of four microsystem factors (see Figure 2).

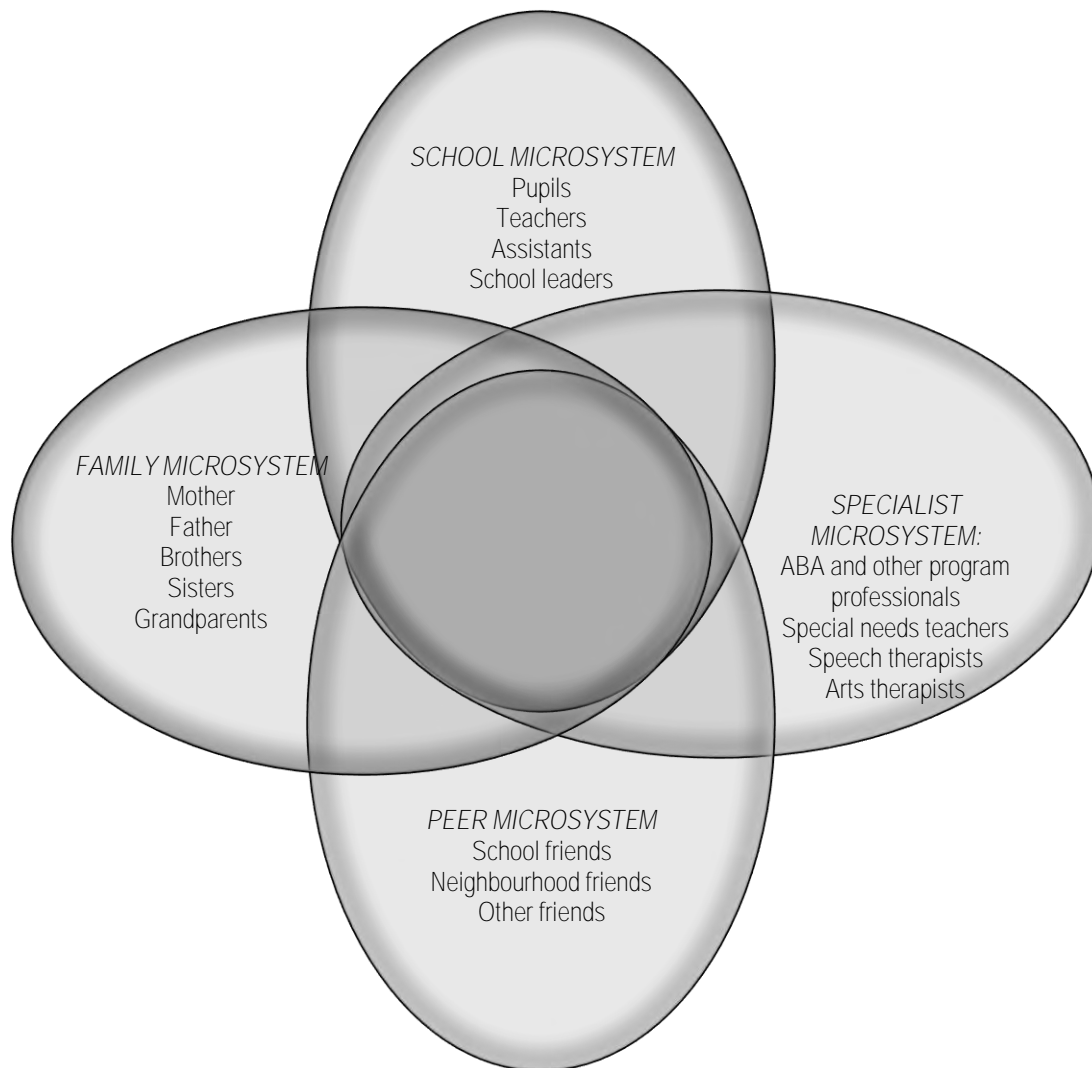


Figure 2. Mesosystem determining the development of adaptation tools in children on the AS

In this mesosystem, the interaction between the microsystems is very flexible, with two or more microsystems forming internal mesosystems according to the problems at hand. The results of the research show that as families with a child on the AS adapt to a new family situation in a period of crisis, the interaction between factors of the microsystems of the family and school and specialists are of particular importance. This interaction helps family members restore their inner harmony and discover the best methods for their child's education. The fact that specialist assistance in the earliest period of crises is crucial to increase the family's ability to take care of the child with a disability was also proven by the results of research from Kapp and Brown (2011) and Krakovich, McGrew, Yu, and Ruble (2016). Hence, the development of

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adaptation tools in a child on the AS begins with the tools necessary for the adaptation of the family: accepting the situation and empowering oneself to act for the sake of the child.

At the same time, a mesosystem determining the development of the child's adaptation tools begins to emerge. The research results demonstrate that in the child's adaptation process, the synergy of factors of family and school microsystems is the most desirable. According to Conn (2014), Goodall (2015), and other authors, children on the AS are characterized by the need to act in a clear and predictable environment. Our research results show that as the microsystems of the family and school interact in a mesosystem, elements from one microsystem are transferred to the other, thus creating an environment that contains fewer irritants and is more familiar to the child. The actors in the mesosystem have been determined to be able to exchange the goals of their roles to adapt to the child's needs. The teacher contributes to developing daily life skills, while the mother adds to teaching academic subjects. This interaction creates an expanded education environment and helps spot the most favorable moments for the formation of specific abilities under the circumstances of a natural social interaction. Thus, the child's adaptation mechanisms are naturally activated.

The mesosystem functioning on the grounds of family and school microsystems is expanded by means of the internalized specialist microsystem. When acting together, the actors of individual microsystems exchange information, make joint decisions, and create a unified adaptation tool system for a child. Charman et al. (2011) and Lindsay, Proulx, Thomson, and Scott (2013) believe that when making efficient decisions in the context of the child's education, information exchange between the family and the specialists plays a particularly important role, since perceiving the child's needs and abilities becomes crucial in the process of adaptation and involvement in community activities. It is particularly important to understand the functions of the child's specific behavior and eliminate obstacles for his or her adaptive behavior. Most teachers acknowledge that they find it difficult to understand and control the behaviors of children on the AS (Lindsay et al., 2013). Research results demonstrate that in the mesosystem determining the development of adaptation tools, specialists convey elements of programs aimed at the education of children on the AS to their teachers and parents, thus broadening the portfolio of education methods the teachers and parents use and help build an adaptable education environment.

The research results show environmental adaptivity to be a highly important condition in the process of the family's planning of their child's education and deciding on its goals. The parents who put more emphasis on the education goals relevant to the present moment choose mesosystems where the factors of the specialist microsystem prevail, and they expect specific adaptation tools to be developed. The parents who more greatly underscore the perspective of their child's adaptation in open society choose the mesosystems that include adaptive education system factors encouraging the use of adaptation tools in changing social conditions. Goodall (2015) and Hamlin (2016) believe that in all cases, the center of the planning of the educational environment is a friendly physical and social environment that reduces the child's stress and suggests possibilities for facilitating adaptation.

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Our research results show that in the mesosystem determining the development of adaptation tools for children on the AS, important significance falls on the interaction with the peer microsystem. Kasari, Rotheram-Fuller, Locke, and Gulsrud (2012), Locke et al. (2015), Reichow and Volkmar (2010), and Huber and Carter (2019) confirmed that regularly developing peers become social behavior models for those on the AS, which are more efficient than pedagogical means directly applied by the adults. The research results reveal that the involvement of a child on the AS in his or her peer mesosystem encourages his or her initiative in building interpersonal relationships. The process develops gradually, moving from stage to stage. In the first stage, the child, by participating in the peer microsystem, passively observes the activity of other children and attempts to copy or imitate this behavior without establishing interpersonal relationships. In the second stage, observation and attempts to align one's own activities to those of other peers determines interest in interpersonal relationships, which may be expressed in the aspiration to have a friend. When moving on to the third adaptation stage, the participation of other children is important. This participation encourages the child on the AS to begin to communicate and play together. These relationships gradually grow into the fourth stage, namely, friendship and curiosity in the peers' interests and expectations. As the relationships evolve successfully, the shift to the fifth stage takes place. Empathy emerges, with its first manifestations evident in willingness to bring joy and pleasure to others. In this process, assistance and support on behalf of the adults is crucial. However, the most important condition for adaptation tools is to develop a safe peer microsystem in which the child on the AS can act. Ensuring a safe environment among peers is the fundamental task for pedagogues and specialists, as the results of many studies show that lack of social skills and strategies for coping with stress in these children might become grounds for bullying. Children on the AS become victims of bullying several times more often than other pupils (Conn, 2014; Goodall, 2015). One of the signs of successful adaptation to acquiring social skills is joint games of children on the AS and their peers (Wolfberg, DeWitt, Young, & Nguyen, 2015).

Conclusion and Implications

Summarizing the results of the research, it can be maintained that the mesosystem determining the development of adaptation tools of child on the AS encompasses various combinations of microsystems, the synergy of the factors of which creates conditions for the child's gradual move from one microsystem to another, understanding its functioning mechanisms and adapting within it. It has been established that at a social break-through point, as the child adapts to the school, the closest interaction takes place between the microsystems of family and school. This interaction builds a favorable environment for the child's adaptation, and the development of their adaptation tools takes place. The specialist microsystem affects mainly the child's development of adaptation tools and creates flexible links with the family and school microsystems. The peer microsystem has indirect interaction with the family and school microsystems. In the process of the child's acquisition of adaptation tools important for independent functioning in society, the peer microsystem takes particular significance. Within it, the child's independent initiative slowly unfolds, as well as the ability to create and maintain

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interpersonal relationships. The child becomes involved in that microsystem through the use of a set of adaptation instruments acquired in the mesosystem of family and school: daily life skills, emotion control skills, and perception of meaning and possibilities. The factors that make part of the specialist microsystem are aimed at the process of overcoming autism-driven obstacles. A successful mesosystem determining the development of adaptation tools, creating safe conditions for gradual development of adaptation tools, might be an important precondition for the successful functioning of a person with ASD in society at the stage of adult life.

The limitations of this research lie in the fact that the participant group includes only mothers and teachers. To achieve more in-depth insights on the issue of the adaptation of persons on the AS, it might be worthwhile to examine the impact of the synergies between the family of the child on the AS and his or her class as a mesosystem (Sheridan & McCurdy, 2005) and the child on the AS and his or her friends (Conn, 2014) in the process of adaptation. The second shortcoming is the fact that mothers are the sole representatives of the families. The involvement of fathers and siblings in research on this topic would reveal deeper adaptation processes.

Implications

The results require deeper scientific research into the didactic issues of adaptation tools that will facilitate the processes of adaptation in society for children on the AS. The issue of adaptation of these children in an inclusive education system is of particular relevance. A deeper understanding of the educational specificities of these children is an important precondition for their welfare.

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