

## The Importance of Architectural Factors on Increasing Social Interactions of Children with Autism in Educational Centers

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### Abstract

**Purpose:** The purpose of this study was to compare social interaction and communication in autistic children with the approach of architectural spaces and ordinary centers.

**Methodology:** The data were causal-comparative. The statistical population was all children with autism in centers with architectural spaces approach and children with autism in normal centers of Tehran. The statistical sample consisted of 3 centers with architectural approach and 3 normal centers selected by available sampling method. Data collection was done based on the Childhood Autism Rating Scale (GARS) and Edited Autism Checklist in Toddlers (M-CHAT) Robins, Feln & Barton (1999). Data analysis was performed by SPSS software in descriptive and inferential statistics at the significant level of 0.05 using independent t-test.

**Findings:** According to the data analysis, the significance level in both variables of the study is greater than 0.05, which means that the scores of social interaction variables and the relationship of both groups follow the normal distribution. Independent t-test was then used to compare the mean social interaction of children with autism with the centers of architecture spaces and ordinary centers and showed that the obtained t was significant at the level of 0.01. Therefore, the null hypothesis can be rejected at the level of 0.01 in favor of the research hypothesis and with 99% confidence that there is a significant difference in social interaction between the two groups. Comparison of means indicates that social interaction of children with autism in architectural centers is higher than that of children with autism in normal centers.

**Conclusion:** Social interaction and communication rate in children with autism in centers with architecture approach were more than children with autism in normal centers. As the number of these children is increasing, especially in Iran, it seems necessary to design centers and spaces appropriate to the needs of these children.

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## 1. Introduction

The term Autism derives from the Greek concept of "living on its own" from psychiatrist Bleuler in 1911 describing patients' behaviors. Autism is also known in Persian as a concept of autism, which is a set of serious mental and behavioral disorders known as "ASD" (Ketelaars, Mol, Swaab, Bodrij & van Rijn, 2017). For the first time in 1943, Kanner described children with communication deficits and behavioral problems such as stereotype and Repetitive behaviors. These children could not communicate with others and ignored whatever was offered to them (Zhang, Shao & Zhang, 2016). The voice and conversation of others and even the movement of toys around these children do not attract attention. At the onset of the illness, the child does not pay attention to what is happening around him, expresses affection for his or her parents or relatives, and lacks eye contact. Self-harming behaviors, such as hitting a wall with a head, biting themselves, have been reported in children with autism disorders (Neul, 2012).

Autism is considered a mental syndrome in early childhood. Because the disease cannot be fully treated, the autistic child becomes an adult with autism due to the severity of the disorder in the treatment process. With the rise in autism figures, in addition to the demand for day care centers, we have seen the demand for day care centers for autism patients, which is unprecedented. Autism is the most prevalent disorder with a prevalence of more than 75%, and its prevalence is increasing dramatically (Campbell et al., 2011).

Various studies have been carried out to identify the factors contributing to autism spectrum disorders and their treatment. Over the years, some theories have attributed these problems to Dysfunctional families and cold, introverted parents. The findings also indicate that the evolutionary functions of autistic children have a weakness compared to the families of healthy children (Aali et al., 2015).

Some theories also highlight the role of biological and hereditary factors. Many scholars today believe that the evolution of these disorders follows a " Bio-Psycho-Social " model. Dynamic interaction of biological and psychological characteristics with environmental factors in family functions plays an important role in the manifestation of these disorders (Amin Yazdi, 2012). Etiologic studies have shown that factors such as Inflammation factors in diet, stress, viral infections, pregnancy poisoning with substances such as mercury, Thalidomide, Valproic acid (VPA), etc. are at risk for this category. Increases in children (Iwata et al., 2010). Studies have shown that Rette syndromes occurs because of a genetic mutation in a particular gene called "MECP2". This gene is located on the X chromosome and is therefore transmitted as a distinct feature of the gene associated with this chromosome (Ketelaars et al., 2017). The researchers also found, after genetic analysis and comparison of the genes of 996 people with autism and 1287 healthy individuals, that the abnormalities in the number of copies of specific genes were more likely to occur in individuals with the disease (Kazempour, 2018).

Regardless of any cause of autism disorder, it is important for these children that appropriate educational and therapeutic spaces can be effective in their health and learning. Because of special problems, these children inevitably need special education and training, which anxious parents and especially their mothers and jeopardize their well-being (Jones et al., 2014).

Spending long hours in therapeutic settings is usually a stressful experience for patients, visitors, and staff, so any effort to reduce these stresses will have a positive effect on increasing the quality of space (Eren, 2015). The responsibility of creating a suitable environment for autistic people, in addition to psychologists, is the responsibility of architects who, through meticulous and integrated architectural and psychological information on the environment, can respond to the future of autistic children. Since the first recognition of autism disorder in 1943, much research has been done on people with autism and their characteristics. Most psychologists have investigated autism from the perspective of pathology, symptoms, and treatment interventions, but in recent years' architects with the help of humanities specialists, especially environmental psychologists, have sought to design new attitudes toward the relationship. Man and the environment around him have acted. Due to the need to deal with environmental psychology, interdisciplinary research between psychology and architecture for these children has been carried out in

the world which shows that proper design and architecture for these children can have a great impact on their health (Fallahi & Karimi Sani, 2016).

A review of a series of studies on the interrelationship of autism and architecture shows that in most countries of the world, significant progress has been made in designing and creating an appropriate educational environment for children with autism spectrum disorders and factors such as acoustic space, light status, altitude fit, Control and security, texture, materials, colors, etc. should be tailored to the needs of autistic children. The findings also indicate that no studies have been carried out on the status of educational spaces available for the use of autistic people in Iran (Cervantes & Matson, 2015). Sensory design theory has been empirically tested and preliminary evidence suggests that autism users, especially those at the lower end of the spectrum, show greater attention and faster response at the start of interventional treatment, and use time and ethical behavior through the use of autism. Sensory design theory has improved (Salehi, 2018). Although more research is needed to investigate the scope and longevity, it is nevertheless one of the few evidence-based research theories to introduce the positive impact of architecture for people with autism disorder (Sartip Zadeh, 2017). This theory argues that by altering the sensory environment, it can have a positive effect on patients resulting from the physical environment, texture, ventilation, closure or open space, orientation, acoustics, and so on. Since minorities are often less attentive, the responsibility of creating a decent environment for autistic people in addition to psychologists is the responsibility of architects who review and integrate architectural and psychological information on the environment and can respond to the future of autistic children. Although designing the physical environment for autism requires a good understanding of autism and identifying their individual needs, some design principles can be applied to improve their response to education and treatment (Lindsay et al., 2017).

In recent years, architects with the help of specialists in the field of humanities, especially environmental psychology, have sought to design new approaches to the relationship between man and the environment around him. Given the need to address environmental psychology, recent cross-disciplinary research between psychologists and architects for autistic children worldwide has shown that designing the right environment for these children can have a major impact on their health. Today, considering the impact of environmental psychology concepts on the quality of the environment and the need to pay attention to this issue in designing therapeutic spaces in order to achieve a favorable environment for patients, it is obvious. Due to their importance, therapeutic spaces should be able to provide a completely relaxed environment according to the needs of the clients. Now the importance of this is doubled if the clients are children. Apart from the fact that the disease has a negative impact on the human psyche at any age or stratum, society must pay special attention to the vulnerability of children, and therefore designing children's health centers is one of the most important part of the work of designers and architects. Since architects are at the heart of the built environment, the task of providing the right environment for people with autism falls within the architectural realm. This should be studied both in public spaces and outside urban environments. When the presence of autistic people in the community is recognized and understood, architects need to develop solutions to integrate autism, similar to the policies created for people with disabilities with visual or motor disabilities. In therapeutic approaches that are more in line with the ability of autistic people to adapt to the environment, the architectural approach is inevitable, and it should be borne in mind that designing an autistic child care center can be as important as self-treatment. Conditions that are often considered normal by us may become toxic and unhealthy due to the sensitivity of autistic people to high visual and perceptual stimuli. Therefore, the present study seeks to ask: What is the difference between social interaction and the level of communication of children with autism in centers with spaces of architectural approach with ordinary centers?

## 2. Methodology

The present study was applied in terms of purpose and in terms of method in quantitative research and in terms of data collection among experimental research and quasi-experimental method with pretest-posttest design with control group. The research population was mothers of first grade elementary school children in all 6 educational districts of Isfahan. The study sample, which was selected as available, consisted of 30 mothers of first grade elementary school children in district 2 of Isfahan education and were divided into two groups of control and experimental, 15 each. The research tool was a checklist for measuring self-esteem in preschool children in Azizi Moghaddam (2007) and Neff self-compassion scale (2003a). For the experimental group, the training was held in 10 sessions of 120 minutes.

The method of this study was causal-comparative in a post-event type. The statistical population of this study consisted of all centers with architectural spaces and ordinary centers of Tehran. To select the sample size of the study, 3 centers with architectural spaces approach and 3 normal centers for children with autism were available from three centers with 20 children architectural space approach and 20 children with three normal centers. Children were selected for autism and their children were evaluated for social interaction and communication. The research tools were:

**Gilliam Autism Rating Scale:** The research tool used to diagnose autism as well as measuring the relationship between two variables of communication and social interactions before and after intervention is the Gossier Test. The test is a checklist for diagnosing autistic people, standardized by Gilliam in 1994, and includes four subscales and each subscale containing 14 items with a score of zero to three. The first subscale is stereotyped behaviors. This subscale describes cases of stereotyped behaviors, motor disorders, and extravagant behaviors. The second subscale, communication, covers items 15 to 28. These items describe verbal and nonverbal behaviors that are symptoms of autism. Social interaction is the third subscale of items 29 to 42. The items in this subscale assess topics that are able to appropriately describe events to people. The fourth subtest is Developmental Disorders, which interviews parents about their child's development and includes items 43 to 56, which in our study will remove the fourth subscale. Among the reasons for choosing this test are: 1) ease of use to diagnose acute cases of children with PDD in the three domains of stereotyped behavior, communication, and social interaction; Estimates the extent of changes in children's symptoms. The most common method to determine the diagnostic validity, sensitivity and specificity of a test is the most accurate method for determining the cut-off point and sensitivity and specificity of a test is the use of discriminant analysis. Therefore, to test its validity, this test was performed among 100 individuals with autistic age group and the data obtained with autism group data were analyzed by analysis test. Previously, the test was tested on a sample of 1094 autistic people in 46 states and standardized and reliably determined using the Cronbach's alpha coefficient. Studies have shown an alpha coefficient of 0.90 for stereotyped behaviors, 0.89 for communication, 0.93 for social interaction, 0.88 for developmental disorders, and 0.96 for autism semiotics. Evaluation and screening systems such as ABC ratings have been approved. How to score the subscales of stereotyped behaviors, relationships, and social interactions that have 'never, rarely, sometimes (often)' responses score 0, 1, 2 and 3, respectively. In order to determine the level of autism and compare the individual with the norms of Iranian society, it is necessary to convert raw scores to standard scores. Finally, using computer software the overall score is calculated and based on it, the severity of autism disorder in the individual is determined. This questionnaire is suitable for people aged 3 to 22 and can be completed by parents and professionals at school or at home. It is also capable of measuring the impact of therapeutic interventions.

**Edited Autism Checklist in Toddlers (M-CHAT):** In 1999, Robins, Feln & Barton designed a checklist of 23 questions to answer yes or no to assess children at risk for autism spectrum disorder. A total of 1293 children were screened, 58 of whom were diagnosed with ADHD and 39 with autism. To identify six social relevance categories, this checklist demonstrates excellent screening power for screening affected and non-affected children. Reliability of this checklist was tested 0.99 and its correlation coefficient with

CHAT was calculated 0.58 (Kamio et al., 2013). The reliability of the revised autism checklist in toddlers in Iran has also been estimated to be 0.81 (Ghamri Givi et al., 2012). Data analysis was done by SPSS software in two descriptive and inferential parts including Kolmogorov-Smirnov test for normal distribution of data, Levine test for homogeneity of variances and independent T-test.

### 3. Findings

The findings of demographic information showed that 59.4% of the subjects were "girl" and 40.6% were "boy" with an average age of 9.23 years. 53.4% had "working parents" and 46.6% had "freelance parents". To check the data normality, the Smirnov test was used which summarizes the results in the table (1).

**Table 1.** Summary of the Smirnov test to check for normality of the research variables

	Architectural centers		Ordinary centers	
	K-S	sig	K-S	sig
<b>Social interaction</b>	0/65	0/8	0/70	0/70
<b>Relationship</b>	0/9	0/4	0/84	0/5

Based on the data in Table 1, the significance level of both variables in the study of both groups is greater than 0.05, meaning that the scores of social interaction variables and the relationship of both groups follow the normal distribution. Before performing the test, the same assumption of variance between two groups was tested and confirmed by Levin test (Sig=0/97; F=0/002).

**Table 2.** Independent t-test for comparing the mean social interaction of children with autism centers with the approach of architectural spaces and ordinary centers

Groups	Number	Mean	SD	df	t	Sig
Ordinary centers	20	59/57	12/2	5	2/99	0/01
Architectural centers	20	68/90	11/9	8		

As Table 2 shows, the obtained t is significant at the 0.01 level ( $t_{85}=2.99$ ; Sig=0/01). Therefore, the null hypothesis can be rejected at the level of 0.01 in favor of the research hypothesis and with 99% confidence that there is a significant difference in social interaction between the two groups. But comparing the means indicates that the social interaction of children with autism in architectural centers is higher than the social interaction of children with autism in normal centers. Levine test showed that the two groups were similar (Sig=0/75; F=0/01).

**Table 3.** Independent t-test for comparing the average relationship of children with autism centers with architectural spaces and ordinary centers approach

Groups	Number	Mean	SD	df	t	Sig
Ordinary centers	20	16/2	4/6	58	3/2	0/01
Architectural centers	20	19/93	4/3			

The data in Table 3 indicate the significant t observed (3.2) at the 0.01 level ( $t_{85}=3.2$ ; Sig=0/01). Therefore, the null hypothesis can be rejected at the 1% level in favor of the research hypothesis and with 99% confidence: There is a significant difference between the two groups in the level of communication in children with autism. Comparison of the means also shows that the relation between children with autism in centers with approach to architectural spaces is higher than children with autism in normal centers.

### 4. Discussion

The purpose of this study was to compare social interaction and communication in children with autism in centers with architectural spaces and ordinary centers in Tehran. The results showed that social interaction and relationship of children with autism in centers with architectural spaces is higher than normal centers. Various studies have been conducted to identify the contributing factors to autism spectrum disorders and ways to treat them. Over the years, some theories have linked these problems to

dysfunctional families and cold and introverted parents. Findings also suggest that family developmental functions Children with autism have a disadvantage compared to the families of healthy children. Some other theories emphasize the role of biological and hereditary factors. Many scholars today believe that the disease follows a biological, psychological, social model that affects the body. Other factors such as genetic deficiencies in dietary factors, stress, viral infections, and pregnancy poisoning with substances such as mercury, thalidomide, valproic acid, etc. increase the risk of these disorders in children. No definitive cure for autism spectrum disorder has been identified so far.

One of the health, growth and dynamics of a community is the presence of healthy, dynamic and active individuals who bring the environment into the spirit and move the community towards the highest goals. The individual and the environment are intimately connected and form a single set that is not individually defined. Urbanization has allowed most people to spend time away from nature and into urban space.

The emergence of the 21st century natural disasters and lifestyles has put contemporary people in the trap of stress and nervous crises that can range from environmental crises to things such as noise and visual pollution, air pollution, disruption of relationships. The Ideal of Man and Nature, Named (Qasemi, 2014). Hence, the concept of healing is important with emphasis on reducing stress and increasing the ability to recover through natural and environmental capabilities. Today, the issue of nature restoration and restoration and the development of programs in this regard are being addressed worldwide to counteract the effects of nature's destruction caused by natural crises. One of the most important elements of urban life is the landscape of the city which seems to have grown in the modern era as a healing garden and as a park with ecological parks with more advanced indicators of their kind. Mild and favorable landscapes are known as healing landscapes, which are very effective in relieving stress and soothe the person because of the distance from anger and fatigue that research suggests that such landscapes not only in the individual It creates a sense of calm, but also because of the relaxation, it drives him to focus on the senses and thinking (Nabizadeh et al., 2018).

Healing is a property that provides mental health and reduces stress and increases recovery. The healing garden provides healing by reducing communication with different senses and reduces the stress of daily living. In the meantime, health centers, as one of the most important urban spaces related to human health, have been neglected by the authorities and experts. And patient and staff satisfaction also increases (Irani et al., 2017). Spending long hours in the therapeutic setting is usually a stressful and unpleasant experience for patients, visitors and staff. Laboratory and clinical studies have shown that patients whose beds are by the window have a shorter recovery time than patients who rest by the wall, and nurses are also more likely to recover (Zojaji et al., 2014).

Regardless of any cause of autism disorder, it is important for these children that appropriate educational and therapeutic spaces can be effective in their health and learning. These children inevitably need special schools and special education because of special problems. In addition to psychologists, the responsibility to create an environment conducive to autistic people is the responsibility of architects who, through meticulous and integrated architectural and psychological information on the environment, can respond to the future of autistic children. One of the environmental and architectural factors that have a positive impact on patients is texture, ventilation, closure or open space, orientation, acoustics and so on. These principles can facilitate and increase the interactivity of children with autism. To have training and medical centers. Field surveys in Iran show that the format of childcare centers with autism disorders is shaped by changing the use of other spaces such as a residential home and adding a few partitions in space, while studies indicate that the environment has a huge impact on the treatment of these children. (Sartip Zadeh, 2017).

Autism is increasingly becoming one of the most common challenges students face in the world. The prevalence of this disease in Iran among school-age children is 9.1 percent (Mashhadi Fathali, 2016). Since autism spectrum disorders are a significant part of developmental disorders, the issue of educating people

with serious concerns about exceptional education and families is a growing issue in our country and it is necessary to adapt educational spaces. Take these students seriously (Aghababaei & Akrami, 2012). Sensory and environmental design with two main components, physical and mental, is one of the appropriate strategies that will increase effectiveness and healing for creating a proper atmosphere for treatment and education of autistic patients. The purpose of the present study was to design a supportive, educational center for autistic patients with a healing approach and maximize the effectiveness of treatment. That will be made accessible by environmental and sensory design based on the knowledge of autistic people. Topics that may help with this are: spatial integration, transition spaces, security, top-down focusing, escape, outdoor and indoor composition, natural spaces, light colors, maximum use of light and Natural, acoustic ventilation.

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