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COMPARATIVE ANALYSIS OF THE COGNITIVE AND SOCIAL SKILLS OF CHILDREN WITH AUTISM SPECTRUM DISORDERS

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ABSTRACT

Autism spectrum disorder is a neurodevelopmental disorder that manifests itself in early childhood through deficits in social-communication skills and restricted, repetitive behaviors, making it one of the pervasive developmental disorders. This social communication disorder and inadequacy in social interaction shown by children diagnosed with autism spectrum disorder is one of the diagnostic criteria for this syndrome according to the DSM-5, the Diagnostic and Statistical Manual of Mental Disorders of the American Psychiatric Association.

A quasi-experimental design was implemented with 20 participants in age 4 to 9 in rehabilitation center in Baku. The study investigated the effects of psychoeducational program strategies on children's development. The participants cognitive, language and social skills were estimated using assessment tools. Statistical analyses indicated noteworthy improvements in cognitive skills and social abilities across children ($p < .01$). Quantitative analysis demonstrated significant gains in skills and abilities among learners in the psychoeducational program groups ($p < .01$). The results underscore the effectiveness of pedagogical approaches grounded in modern educational program for children with ASD. These outcomes indicate important implications for future research, teacher preparation, and the reform of new education policies.

KEYWORDS

Autism, Cognitive Skills, Language, Social Skills, Educational Program

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1. Introduction:

The question "What causes autism spectrum disorder?" has been a question of interest for many years among scientists in both medicine and education, each conducting research in their own fields and seeking an answer. Until recently, the answer to this question would have been "we have no idea" or "there is no definitive information yet." Today, the answer to this question is provided by numerous research findings in neurochemical, neurobiological, neuroanatomical, neuropsychological, and neuropsychiatric fields (Köse, Özbaran, & Erermiş, 2012). The first and most important of these answers is that there is no single type of autism spectrum disorder, nor is its cause caused by a single cause. Over the past five years, scientists have identified several significant gene changes or mutations associated with ASD. It is explained that the various combinations of these different genes constitute the complex genetic structure of autism spectrum disorder (Aydın & Saraç, 2014; Turkington & Anan, 2007; www.autismspeaks.org). Even a small number of these genes is reported to be sufficient to cause ASD. However, in most cases, the risk of ASD appears to stem from a combination of genes and environmental factors that influence early brain development, leading to this neurodevelopmental disorder (www.autismspeaks.org; Fisch, 2005).

Literature review: Although ASD has been shown to be a common neuropsychiatric disorder, its cause remains unknown, and there is no medical treatment that alleviates its core symptoms (Autism Research Program, 2010; Bilgiç & Cöngöloğlu, 2009).

While genetic factors play a significant role in the development of ASD, the fact that the disorder cannot be explained solely by genetic factors has led to the emergence of hypotheses that factors such as exposure to environmental toxins, gastrointestinal dysfunction, and autoimmunity (self-immunity) may play a role in the disease's development (Bilgiç and Cöngöloğlu, 2009). Many theories have been proposed regarding the causes of ASD. Some researchers suggest that functional impairments in the brain regions where environmental stimuli are processed and that this damage in the temporal region of the brain may be the cause of ASD. Others suggest imbalances in the secretion of chemical substances in the body (e.g., high serotonin levels in the blood or urine), as well as exposure of families or children to toxic chemicals, are also contributing factors. On the other hand, genetic researchers also argue that genetic factors play a role in ASD (Birkan, 2009; Rutter, Bailey, Simonoff, Pickles, 1997; Volkmar, Klin, and Cohen 1997; Vural-Kayaalp, 2007). Another view suggests that uncontrolled drug use during pregnancy may cause ASD (Sökmen, 2010; Vural-Kayaalp, 2007). The view that ASD stems from neurological causes is also prevalent.

A significant portion of individuals diagnosed with ASD (approximately 35%) may also experience neurological problems such as seizures, involuntary movements, and loss of consciousness due to abnormal electrical activity in the brain. Yüksel (2005) grouped etiological factors as genetic diseases, natal, neuroanatomical, neurochemical, immune, genetic, and environmental factors. Şener and Özkul (2013) listed the factors that cause autism spectrum disorder as follows: genetic factors, medical diseases, prenatal and postnatal factors, brain damage or brain dysfunction, neurobiochemical disorders (especially those involving the dopaminergic, serotonergic, peptidergic, and noradrenergic systems), neurobiological factors, neuroanatomical factors, emotional developmental abnormalities (empathy disorders, neurosensory abnormalities), cognitive processes, and language and speech development disorders.

Autism spectrum disorder and other pervasive developmental disorders, diagnosed due to distinctive disturbances in behavior and development, are currently receiving clinical attention. While there is consensus among clinicians and researchers regarding autism spectrum disorder and related syndromes, these findings only superficially address the underlying neurobiological deficits stemming from phenotypic indicators or biological genotypes. Numerous specialized genetic and biological studies have yielded findings that help explain the causal basis of the more than 1,000 types of intellectual disability. These robust and similar studies hold promise in helping to clarify the causal relationships between autism spectrum disorder and other pervasive developmental disorders. Achieving this goal is still a long way off; however, advances in neuroscience have yielded findings directly relevant to pervasive disorders and other subtypes (Volkmar, 2005). In summary, it is now accepted that ASD does not arise from a single cause but rather manifests as a complex developmental neurological disorder through the interaction of many factors, including genetic and environmental factors (A Parent's Handbook, 2013; Baykara, 2003; Parellada, Penzol, Pina, Moreno, Gonzalez-Vioque, Zalsman, & Arango, 2014; Şener & Özkul, 2013). Researchers are conducting both national and international studies to explore the causes of ASD.

Today, the participation of families and children in research is essential to help scientists understand why autism spectrum disorder develops in some children. By participating in research, parents not only learn more about their children but also contribute significantly to science (Autism Research Program, 2010). Every piece of information learned about the causes of ASD not only guides the treatment and educational services that should be provided to children with ASD, but also contributes significantly to the development of these services. The causes of ASD are explained in the literature across different disciplines and dimensions; the findings of each are explained in relation to each other and may exhibit interconnected characteristics. Considering this, the following sections provide a more detailed overview of the most frequently discussed possible causes of ASD, including genetic, neurobiological, neurological, environmental, and familial factors.

1.1. Objectives and Hypotheses of the Study

The main objective of the present study was to investigate behavioral patterns of the children with autism spectrum disorders. An additional aim was to examine whether physical conditions of the environment are associated with students' performance. A third goal was to explore for program models of family support.

Our primary hypothesis is that physical condition is positively related with performance of the children. Our second hypothesis is that greater family support will positively affect to successful results of children.

2. Materials and Methods

The participants' cognitive skills and abilities (language, attention, social skills, and learning abilities) were searched using the assessment scale.

Independent variables – age, and gender; autism spectrum disorder level

Dependent variables- cognitive skills.

2.1. Ethics

The authors' university does not have an Institutional Review Board (IRB); therefore, it was not possible to get IRB approval for the research. Hence, he followed the appropriate ethical procedures of the declaration of Helsinki when conducting research with human subjects. The author got approval from the Rehabilitation center where he worked with the children and their families. All parents were given a written informed consent form for voluntary participation.

2.2. Sample and participants

A total of 20 children, aged 4 to 9 took part. The sample consisted of 55% males, and 45% females. All participants provided informed assent with parental consent obtained.

3. Results

Majority of the participants had mild level of the ASD symptoms, only 25% of them suffered severe symptoms. The results described in the following chart:

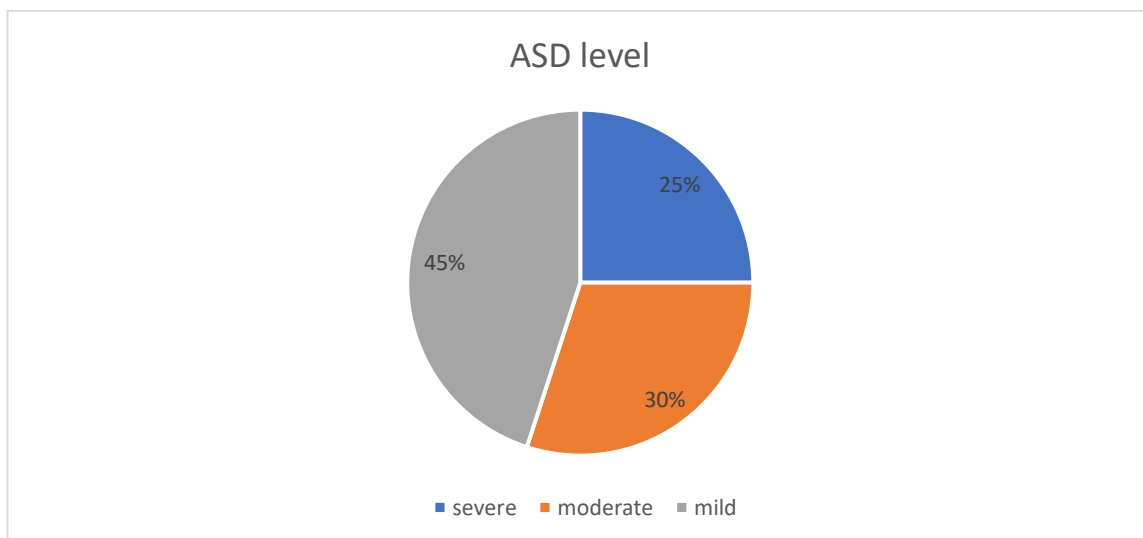


Fig. 1. ASD level and symptoms

The cognitive and social skills results were presented in the following table and picture:

Table 1. Cognitive and social skills

	Min.	mean±SD	Max.
Language skills	35	63.1±19.2	85
Attention	30	64.1±21.5	88
Social skills	28	60.1±21.5	87
Learning abilities	30	65.1±22.1	91



Fig. 2. cognitive and social skills

Above Table 1 and Figure 2 show that participants demonstrated statistically significant gains in cognitive skills, but their social skills were lower than language and learning abilities.

The difference among boys and girls were presented in the Table 2 and Figure 3.

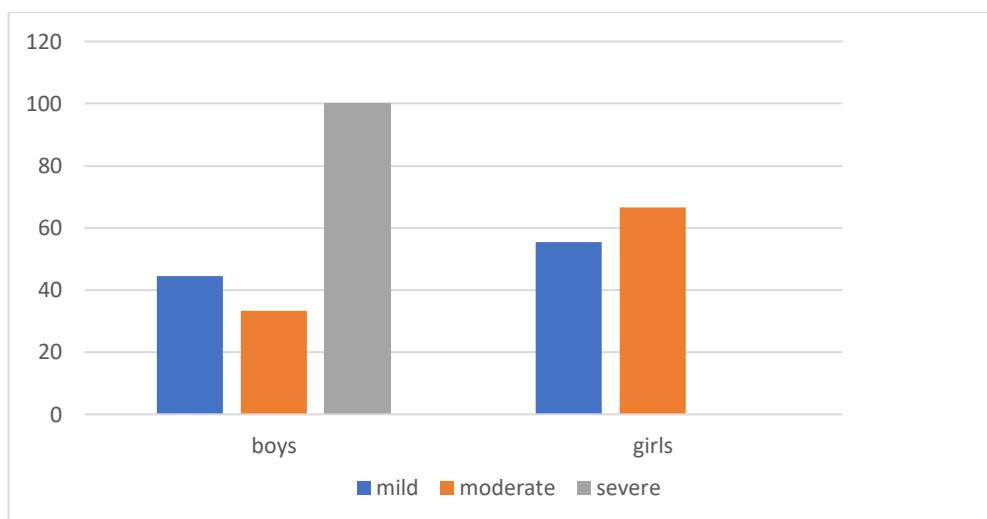


Fig. 3. ASD level (boys and girls)

Table 2. Cognitive and social skills (boys and girls)

	Boys (mean±SD)	Std. error	Girls (mean±SD)	Std. error
Language skills	55.7±20.9	6.6	71.6±15	5
Attention	55.2±24	7.5	74.1±15	5.2
Social skills	51.3±22	7.2	69.8±15	5.2
Learning abilities	56.4±24	7.5	74.7±16	5.3

There was statistically significant positive correlation between the cognitive skills and age factor of the participants. The statistical results were demonstrated in the following table:

Table 3. Correlation among the variables

		language	attention	social	learning	age
Language	Pearson Correlation	1	.998(**)	.998(**)	.999(**)	.808(**)
	Sig. (2-tailed)		.000	.000	.000	.000
	N	20	20	19	19	20
attention	Pearson Correlation	.998(**)	1	.999(**)	.999(**)	.809(**)
	Sig. (2-tailed)	.000		.000	.000	.000
	N	20	20	19	19	20
social	Pearson Correlation	.998(**)	.999(**)	1	.999(**)	.856(**)
	Sig. (2-tailed)	.000	.000		.000	.000
	N	19	19	19	19	19
learning	Pearson Correlation	.999(**)	.999(**)	.999(**)	1	.848(**)
	Sig. (2-tailed)	.000	.000	.000		.000
	N	19	19	19	19	19
age	Pearson Correlation	.808(**)	.809(**)	.856(**)	.848(**)	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	20	20	19	19	20
* Correlation is significant at the 0.05 level (2-tailed).						
** Correlation is significant at the 0.01 level (2-tailed).						

The negative correlation was examined between ASD symptoms and age factor of the participants ($r = -0.729^{**}$; $p = 0.000$).

4. Conclusions

The present research study provides valid evidence that children language, learning skills can be developed during the therapy and special educational programs. Learners demonstrated both qualitative and quantifiable improvements in language skills, and cognitive abilities.

The results indicate that social skills of the children with ASD symptoms have to be increased in the complex interactive programs. This knowledge can be transformed from passive stage to active knowledge construction. In addition to cognitive skills, learners also developed interpersonal skills, which are essential qualities for success in everyday situations characterized by rapid change and increasing complexity.

The findings of the present study have substantial policy implications. Training modules that enable to support families, and schools to practice interactive instructional design, peer feedback, and formative evaluation should be systematically integrated into tutor education programs. Furthermore, educational institutions should establish professional learning communities in which educators collaboratively evaluate and adapt interactive approaches to their specific contexts.

The study also underscores the global applicability of interactive pedagogy. Nevertheless, contextual adaptation remains essential, as effective implementation depends on available technological resources, class size, and cultural sensitivity.

4.1. Suggestions for future research

Future research should examine effect of the next group of independent variables, and explore modern humanities contexts. In addition, future studies should link interactive learning outcomes to emotional intelligence, and well-being, which are increasingly recognized as main factor of ASD population. Longitudinal and cross-linguistic research is also required, as indicated by the limitations of the present study, including its quasi experimental design.

4.2. Data availability statement

The datasets are not publicly available due to ethical restrictions protecting participant confidentiality. However, aggregated anonymised datasets are available from the corresponding author upon reasonable request, subject to appropriate ethical approval. All summary statistics are reported in this article.

4.3. Acknowledgements

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4.4. Conflict of interest

The author declares no competing financial interests or personal relationships that could have influenced this work.

4.5. Funding

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