

CASE STUDY OF CHILD WITH ASPERGER SYNDROME

SARRIS DIMITRIOS¹,
CHRISTOPOULOU FOTEINI²,
ZARAGAS HARILAOS³,
PAPADIMITROPOULOU PANAGOULA⁴,
CHRISTODOULOU PINEIO⁵

¹Assistant Professor of Special Education, Director of Laboratory Hall of Special and Curative Education, Department of Preschool Education, University of Ioannina, Epirus, Greece

²Postgraduate Student, Department of Preschool Education, University of Ioannina, Epirus, Greece

³Assistant Professor, Department of Preschool Education, University of Ioannina, Epirus, Greece

⁴Postgraduate Student, Department of Preschool Education, University of Ioannina, Epirus, Greece

⁵PhD-Special Education, Chief of the Center for Educational and Counseling Support, Epirus, Greece

ABSTRACT

The present study focused on investigating the effectiveness of a motor intervention program, which aimed at improving the motor development of a 12-year-old child with Asperger syndrome. Furthermore, the study aimed at the possible effects of the intervention program in improving the child's adaptive behavior, given the fact that motor skills are one of the dimensions of the individual's adaptive behaviour. From the results of the implementation of the intervention program, it was found that the improvement of the motor skills of the specific case of a child brought about an improvement in his adaptive behavior.

Keywords: Asperger syndrome, motor intervention program, adaptive behavior.

1.0 INTRODUCTION

Autism Spectrum Disorders (ASDs) are chronic serious neurodevelopmental conditions that are characterized by impaired social communication and interaction, as well as limited interest and repetitive behaviors. They manifest in the first years of a person's life and significantly affect many aspects of the individual, such as his self-image, his school performance and his adaptation to the demands of everyday life. Asperger syndrome belonged to the broad category of diffuse developmental disorders, but based on the DSM-V (2013) it was incorporated into the broad category of autism spectrum disorders (ASD), (Singh, 2011).

The Asperger Syndrome is one of the five subcategories of Autism Spectrum Disorders (ASDs), according to the American Society of Diagnostic and Statistical Manual DSM-IV-TRTM. In particular, the other subcategories are Autistic Disorder, Rett Disorder, Pediatric Disorganization Disorder, and Diffuse Developmental Disorder Not Defined Otherwise. All of the above types of Autism Spectrum Disorders are neurological in nature and are usually perceived around the age of 28-30 months of the child's chronological age (Stasinou, 2016).

Regarding the incidence of ASD, according to the Center for Disease Control and Prevention (CDC, 2014), one in 68 children will have it. Parents may suspect the presence of ASD from the first months of a child's life, based on certain behavioral signs/symptoms (Bodfish et al., 2000).

Wing (1981) identified 6 diagnostic criteria for Asperger syndrome. More specifically, Wing stated that individuals with Asperger syndrome: a) in terms of verbal communication, show no linguistic delay, however, the content of their speech is formal and meticulous, b) in terms of non-verbal communication, show the minimal expression on their face, c) in terms of social interaction, show lack of reciprocity, failure to form deeper social relationships and do not express their feelings, d) in terms of their motor functions, show clumsiness, e) in terms of their general behavior, react negatively to environmental changes and g) in terms of their special abilities and activities, they have a good memory and have high levels of memorization and arithmetic.

People with Asperger syndrome usually seek communication, but they tend to approach their interlocutors in a special way, provoking negative reactions to them. At the same time, they may have difficulty understanding body language and maintaining social distance. Also, there are usually obsessive routines and intense attention to specific topics of interest. Some people with Asperger syndrome have reported hypersensitivity to sounds, tastes and smells. In terms of their mental ability, they have a normal to higher than normal IQ and in fact, some show exceptional special skills or talents. Regarding gender differences in the incidence of the syndrome, the syndrome appears to be more common in boys than in girls at a ratio of 10 to 1, however, girls appear to be more severely affected (Papadatos, 2010). Regarding school attendance, children with Asperger syndrome usually attend general education schools, in the presence of a special education teacher (parallel support).

The fastest-growing subgroup of ASD is the one in which mental disability does not coexist and is called high functionality (i.e. HFASD) (Baio, 2014). In general, people with HFASD exhibit impaired adaptive communication skills but show the greatest weakness in adaptive socialization skills (Kenworthy, Case, Harms, Martin, & Wallace, 2010). Asperger syndrome is associated with high functionality, but intervention is needed, as it has been shown that these individuals are deficient in their adaptive behavior and communication skills, socialization, daily living and motor skills. Also, being aware of their uniqueness creates particular problems in their education and daily life.

Motor development refers to the changes in motor skills that occur throughout a person's life, which reflect the development of muscle coordination and control. Also, motor skills are influenced by the personal characteristics, the environment and the interactions of these two factors. Motor skills are any form of motor activity that requires the coordination and control of large and small muscle groups and can be distinguished into activities of gross and fine mobility based on the accuracy of the movement. Gross mobility refers to the skillful use of the whole body in activities where large muscle groups are activated (Isaacs & Payne, 2002) and which relate to the fundamental motor patterns, which are acquired during infancy. Fine mobility involves skillful handling movements with the activation and use of small upper limb muscle groups (Anderson et al., 1991), which require good neuromuscular coordination, and at the same time great accuracy in performing the movement (Isaacs & Payne, 2002).

In particular, according to research by Puspongoro et al. (2016), who investigated the gross mobility of children with ASD, aged 18 months to 6 years, and its association with socialization skills, children with ASD had lower gross mobility skills compared to typically developing children. Also, deficits in gross mobility were found in 20% of children with ASD, also showing lower socialization skills than children of typical development. Martsenkovsky & Dubovyk (2018) investigated motor developmental disorders in 150 children with ASD, aged 4 to 8 years, and correlated the severity of motor dysfunction with their general developmental delay. It was found that the delay in the development of fine motor skills was associated with the severity of speech disorders. In terms of visual-motor coordination disorders, they were associated in a high level with the severity of their delay at home skills and play activities. Therefore, the presence of severe motor disorders worsens the prognosis for motor skills development and overall development, resulting in improved speech development, mimetic activity and cognitive function for children with ASD expected after motor rehabilitation.

Adaptive behavior is a multidimensional concept and consists of those skills that make a person personally self-sufficient and socially adequate (Sparrow, Balla, & Cicchetti, 2005). The adaptive behavior of the individual in its content includes the skills of daily life (personal, home, community), communication skills (recruitment, expressive, written), socialization skills (interpersonal relationships, play, leisure, coping skills) and motor skills (gross and fine motor skills), (Sparrow et al., 2005). The child's ability to display the aforementioned adaptive behaviors successfully helps him to make decisions for himself and to identify himself more easily (Sparrow et al., 2005) and at the same time facilitates him to maintain a successful relationship with his environment.

The adaptive function has been discussed as a promising outcome tool for a variety of neurodevelopmental and neuropsychiatric conditions (Anagnostou et al., 2015; Bal, Farmer, & Thurm, 2017). Farmer, Swineford, Swedo, & Thurm (2018) conducted a longitudinal study of 106 children with ASD, aged 18 months to 7 years, investigating the development of their adaptive behavior. The findings show that the first delays in adaptive behavior are stable or worsen from preschool to school-age for the majority of participating children. For some children with lower adaptive abilities, this slower-than-expected growth leads to a reduction in complex standard grades in childhood.

Liss et al. (2001) pointed out that the evaluation of adaptive behavior is very important because it allows a more accurate determination of the role of the individual in his daily life and his ability to cope with daily challenges. At the same time, the evaluation of a child's adaptive behavior can be considered for the decision that will be made regarding his educational placement, for maximizing independence when he leaves the school environment (Lee & Park, 2007), but also for assessing the effectiveness of implementing an intervention program in a child case (Foster, 2010).

Research has shown that ASD symptoms can be reduced and people with ASD can develop their communication skills (Anderson et al., 2014; Bal et al., 2015). According to the relevant literature, in this direction can contribute various intervention programs that adapt different models and combinations with treatments to improve the lifestyle of children with ASD,

reduce symptoms, but also strengthen their social interaction (Hojjati & Khalilkhaneh, 2017; Sanz-Cervera et al., 2018; Hamadneh, Alazzam, Kassab, & Barahmeh, 2019).

Based on the above, the main objective of this study was to investigate the effect of a motor intervention program, which was based on the routine strategy. The personalized intervention program lasted two months and aimed both at improving motor skills and adapted behavior of a child with Asperger syndrome.

2.0 OUTLINING THE PROFILE OF CHILDREN WITH ASPERGER SYNDROME

Gillberg et al. (2001) outlined the profile of children with Asperger syndrome. In particular, they initially referred to a) their limited social relationships (few or non-existent) and their social isolation. More specifically, they referred to the clumsy interaction of children with Asperger syndrome with their peers, to their unusual egocentrism and reduced empathy, as well as their deficits in awareness of social norms. Then, b) they referred to their communication problems with others. In particular, children with Asperger syndrome often have a strange voice, monotonous and perhaps unusually loud, use formal and meticulous language, speak to others with little concern about their response, and have an awkward or strange posture and body language. They also understand the literal meaning of language and words, having difficulty grasping their metaphorical meaning. Finally, c) their non-verbal communication behavior is absent, as they have an apathetic appearance with a few gestures and a poorly coordinated gaze that can avoid the gaze of their interlocutor, as well as they have difficulty in understanding body language.

As for their interests and routines, they usually present unusual routines or ritual stereotypes and obsessions, are upset by the changes and have limited interests, to which they are completely devoted. In terms of their mental level, children with Asperger Syndrome have a normal IQ and several of them show great skills or talent in a particular area of interest and have excellent long-term memory. Also, they all have some degree of learning difficulty, but this degree cannot be calculated from birth. In addition, children with Asperger syndrome often have sensory sensitivity, that is, sensitivity to sounds, tastes, scents, lights, and images, even if they are not perceived by those around them and may prefer soft clothes and certain food. In addition, children with Asperger syndrome often have difficulty with gross and fine mobility and activities that require coordinated movements, such as balance, cycling, string tying, coordinated movements in exercise. Also, they have strange gait, slow reflexes, they show difficulty in orienting in space and they have ugly graphic character.

Due to their inadequacy in the Theory of Mind, children with Asperger syndrome are unable to recognize the feelings of others, have a deficient ability to perceive what others know, their intentions, their interests in a speech, what other people may be thinking about one's actions. They also have a lack of understanding of common misconceptions about people and a lack of ability to deceive or perceive the deceptions of others, or the motives behind human actions (Baron-Cohen & Howlin, 1993, as reported in Stasinis, 2016). In addition, they lack the ability to think about thought and to feel one's feelings in relation to another's behavior (Graziano, 2002, as reported in Stasinis, 2016).

As can be seen from the above, one of the main difficulties identified in the cases of children and an adolescent with Asperger Syndrome is their inability to socially integrate into their peer group and interact actively (Attwood, 2000). Some effective social integration techniques and strategies are used to deal effectively with these deficits, such as providing opportunities for interaction with children of typical development - provided that peers show appropriate social and emotional behaviors (Attwood, 2000) and accept the child - knowledge about the nature of the syndrome (Faherty, 2000), the teaching of skills related to the Theory of Mind, the use of Applied Behavior Analysis, the use of social stories so that these individuals understand the various social situations (Gray, 2010).

The aim of the intervention programs for children with Asperger syndrome is to promote skills, normalize behavior and, of course, skills related to all areas of their abilities' development. Therapeutic design is individualized and interventions are determined by the child's characteristics and the capabilities of the context (Cederlund, Hagberg, & Gillberg, 2010). However, these interventions are difficult, as the symptoms of each child with Asperger syndrome are different.

3.0 METHODOLOGY

3.1 Participants

A. is a child, 12 years old, with Asperger syndrome, based on the opinion of the relevant Educational and Counseling Support Center. He is the only child of a family with a high socio-economic level (Vamvoukas, 1988). He attends a general education school with the support of a special education teacher (private parallel support). Based on the opinion it has a high mental level. The priority problem is located in his gross and fine mobility, but also in his adaptive behavior in general. He cannot successfully perform activities that involve both gross motor development and fine motor skills. More specifically, several times he stumbles and falls. He also has difficulty performing activities that require fine motor precision, such as tying his laces and has slow reflexes. He has a relatively illegible graphic character.

Difficulties are also identified in the successful understanding of social rules and their implementation. His social behavior is quirky, often eccentric, and he has limited interests. He finds it difficult to develop and maintain interpersonal relationships with his peers, due to his special approach, even though he wants to. It develops more interpersonal relationships with adults. A. has significant communication difficulties. His vocabulary is highly developed, but he hardly understands puns and metaphors. His speech is too precise and meticulous, the tone of his voice is often unusual. He usually speaks loudly and often invents words or adds consonants or other endings to known words. During a discussion, he does not know when he can interrupt his interlocutor, nor when his interlocutor has lost interest, and as a result, he often prolonging, or monologuing, or repeating the same questions to his interlocutor. He often clings to routine behaviors in order to manage his stress. In terms of his cognitive skills, he has a very good short-term, but also long-term memory, especially in matters related to his interests. His thinking is not flexible and at the same time, he presents a maladaptation to changes, new data and situations.

3.2 Measures

Using weighted questionnaires, the researcher is able to receive standardized information, which allows repetition, as well as the generalization of the findings. In the present study, the Short Form of the Bruininks-Oseretsky Test of Motor Proficiency (BOT-2) was used to assess the participant's motor development (Bruininks & Bruininks, 2005). Respectively, the Vineland-II Adaptive Behavior Scale, Teacher Evaluation Form (Sparrow, Balla & Cicchetti, 2005) was used to evaluate the participant's adaptive behavior. The validity and reliability of the English version of the tools used in the present study were well documented.

BOT-2 (Bruininks & Bruininks, 2005) is an individual psychometric tool and is aimed at children and young people aged 4-21 years. It is a tool for assessing a person's motor presence. In particular, the assessment focuses on four areas of motor development: a) fine skill control, b) coordination skills, c) body coordination, and d) strength and agility (Deitz, Kartin, & Kopp, 2007). It comes in two forms: a) the Complete Form and b) the Short Form, (Deitz, Kartin, & Kopp, 2007). The Short Form consists of 8 subtests and 14 tests. Some tests consist of two subtests. The second subtest is administered when the test taker does not achieve the maximum possible value/performance in the first subtest.

Vineland Adaptive Behavior Scales-Second Edition (VABS-II), Teacher Rating Form (Sparrow, Cicchetti & Balla, 2005) is the improved and revised form of the Vineland Adaptive Behavior Scales (VABS), (Cicchetti & Balla, 1984). The very good psychometric characteristics of VABS-II (Widaman, 2010, Sparrow et al., 2005) make it a valuable and very useful psychometric tool for assessing adaptive behavior. It has sufficient reliability and validity and has been widely used to measure adaptive skills in children and adults with a wide variety of developmental and chronic disorders (Sikora et al., 2012). It is reported as the most appropriate tool for assessing people's adaptive behavior in the autism spectrum (Lee & Park, 2007). This scale helps to design programs for people with developmental disorders, so that after their participation in them, it becomes possible to live in a less restrictive environment (Sparrow et al., 2005).

VABS-II (Sparrow et al., 2005) is available in four different versions. All four versions assess the following four areas of adaptation: Communication, Socialization, Daily Living Skills, and Motor Skills. VABS-II-Teacher Rating Form provides a targeted and understandable assessment of personal and social competence for students aged 3-21, in a school, preschool, or structured day care setting (Sparrow et al., 2005). It consists of 223 questions and its completion time is around 20 minutes. The time that the researcher needs to calculate the scores, without the help of a computer, ranges between 15-30 minutes. The assessment of the student is done indirectly by a person of the school context in which the student studies. The questionnaire is completed independently by the teacher or caregiver and covers the above four broad areas of the individual's adaptive behavior (Sparrow et al., 2005).

3.3 Procedure

For the data collection, the ethical guidelines were observed, the written informed consent of the parents for the participation of their child in the intervention program was given and the anonymity of the child and his family was maintained. The child's motor development and adaptive behavior were measured before the implementation of the personalized motor intervention program, and immediately after the implementation of the motor intervention

program a repeated measurement was performed. The VABS-II questionnaire for the child's adaptive behavior was completed by the child's classroom teacher and the evaluation of the child's overall motor development was performed by the researcher.

3.4 Intervention Programme

In the case of A. a motor intervention program was implemented, which focused on the cultivation of his motor skills and relied on the use of routine. A. participated in a customized Physical Education program lasting a total of eight weeks, with a frequency of 3 times per week and duration of 40 minutes per session. In each session, the same repertoire of exercises was repeated and so a routine for the participant was built. This pattern was chosen to be used, as the use of routines is indicated for cases of children with Asperger syndrome, as it ensures the environmental predictability factor.

The intervention program started with warm-up exercises followed the main program and ended with recovery exercises. The warm-up phase lasted 10 minutes and the participant did a bike or treadmill or elliptical. The main phase of the program lasted 25 minutes and included orthodontic exercises, exercises to improve fitness with an emphasis on static and dynamic balance, spatial orientation exercises, fine motor exercises and coordination. The recovery phase lasted 5 minutes and included relaxation exercises.

As mentioned above, in terms of its objectives, the intervention program aimed at improving the overall motor development of the participant. More specifically, it focused on the development of fine motor precision, fine motor integration, hand dexterity, bilateral motor coordination, balance, flexibility, coordination of the upper limbs, and the development of strength. The main guide for the selection of the exercise book was the fulfilment of the objectives set within the specific intervention program, as well as the possibilities and needs of the specific case of a child. However, the final form of the content of the exercise protocol emerged after some of the elements of the protocols that were successfully applied in similar surveys were taken into account. Mainly, however, it was based on some of the exercises suggested by Auxter et al. (2001), as well as the research of Christodoulou (2016).

The type of exercise chosen was an individual-individualized exercise with supervision and guidance. The equipment used to carry out the activities of the intervention program consisted of various objects and surveillance Physical education's material. Exercises used based on their type can be grouped into fitness exercises, flexibility exercises, muscle strengthening exercises, balance exercises, orthostatic exercises and physical expression exercises. The main program included an exercise by each group of selected motor skills to be acquired. For example, a session could include a speed exercise, muscle strengthening exercises, stretching in all muscle groups to increase flexibility, a body coordination exercise, and two balance-and-propriety exercises.

4.0 RESULTS

After the end of the implementation of the intervention program, the participant's performance was recalculated regarding the investigated parameters. The same scales for assessing motor development and adaptive behaviour were used again. More specifically, the

score scored by A. in terms of the motor development parameter before the implementation of the intervention program was equal to 40. After the implementation of the intervention program, he scored a score equal to 64 (Figure 1). Regarding the adaptive behavior before the implementation of the intervention program, the score was equal to 65, while after the implementation of the intervention program it was equal to 80 (Figure 1).

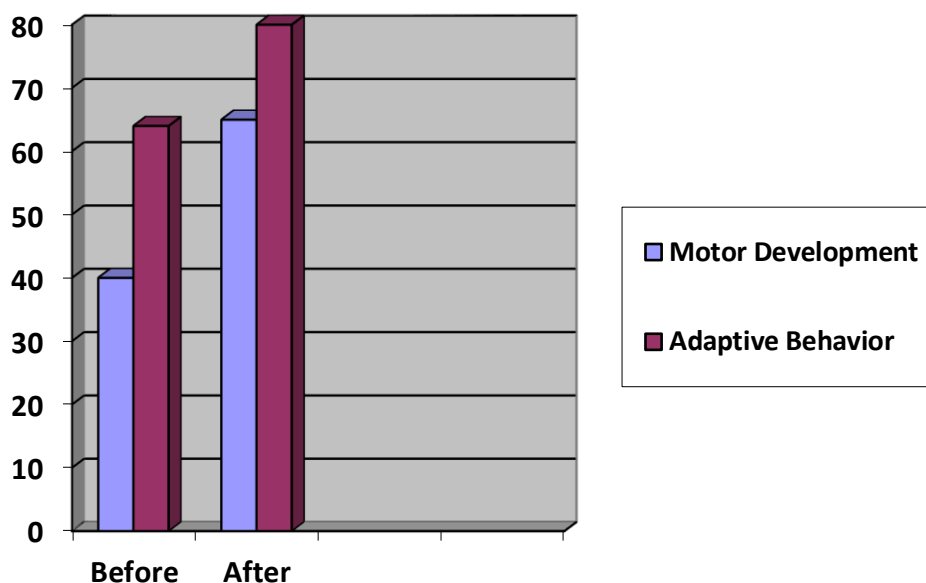


Figure 1. Motor development and adaptive behavior of the child with Asperger Syndrome before and after the implementation of the motor intervention program.

5.0 DISCUSSION

At the end of the implementation of this intervention program, it emerged that the intervention program was effective and improved both the overall motor development and the overall adaptive behavior of the participant. The above finding is important as it highlights the correlation between motor development and adaptive behavior. The importance of this finding is due to the fact that the parameter of the application of an intervention program is a potentially modifiable factor in the cases of children with Asperger syndrome. This is an indication that with proper intervention and activities tailored to the needs and particularities of each child with Asperger Syndrome, it is possible to improve his adaptive behavior skills by improving his motor skills. This finding is very important, but it cannot be generalized. Other field research should follow in a large sample of the population.

Findings that show the association between motor development and adaptive behavior in children with Asperger syndrome have also emerged from the results of other similar studies. Research conducted by MacDonald, Lord, & Ulrich (2013) on a population of people with ASD has shown that improving motor skills in children with autism helps improve their adaptive behavior. In addition, Borremans, Rintala, & McCubbin (2009) conducted research on 30 young adults with Asperger syndrome, aged 15-21, to investigate their motor skills compared to those of their peers without disabilities. They also investigated the effect of participants' age on their motor skills. According to the results of the research, young adults

with Asperger's syndrome performed motor tasks at a much lower level than their peers, without disabilities. In addition, they continued to show motor delays over time, although their motor skills appeared to improve after adolescence.

6.0 DECLARATION OF CONFLICTING INTERESTS

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