

The Role of Physical Architectural Environment on Treatment of Autism Disorder in 4-10-Year-Old Children in Urmia

Mehrvash Kazemi Shishavan^{a*} - Sepideh Sharif Khajehpasha^b

^a Assistant Professor of Architecture, Faculty of Art and Architecture, Shabestar Branch, Islamic Azad University, Shabestar, Iran (Corresponding Author).

^b Ph.D. Candidate of Architecture, Faculty of Art and Architecture, Shabestar Branch, Islamic Azad University, Shabestar, Iran.

Received 10 April 2017;

Revised 06 August 2017;

Accepted 08 October 2017;

Available Online 19 March 2020

ABSTRACT

This study was done to evaluate the effect of physical architecture components on the treatment of autism disorder in children aged 4 to 10 years old. Using a semi-experimental design, 24 participants were selected from people referring to West Azarbaijan Welfare Center in Urmia city and were randomly divided into two experimental and control groups (n=12 in each group). At first, each group was given a pre-test by Conners Questionnaire, Parent Form, and after making changes to the physical environment of the experimental group's home and learning environment and making recommendations in this regard by their parents and caregivers, post-test was taken from both groups after 6 weeks and the results were analyzed by covariance analysis using spss18 software. The research findings showed that natural light, audio and visual connection to the outdoors, a view of nature from the child's bedroom window, the the pink and purple color spectrum, enough space for physical activity, encouraging the child to do their outdoor activities and homework as well as targeted games in the natural and green outdoors, the presence of small plants and shrubs in the courtyard and the ability of the child to interact with them can significantly reduce the severity of ADS symptoms. Regarding the significant difference between these experimental and control groups, it can be concluded that proper design of housing and educational facilities and attention to the quality of spaces may help to reduce the symptoms of autism in children.

Keywords: Autism Disorder, Therapist, Effective Architecture, Physical Environment Components, Training Center, Rehabilitation Center.

* E_mail: m.kazemi@iaushab.ac.ir

1. INTRODUCTION

The term autism is derived from the Greek concept of self. It was used by the Greek psychiatrist Bleuler in 1911 to describe the behavior of a patient. This patient displayed a tendency to become engrossed in social aspects. According to the American Psychiatric Association, these disorders are characterized by severe and pervasive damage in several aspects of development, including interactive skills, communication skills or the presence of behavior, interests, and stereotyped activities. The qualitative traits that characterize these disorders typically deviate from one's level of development or mental age. Autism usually manifests in the first years of life and is often associated with degrees of mental retardation and sometimes with a variety of general medical conditions such as chromosomal abnormalities, congenital infections, central nervous system structural abnormalities. People with this disorder, which begins before age 3, are severely delayed by abnormal social interaction, conversational language, or play (Halligan & Cross Whitburn, p. 261).

Autism is a pervasive developmental disorder that is associated with severe developmental disorders such as social interaction and communication skills or behaviors, tendencies, and extravagant activities (Presmanes Hill, Zuckerman, & Fombonne, 2005, p. 111). The IQ of people with autism varies widely. From the mentally retarded to the very intelligent can be found among the infected. This disease is four times more common in boys than in girls. Some articles have called this disease a male brain disease (Baron, 2002, p. 249). Usually in their early teens, people with autism, before the age of 3, exhibit strange characteristics in several contexts that others can find out. Although autistic disorder is not evident in almost 20% of cases in the first year or even the second year of life, the more common condition involves perceptual abnormalities from the first months of adulthood, so that parents of these children understand that their child looks different (Halligan & CrossWhitburn, 2011, p. 254). Recent research shows that autism is on the rise (Frith, & Hill, 2003, p. 28). There is a growing body of information about the prevalence of autism in general. By the early 1950s, their number was estimated at one in 10,000. Rutter (1966) and Sherman (1988) reported 4.5 per 10,000, and the latest data are reported in Sweden and the United States of Texas, 5 to 6 per 1,000. In other words, one in every 150 to 170 live births, one person (Golabi, Alipoor, & Zandi, 2005, p. 1), prevalence ratio in boys is 3 to 4 times higher than in girls, but when the IQ is 35, the number of girls increases. There is no reliable information on the number of children with autism in Iran and it is not possible to make a definitive opinion about the number of children with autism. Therefore, it may be necessary for the relevant organizations to examine the number and prevalence of this important disorder that has become

one of the country's problems. In line with treating this disease, there is no single and no definitive cure for this disorder. But according to researches among the therapeutic methods, occupational therapy, speech therapy or a combination of these have improved these children (Golabi, Alipoor, & Zandi, 2005, p. 2). Due to the complexity and seriousness of the autistic disorder, its treatment requires a comprehensive intervention program. This program should include work with families, peers, and schools, as well as the person with the disorder. In addition, it may be necessary to place the person in a disability home, at least until dangerous behaviors are controlled. But Harkness et al. believe that environmental factors that influence the behaviors of children with disabilities have not been well studied and believe that the child's environment can influence the development of behavioral disorders, while the use of drugs due to their rapid effects, and cost-effectiveness is more common (p. 115 Harkness, Raeff, & Super, 2000,). Sameroff states that overuse of medication is a temporary treatment that instead of addressing the more complex issue of trying to adopt the child and the environment, makes the problem unique to the child and neglects the role of the environment (Sameroff, 2001, p. 89). Thus, as long as drug use seems to be cost-effective and operative in solving the child's problem, the community is reluctant to dedicate resources to design appropriate environments that respond to children's behavioral needs (Gretchen & LeFever, 2003, p. 9). The children's home, school environment and social environment can vary greatly, so it is ideal to try psychosocial measures such as parent education as well as creating appropriate environments for children before introducing medication as a treatment plan. Be used to interact with the child's environment (Parens & Johnston, 2009, p. 33). Much research has recently been done on the link between architecture and autism or the design of autistic-friendly environments, which suggests that appropriate architecture can be effective in improving the mood of children with autism spectrum disorders (Mojahedi, Ghasemi Sichani, Foruzandeh, & Bahramipour, 2014, p 72). One of the most important factors affecting autistic children is the environment. The physical and mental health of these children is due to the environment that organizes the behavior within a normal, natural and self-motivated framework. The environment encompasses natural and artificial spaces, and architects as designers of the environment need the knowledge to understand the impact of natural and artificial environments on these children. On the other hand, it is also noteworthy that architecture is related to different disciplines and that architectural research should take advantage of the positive features of these disciplines. Architectural research is therefore interdisciplinary in that it adopts strategies (methods) and techniques (techniques) from other disciplines and applies them in explaining the knowledge of the application of the human-built environment for the growth of human life (Grout & Wang, 2002, p. 71).

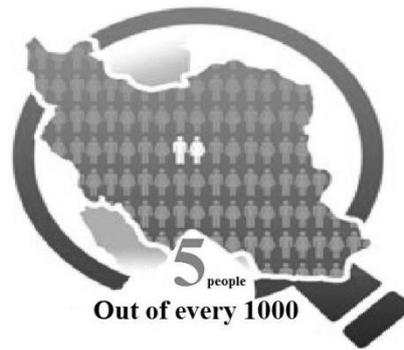


Fig. 1. The Rate of Children with Autism in Iran
(Saeidi, 2014, p. 3)

Field surveys in Iran show that most child care centers with autism spectrum disorder are shaped by the changing use of other spaces such as residential homes and by adding a few temporary walls to space, while studies indicate that the environment has an impact on the treatment of these children (Mojahedi, Ghasemi Sichani, Foruzandeh, & Bahramipour, 2014, p. 132). Therefore, this study is designed to answer the following two questions:

1. Does the physical architectural environment affect the treatment of autism?
2. What are the physical factors influencing the symptoms of autism disorder?

2. RESEARCH BACKGROUND

In a 2008 study, Hinder says that when designing a space for autistic children, it is important to have enough information about how they experience the environment, people and things around them. Bulletin offers a simple design of the building in such a way as to induce order and calm, with good signs and navigation. Mostafa has proposed the use of unbalanced spaces for autistic visually impaired children and has observed during his research that limiting learning environments both physically and visually and adapting to the physical needs of the ASD child over a given period, allows the child to remember their experience, focus, and activity. Whitehurst outlined the design of a one-story building with curved walls and high windows, and Ahrentze and Steele suggested to minimize the irritating spaces, and Yang found the combination of small and large spaces necessary. Plimley pretends that students choose paintings that use a computer and electronic tools to create the virtual world. Computers appear to be particularly popular among autistic children, and research also supports the benefits of small, personal spaces that affected children can use to quit activities that cause them fatigue, discomfort, or congestion (Lowry, 1993, p. 132).

Beaver believes that curved walls help some kids find their way in the building because they like to follow the curvature and avoid sharp corners (Beaver,

2006, p. 116). Curved walls facilitate movement in the building and are especially useful for children with visual impairments. Children experience deep sense problems; they are usually hard-pressed to understand where they are located and are unable to grasp the situation they are in (White & White, 1987, p. 89). In addition, the curved walls take away the organizational state of the place and make the space more beautiful. Some children like to walk by the wall while catching the curved wall. Curved walls in circulation spaces for children act as a guide and children find their way through these walls (Mojahedi, Ghasemi Sichani, foruzandeh, & Bahramipour, 2014, p. 84). Alistair believes that clear and distinctive signs in different spaces are essential for children and students with autism who are often dependent on visual cues (Mcallister, 2010, p. 9). Consequently, the use of visual aids in different settings is suggested. These children usually have better visual skills than hearing skills. Therefore, the use of visual aids is an effective and useful way of teaching skills and independence for these students in their educational and therapeutic settings. Woodcock believes that when the classrooms are divided into different sections and each section is dedicated to a particular activity, cognitive ability will increase dramatically, for example, separating the training section from other areas and splitting the free play area into smaller sections. Instead of a larger enclosed area full of distracting agents dealing with various functions, a clear planned attention spot was provided for these children. (Woodcock, Georgiou, Jackson, & Woolner, 2013, p. 78).

3. THE IMPACT OF ENVIRONMENT ON HUMAN

Today, it has been found that humans are more influenced by space than they influence the space (Zarghami, Nasiri, & Ejdefar, 2013, p. 410). Human behavior is influenced by the environment in which they live. Since human social behavior does not occur in a vacuum, one of the spaces influencing this behavior is the physical environment. Thus, on the one

hand, the physical environment is effective on human behavior, and on the other hand, the reflection of the physical environment is mirrored in the quality of the environment in which humans live. As such, there is an objective relationship between human beings, physical environment, and quality of life (Mohammad Nia & Zabihi, 2013, p. 1). Psychologists believe that psychological phenomena and their changes are the

results of the interaction between the human organism and the environment. The physical environments around man play an important role in the meaning and organization of his life. Studies show that many behavioral anomalies lie in addition to historical, cultural, and economic roots in the quality of people's residential, educational, and workspaces.

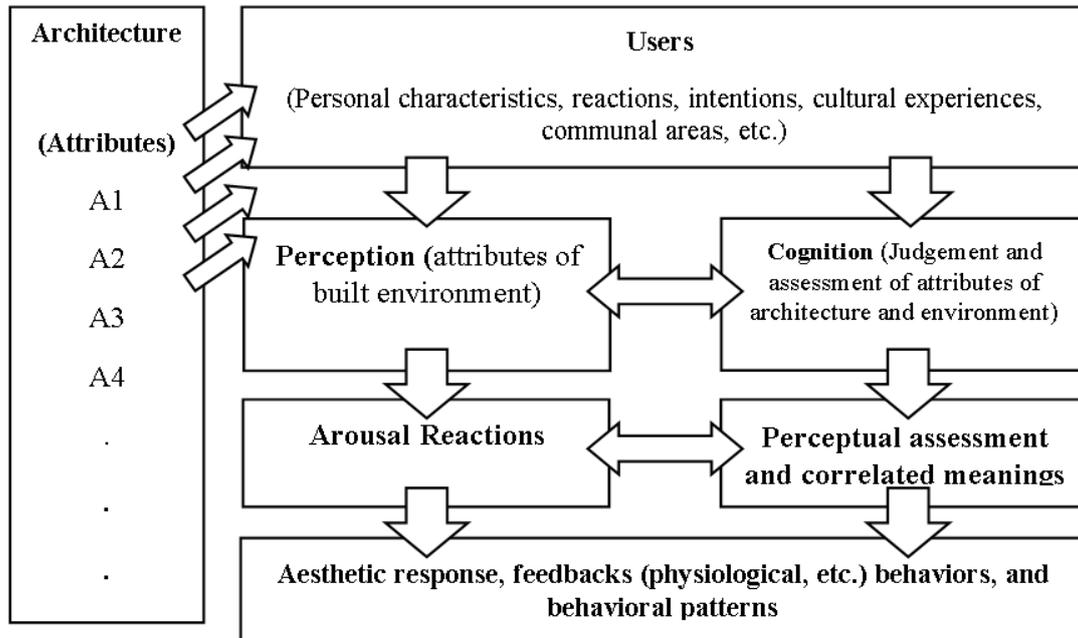


Fig. 2. Model of Feedbacks and Behavioral Responses in Explaining the Relationship Between Users and the Built Environment (Nasar, 1994, p. 379)

Physical and environmental factors are constantly affecting human life and he is changing the environment around himself more than any other creature (Altman, 1975, p. 9). Most psychologists agree that biological and environmental variables (physical and social) are both involved in growth patterns. In the structural behavioral model of growth, humans were grouped

in a continuum from inherent vulnerability to inherent invulnerability, and the environment was classified based on the continuum from informative to non-informative. This model is designed to show that the greatest risk is for children who are biologically vulnerable and their environment is not provided (Mason, 1990, p. 35).

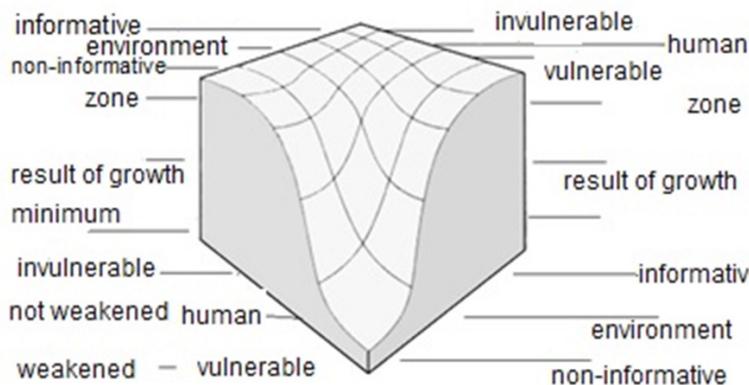


Fig. 3. Interaction Between Nature and Environment in the Structural Behavioral Model of Growth (Mason, 1990, p. 67)

Barker, the founder of Ecological Psychology, believes that there is a special relationship between the physical-architectural and behavioral dimensions (physical and behavioral bases) that express it with the concept of structure. In all living things, by virtue of the Law of Influence of and Influence on the Environment, there is a tendency to adapt to the environment in such a way that the child strives to adapt to the environment in which he or she lives and, according to Piaget, adaptation to the environment is one of the two forms

of intelligence in humans. The child initially tries to adapt the environment to his or her internal system and intelligence, but since this is not always possible, the child encounters issues and problems that do not fit with his or her previous experiences, so he adapts to the new experience. So he is not a mere active child. In other words, as can be seen in Fig. 4, compatibility with the environment is seen as a balance between internalization and externalization (Moghadam, 1988, p. 9).

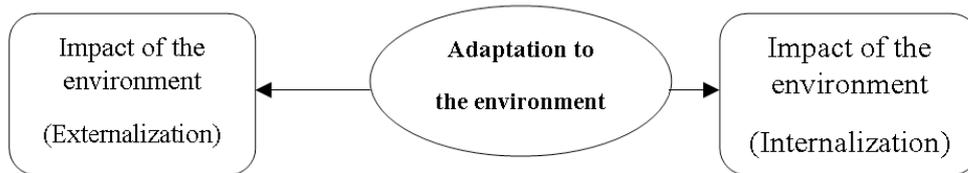


Fig. 4. How the Child Interacts with the Environment
(Moghadam, 1988, p. 29)

4. IMPACT OF THE PHYSICAL ARCHITECTURAL ENVIRONMENT ON BEHAVIOR

People's lives are influenced by communication with the environment (Jalili, 2001, p. 86) Frequently the term 'environment' in most texts refers to the socio-cultural environment, where the impact of the physical architectural environment itself is a highly significant topic (Ejdehfar, Ejdehfar, & Omranipour, 2014, p. 145). Since human social behavior does not occur in a vacuum, one of the areas influencing this behavior is the physical environment. Therefore, on the one hand, the physical environment influences human behavior, and on the other hand, a reflection of the physical environment is mirrored in the quality of the environment in which humans live. So, there is an objective relationship between human beings, the physical environment, and the quality of life.

Built environments impose some new patterns of behavior and social roles on their residents, or reinforce some patterns and behavioral measures and weaken others and, in short, add new directions and dimensions to their residents' behavior (Mortazavi, 1998, p. 70). The effects of the environment on people can be direct or indirect (characteristics and qualities of the environment directly affect activities, moods, etc.) The environment can be facilitating or inhibiting certain behaviors, cognitive processes, moods, and the like. It can be claimed that inhibitory environments are more effective than facilitators. Sometimes they seem to follow new behaviors of environmental change, but as a result, the environments that act as catalysts are better understood, they abandon behaviors that were previously blocked by highly restrictive environments. When people's abilities are reduced for some reasons, environments have a greater impact on them. Such people need more stress and effort to overcome the

inhibitory effects. In these cases, highly supportive environments are necessary (Rapport, 2005, p. 102).

5. INVESTIGATION OF THE FACTORS AFFECTING THE TREATMENT OF CHILDREN WITH MENTAL ILLNESS

The center for the treatment of children with autism spectrum disorder needs special features to treat these children, and proper education for children with Autism Spectrum Disorders needs to create a structured and appropriate environment for them to take into account the sensory needs of these children to improve their conditions. These include the effects of natural light, color, nature, the healing garden, and the greenery. The following is the introduction and impact of each one.

• Natural Light

One of the most important factors in maintaining human health is sunlight. In addition to physical health, some mental disorders can also be caused by a lack of sunlight. Designing for children should take full advantage of natural lighting (Humphreys, 2011, p.17). Humphreys recommends the use of natural light to a great extent, so designing large or ceiling windows for daylight and natural lighting is necessary. It is important because daylight enhances the ability and health of the child (Heschong, 1999, p. 59).

• Color

Research has confirmed that colors affect human mood and that they have a long history of use. (Withrow, 2004, p. 33). Generally, bright colors are exciting and dark colors have a calming effect. However, the effect of specific colors on autistic children is not always constant, so it may be necessary to try and error several different colors to determine the appropriate color for each child. Although research has shown that some

autistic children find colors more vibrant and fuller (White & White, 1987, p. 225), this is not the case at all. (Cherry, 2012, p. 135) However, autistic children may respond to certain colors and patterns in a different

way than their peers. Dark colors can make it difficult for people with chronic problems, but bright colors can also bring attention to successful motivation.



Fig. 5. Interior Design of the Western School, Using Bright Colors
(www.hedearchitects.com)

• Nature and Green Space

The role of nature goes beyond creating the right context for the game. Nowadays, research points to the important role of nature in the playground and the significant impact of nature on learning and creating a meaningful world for children (Sachs & Vincenta, 2011, p. 66). Psychologists believe that observing how plants grow and observing their changes over time, on the one hand, leads to understanding the importance of plants and, on the other hand, is a factor in reducing anxiety in individuals (Taylor, Frances, & Sullivan, 2009, p. 17.). In addition to beauty, green spaces and plants can influence the environment, which is caused by the choice of color, texture, shape, height, and harmony with the environment. Sherman et al. (2005) conducted a study on the impact of construction and natural environments on children's health, which showed that access to and connection to green spaces and exposure to nature, reduced stress, improved social interactions, and cognitive functioning. Nowadays, environmental psychologists have studied how the environment affects different people and identified nature as a very important factor in the treatment of various diseases. The fun and educational environments for children in the yard can help them to spend their time in a safe and acceptable environment and learn about the powerful benefits of nature based on their classroom skills (Sachs & Vincenta, 2011, p. 69). Ford's research has also confirmed the positive effect of light and communication with green space on children (Ford, 2007, p. 98). Research suggests that communication with nature and green space can be effective in improving children's mood and social functions (Ulrich, Quan, Zimring, Joseph, & Choudhary, 2004, p. 66).

• Healing Garden

The term garden healer is a concept whereby outdoor space can have a therapeutic role. However, healing gardens are not designed to heal the sick or injured, but to improve the mental and physical condition of these individuals depending on the design. Many sensory healing gardens stimulate a feeling. Like a perfume garden or a garden with a collection of colors. In a well-designed sensory healing garden, education, socialization, relaxation, and exercise must take place outdoors (Mojahedi, Ghasemi Sichani, foruzandeh, & Bahramipour, 2014, p. 84).

• Play and Play Space

Play is a necessity for children's lives. Children tell their thoughts through play, and just as adults express their feelings in words, they do so through play. The game is also used as a means of communication. By observing the child while playing, we can find out ability and his understanding in different fields such as interacting with others, understanding people as well as understanding them. The behaviors, opinions, feelings, and how the child expresses themselves in the game help us understand their problems and how they perceive the world around them. During the play, the child is able to solve his or her problems and thus develop confidence and a sense of independence. They express emotions such as fear, sadness, happiness, and anger through play and thus feel secure and valued. For restless children who have little control over their body movements and do not stop easily, play helps to ease their tensions and is one of the most important learning environments for children with social disorders, play and playground are suitable for teaching social skills naturally and realistically (Saeidi, 2014, p. 62) The

colors, textures, shapes and finally the layout of the playground encourage the child to interact with the environment and learn more.

6. METHOD

Assessment of children's problems is a complex process and often involves several aspects of children's performance. Therefore, choosing the correct method for measuring their problems is an important issue. The purpose of this study was to investigate the effect of architecture of physical environment on the treatment of autism disorder symptoms. Therefore, according to the purpose and subject of this research, a quasi-experimental¹ design with pre-test and post-test design with control group and experiment was designed and measured by children behavior. Different methods such as observation, play, painting and organized methods such as interviews and various psychological tests and behavioral questionnaires were performed, but since parents and teachers are most associated with children,

the questionnaires completed by these two groups were valid and reliable. It was high. In this study, the Conners 25-item Parenting Scale was used as a tool for measuring the severity of autism symptoms. This questionnaire has 25 items that was completed by parents. Parents rate their responses on a 4-point Likert scale. The range of scores for each question from zero (not correct at all, or never, rarely) up to 3 (completely correct, or often) is variable. Also, ANCOVA was used to analyze the data. The mean of the experimental group was compared with the post-test mean of the control group and the pre-test scores were used as an auxiliary variable to select the sample from the available community, so for parents of 30 children with autism disorder referring to Weste Azarbaijan Welfare Center, a 25-item Conners Parenting Scale was provided and then, out of the initial 30 people, 24 mothers and children were selected to conduct the research and to control for all intervening variables, the subjects were randomly divided into two equal groups of 12 control and experimental groups.

Table 1. Sample Distribution by Age

Groups	Control Group		Experimental Group		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
4	0	.	1	8.3	1	4.17
5	1	8.3	0	0	1	4.17
6	2	16.7	4	33.4	6	25
7	1	8.3	3	25	4	16.7
8	4	33.34	1	8.3	5	20.83
9	1	8.3	1	8.3	2	8.33
10	3	25	2	16.7	5	20.8
Total	12	100	12	100	24	100

Table 2. Distribution of Samples by Gender

Groups	Experimental Group		Control Group	
	Frequency	Percentage	Frequency	Percentage
Boy	8	66.7	7	58.3
Girl	4	33.3	5	41.7
Total	12	100	12	100

To study the effect of physical architectural components on education and rehabilitation of children in the experimental group, changes were made, but these changes were not applied for the control group. Changes such as using wallpaper with different textures and colors to cover the walls, enjoying natural light and natural and artificial green spaces, and considering larger and more varied play spaces and installing class displays that feature landscapes with their sound (for example, the sound of rain and wind, or the sound of birds, etc.) live in the classroom, and instructors were asked to install wall paintings of children across the hallway and arrange classes so that each child had a

desk, and make it possible for each student to work independently.

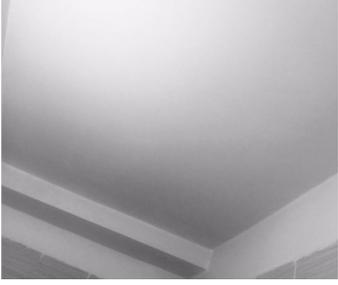
During the study period (6 weeks), both experimental and control groups continued the programs previously given by their respective professionals, which included one-week occupational therapy services and medication use. Due to the ethical considerations of the drug therapy program of these groups, according to the child and adolescent psychiatrist, no changes were made.

In addition to the same interventions, the experimental group was provided with measures to evaluate the hypothesis of the present study. In this way, the

researcher referred to the home of these children and examined the quality of their living space. Some of the children did not have a private bedroom, and their parents were asked to allocate a private room to the child with the disorder during the investigation. A room was chosen for it that it has to have first-class light, be open-air and preferably green and noise pollution be avoided. Some of these children had private rooms, but their windows did not open to the light or were covered with curtains or opaque glass. Parents were also asked to use brightly colored curtains for their child's room and during the day, set aside the curtains for the child to interact with the surroundings, and to perform activities during the day and in natural light. Yourself, including doing homework or playing. Instead of ceramics or parquet, soft flooring such as carpet should be used for

flooring. In a way that reduces the reflection of sounds. Also, if the backyard has the necessary amenities, including greenery, flowers, and plants, For at least 2 hours a day, when the lighting is good, the parents bring the child outside to encourage them to play targeted games and do some of their homework. In the absence of such a facility, parents were asked to take their child to the nearest neighborhood park for at least 2 hours a day, walk, interact, and even encourage the child to be in the green and do their homework outdoors. After (6 weeks) the mothers of all 24 children in both control and experimental groups received post-test, the data were subjected to specific conditions to explore the cause and effect relationships of the experimental group and the results were compared with those of the control group that did not.

Table 3. An Example of Making a Change Using Some of Interior Architecture Components in the Autistic Child's Place of Residence

Used Materials	Before Execution	After Execution	Description
Applying soft flooring			Replacing parquet with soft flooring
Using pictures of nature artificially			Having virtual sky and pictures of nature on the ceiling of the child's room
Using pictures of nature artificially			Using elastic ceilings to create a natural light and image in the bathroom
Using bright curtains			Replacing the curtain with silk curtains for providing more natural light and easier viewing of the outdoors

Covering wall with different materials



Creating different textures on the wall

Using wallpaper with different textures and colors



Covering wall in light pink and blue

Using flowers and shrubs



Using natural flowers in the yard or terrace of the house

7. FINDINGS

Calculation of the default covariance for the aspect showed that the interaction between the experimental effect and the covariance variable was not significant. One-way covariance showed that by omitting pre-test scores of autism disorder as a covariate, the main effect of “physical environment” variable on post-test scores,

Autism disorder is significant. The adjusted mean after excluding the auxiliary variable for the experimental group is 9.93 and for the control group is 14.73. The data in the above table indicate that the research hypothesis is confirmed and it can be said that physical factors of the environment have reduced the symptoms of autism disorder in the experimental group compared to the control group.

Table 4. Covariance Analysis for Investigating the Effect of Physical Factors on Autism Disorder in Pretest

Source of Change	SS	df	MS	F	α
Pre-test Covariance of Autism Disorder	58.67	1	58.67	20.84	0.01
Original Effect	83.80	1	83.80	64.47	0.01
Residual Error	33.19	27	1.22		

8. DISCUSSION AND CONCLUSION

The present study aimed to investigate the effect of physical environment quality on autism symptoms. Finally, the research findings show that natural light a visual and audible connection to the outdoors, a view of nature through a room window, a virtual wall and sky with pictures of nature in the room or living space, adequate space to engage in physical activity, encouraging the child to do outdoor activity and homework, and to play targeted games in the natural and green outdoors, the presence of small plants and shrubs in the yard, the structure and ability of the child to communicate with them can significantly reduce the severity of autism symptoms, and the pink and purple

range has the most positive effect on them. This color can be widely used on walls. Gray can also be widely used because it has been shown to be neutral and does not reflect light, as it will not cause a strong positive or negative reaction. Complexity of space can cause stress and incompatibility because children are not easily able to distinguish sounds and shapes and so on and this can be stressful for them. Natural lighting must be such as to avoid excessive light contrasts. Because staring at the sun, too much shade or too high light contrast, rhythmic or patterned light and shadow sequences, etc. overly intense visual stimulation is problematic for autistic children, and in artificial lighting, looking directly at light bulbs must be avoided and to use indirect lighting

Kazemi Shishavan, M. et al.

in the spaces. Also, fluorescent lamps should not be used due to the high sensitivity of children to noise and vibration and should be used in some areas to avoid misidentification and ambiguity in space. Based on the findings of the present study, it can be acknowledged that the provision of an appropriate and appropriate physical environment can be used in combination with existing approaches in the treatment of autistic children. It seems that subjects had a good feeling about being placed in the new situation, and this feeling leads to pay more attention to different issues, which they extend this attention to other situations as well. It is imperative to note that today, due to the economic conditions of society and the smaller size of homes, and consequently, lower quality of the environment, the mental health of children is at risk. Therefore, it is recommended that the importance of the quality of spaces be ignored and that attention be paid to them. At the end of the research, important points will be mentioned in the design of autistic treatment centers:

- The building should have a simple design, so that order and comfort can be found in it clearly and obviously.
- To design simple environments with low stimuli to reduce stress and worry for children.
- Not to use abstract or obscure sculptures in interior design to prevent fear and reduce stress (Ulrich, 2008, p. 8)
- Minimalism and reduced detail in map design can prevent child aggression.

- It is better to have children's paintings along the corridor to give children a sense of personal space, not a sense of organizational and therapeutic space.

- Autistic children are divided into two groups, some of whom may enjoy large and open spaces and aspire to be in smaller rooms, while others are unhappy with indoors. And for this purpose, the combination of both parts should be used.

- To avoid the use of direct light, noise and other disturbing agents (such as dead-end corridors, exposed pipes, etc.)

- To create an acoustically balanced and controlled environment because the sound of children is high frequency (Mostafa, 2008, p. 9)

- To install displays in classrooms that broadcast landscapes of nature with their voices in the classroom.

- Classes should have separate work desks separated by two walls and allow each student to work independently.

- Not to design tight, dark spaces because these spaces can raise stress levels, decrease performance, increase aggressive behavior, and deteriorate interpersonal relationships.

- Not to plant thorny plants in the yard, as it may damage the skin of children.

- Not to plant toxic plants because children sometimes explore the world through taste.

- To create sandy spaces, because many children with tactile disorders use water and sand to address their sensory needs.

END NOTE

1. Semi-experimental designs are semi-completed designs of an experiment, these designs have the ability to control some of the internal validity criteria, although their effectiveness is not as good as the performance of the experimental designs, their ability to control the variables is more than quasi-experimental designs. These designs are used in those situations where it is not possible to use experimental designs.

REFERENCES

- Altman, I. (1975). *Environment and Social Behavior*. (A, Namazian. Trans.). Tehran: Shahid Beheshti University.
- Baron, S. (2002). The Extreme Male Brain Theory of Autism. *Journal of Trends in Cognitive Sciences*, 6, 248-254. <https://www.semanticscholar.org>
- Beaver, Ch. (2006). *Designing Environments for Children and Adults with ASD*. Second World Autism Congress and Exhibition. Cape Town, South Africa, 30 oct to 2 nov.
- Cherry, C. (2012). The Ideal Home for the Autistic Child: Physiological Rationale for Design Strategies. *Autism Science Digest the Journal of Autismone*, 03, 135. Reprinted with Permission. <https://purposefularchitecture.com/the-ideal-home>
- Ejdefar, Sh., Ejdefar, L., & Omranipour, A. (2014). The Relationship between Architectural Physical Environment with Transformations of Attention Deficit Hyperactivity Disorder in Children of 6-10 Years Old Tehran, *Iranian Journal of Architectural Studies*, 6, 141-158. <https://faculty.kashanu.ac.ir/articlesInPublications>
- Ford, A. (2007). *Designing the Sustainable School*. 1 stEdition, The Images publishing group Pty Ltd:Australia.
- Golabi, p., Alipour, A., & Zandi, B. (2005). The Effect of Intervention by ABA Method on Children with Autism. *Research in Exceptional Children*, 5(1), 1-24. <https://books.google.com>
- Gretchen, B., & LeFever, k. (2003). ADHD among American Schoolchildren. *The Scientific Review of Mental Health Practice*, 2(1). <https://www.srmhp.org/0201/adhd>
- Grout, L., & Wang, D. (2002). *Research in Architecture*. (A.R. Eynifar, Trans.). 1384. Tehran: University of Tehran Publications.
- Halligan, R., & Cross Whitbourne, SA. (2011). *Psychopathology (Clinical Perspectives on Mental Disorders)*, (Y. Seyed Mohammadi, Trans.). 2. Ninth Edition, Tehran: Psychological Publications.
- Harkness, H., Raeff, C., & Super, C. (2000). Variability in the Social Construction of the Child: New Directions. 111-117
- Hescong, L. (1999). Day Lighting in Schools: an Investigation into the Relationship between Day Lighting and Human Performance. *Journal of the Pacific Gas and Electric Company on behalf of the California Board for Energy Efficiency Third Party Program*, 12, 56-62. h-m-g.com/projects/daylighting/summaries/daylighting
- Hill, E., & Frith, U. (2003). Understanding Autism: Insights from Mind and Brain. *Journal of Philosophical*, 8, 22-31. <https://www.ncbi.nlm.nih.gov/pubmed>
- Humphreys, S. (2011). Architectural and Autism. *Autism Europe Link*, 55, 9-13. <https://www.autismeurope.org/wp-content/uploads/2017/08/LINK-55-EN.pdf>
- Jalili, M. (2001). *Color and Communication* [MSc. Thesis]. Tehran: Tehran University, School of Art.
- Lowry, P. (1993). Privacy in the Preschool Environment: Gender Differences in Reaction to Crowding. *Children's Environment*, 10(2), 130-139. www.jstor.org/stable/pdf
- Mason, R. (1990). *Child Growth and Personality*. (M. Pashaei, Trans.). Tehran: Center Publishing, Med Book.
- Mcallister, k. (2010). The ASD Friendly Classroom-design Complexity, Challenge and Characteristics. Design Research Society Conference, Montreal, Canada, 7-9. <https://www.semanticscholar.org/paper/The-ASD-Friendly-Classroom-De>
- Moghadam, B. (1988). *Application of Psychology in the School*, Tehran: Soroush Publishing, Fourth Edition, Tehran.
- Mohammad Nia, M., & Zabihi, H. (2013). Investigating the Impact of Physical Environment on Human Behavior in Measuring the Quality of Life in New Towns, A Case Study of New Sunshine City, National Conference on Architecture and Human Urbanism. 1-13. https://www.civilica.com/Paper-NCAU01-NCAU01_1
- Mojahedi, H., Ghasemi Sichani, M., Forouzandeh, E., & Bahrami Pour, M. (2014). *Architecture and Autism*, Publishing: Isfahan: Islamic Azad University of Khorasgan Branch. <https://memarnet.com/node>
- Mortazavi, Sh. (1998). *Educational Spaces from the Perspective of Environmental Psychology*. Tehran: Publications of School Renovation and Equipping Organization. <https://search.ricest.ac.ir/Inventory>
- Mostafa, M. (2008). An Architecture Autism: Concepts of Design Intervention for the Autistic User. *Journal of Architectural Research*, 2, 189-211. https://www.researchgate.net/publication/26503573_An_An_Architect
- Nasar, J. (1994). Urban Design Aesthetics, the Evaluative Qualities of Building Exteriors. *Environment and Behavior*, 26, 377-401. www.semanticscholar.org/paper/Urban-Design-Aesthetics-The-Evalu
- Parens, E., & Johnston, J. (2009). Facts, Values, and Attention-deficit Hyperactivity Disorder (ADHD): An Update on the Controversies, *Child Adolesc Psychiatry Ment Health*
- Presmanes Hill, A., Zuckerman, k., & Fombonne, E. (2005). Epidemiology of Autism Spectrum Disorders. *Journal of Awares Autism*, 5, 110-116. www.researchgate.net/publication/237690143_Epidemiology_of_3_1. <https://capmh.biomedcentral.com/articles>

Kazemi Shishavan, M. et al.

- Rapport, A. (2005). Culture, Architecture and Design, (M. Barzegar., & M. Yusuf Nia Pasha, Trans.). Mazandaran: Shelfin Publications. <https://www.amazon.com › Culture-Architecture-Design-Amos-Rapoport>
- Sachs, N., & Vincenta, T. (2011). Outdoor Environments for Children with Autism and Special Needs. *Journal of Informs Design*, 9(1), 1-7. https://www.researchgate.net › publication › 280948490_Sachs_N_Vinenta
- Saeidi, k. (2014). Design of Autism Exceptional Child Care Center, MSc thesis, Islamic Azad University, Shabestar Branch.
- Sameroff, A. (2001). Risk and Resilience from Infancy to Adolescence: Is It Better to Change the Child or the Context? Paper Presented at the 2001 OSEP Research Project Directors' Conference, Washington, D.C.
- Taylor, F., Frances, K., & Sullivan, W.(2009). Growing Up in the Inner City: Green Spaces as Places to Grow. *Journal of Green Architecture*, 4, 13-20. <https://journals.sagepub.com › doi>
- Ulrich, R. (2008). Biophilic Theory and Research for Healthcare Design. *Journal of Biophilic Design*, 3, 202-208. <https://books.google.com › books>
- Ulrich, R.S., Quan, X., Zimring, C., Joseph, A., & Choudhary, R. (2004). The Role of the Physical Environment in the Hospital of the 21st Century: A Once-in-a- Lifetime Opportunity. Center for Health Design. https://www.healthdesign.org › files › Ulrich_Role of Physical_2004
- White, B.B., & White, M.S. (1987). Autism from the Inside. *Med Hypotheses*, 24(3), 223-229. <https://www.ncbi.nlm.nih.gov › pubmed>
- Withrow, L. (2004). The Use of Color in Art Therapy. *JHumanist Counseling EducDev*, 43(1), 33. https://www.researchgate.net › publication › 264807429_The_Use_of_Color. <https://onlinelibrary.wiley.com › doi › abs>
- Woodcock, A., Georgiou, D., Jackson, J., & Woolner, A. (2013). Designing a Tailorable Environment for Children with Autistic Spectrum Disorders. Triannual Ergonomics Conference, Netherlands, July 14. <https://www.iea.cc › ECEE › pdfs › art0228>
- Zarghami, E., Nasiri, N., Ejdehfar, Sh., & Ejdehfar, L. (2013). The Influence of Qualitative Environmental Factors on the Reduction of Behavioral Disorders in 5-7 Years Old Children. *Journal of Monitoring*, 12(40), 404- 414. <https://www.sid.ir › Journal › ViewPaper>
- [http:// www.hedearchitects.com](http://www.hedearchitects.com)

HOW TO CITE THIS ARTICLE

Kazemi Shishavan, M., & Sharif Khajehpashab, S. (2020). The Role of Physical Architectural Environment on Treatment of Autism Disorder in 4-10-Year-Old Children in Urmia. *Armanshahr Architecture & Urban Development Journal*. 12(29), 143-154.

DOI: 10.22034/AAUD.2020.102372

URL: http://www.armanshahrjournal.com/article_102372.html

