

Spatial Qualities Supporting Treatment Process of Children with Autism Disorder*

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ABSTRACT

The significant outbreak of autism as a profound developmental disorder in children can be considered the result of modern machine life. It is a disorder that has not fully responded to the medication. Therefore, the use of natural healing supports and the forces of nature is recognized as one of the complementary solutions. The current study aimed to achieve the landscape design criteria that support the treatment of autistic children to identify "landscape design criteria that meet the needs of autistic children" to provide solutions to use these spatial quality criteria. The significance of this study was to take steps to achieve the applicable details in the spaces supporting the treatment of autistic patients so that its results can be utilized as design guidelines. The current research was applied-theoretical with qualitative and quantitative approach and case study. The data collection tools were library studies on the related research to achieve a strong theoretical framework, behavioral observation, and interview using the Delphi technique with the participating experts. The target population included 30 psychologists and experts in the area of autistic children in Tehran selected purposeful and non-randomly based on the saturation method. The collected data were analyzed using NVivo software, and a triangulation method was used to improve the validity of the findings. According to the research results and findings, the landscape components supporting the treatment of children with autism were identified. Then, these results led to presenting special recommendations for designing or spatial guidance. The measures and guidelines based on the specific details will have a positive effect on the treatment process of the user children.

Keywords: Architectural Design, Landscape Therapy, Naturalism, Five Senses.

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1. INTRODUCTION

The outbreak of autism in children, as a result of modern machine life, has caused serious damages to various classes of communities (Plotkin, Gerber, & Offit, 2009, p. 457). Autism affects the child's brain and disrupts it, causing disability in the process of receiving information through the five senses and thus the impossibility of communication with society and the environment (Aghababaei & Akrami, 2013, p. 12). In such a way that the sick child is isolated and is quietly excluded from society due to lack of access to a supportive and responsive living environment to their needs (Pouretamad, Fathabadi, Sadeghi, & Shalani, 2016, p. 217) (Varvani Farahani, Hekmat Pour, Khonsari, Shamsikhani, Matouri Pour, & Gholami, 2016, p. 1550). As a result, addressing the spaces that support autistic patients will be of particular importance; spaces with natural context that have been designed taking into account the disabilities caused by this disease.

Studying the previous research shows that most studies were focused on the biological and psychological aspects in this regard (Almandil, Alkuroud, AbdulAzeez, AlSulaiman, Elaissari, & Borgio, 2019; Barakat, Bakr, & El-Sayad, 2018; Cresswell & Cage, 2019; Giambattista, Ventura, Trerotoli, Margari, Palumbi, & Margari, 2019; Kilroy, Aziz-Zadeh, & Cermak, 2019; Li, Larsen, Yang, Wang, Zhai, & Sullivan, 2019; Schofield, Scott, Spikins, & Wright, 2020; Shah Rafati, Pourmohamadrezaj-Tajrishi, Pishyareh, Mirzaei, & Biglarian, 2016; Varley, Wright, Cooper, Marshall, Biggs, Ali, Chater, Coates, Gilbody, Gomez de la Cuesta, Kingsley, Couteur, McKelvey, Shephard, Teare, 2019), often leading to creating or developing more opportunities in recognizing the mental and physical needs of the patients. Thus, involving interdisciplinary studies, such as architecture and landscape with the practical aspects in the therapeutic spaces, can be significantly effective in improving the general quality of life. Therefore, the current study was conducted to achieve the landscape design criteria supporting autistic children. The main question was "What are the landscape design criteria responsive to the needs of the autistic children?" and "How these criteria can be used in the therapeutic landscape design of the children with autism?" To this end, after reviewing the research literature, presenting the related theories and conceptual framework of the research, the research method, and selected tools were introduced. Then, while analyzing the collected data, the findings and conclusion were presented in the form of answering the research questions. The necessity and importance of the current research were taking steps to achieve the applicable details in the spaces supporting the treatment of autistic patients. In other words, its results can be used as landscape design guidelines.

2. THEORETICAL FOUNDATIONS

The interaction and relationship with nature as a dynamic system and using therapeutic aspects of landscape design are two strong tools in creating the opportunity for the treatment of children with autism. It is a matter that includes numerous benefits despite the developing approach of neglecting nature, which can play a supporting role along with the common treatments. Thus, the structure of the theoretical foundations of the current research was based on these axes.

2.1. Naturalism; An Approach for Healing Environments

Naturalist therapeutic landscape design is creating opportunities that architecture can improve the quality of life using its capabilities. In this regard, facilitating or accelerating the treatment process is one of the significant aspects in improving the quality of life as the lack of the natural elements in the spaces will cause stress, reduction of attention and focus on perception, disruption in the efficiency and emergence of the aggressiveness (Shahcheraghi & Bandarabad, 2015, p. 421). It is a matter that has caused chronic diseases in the long term, such as hypertension, heart diseases, and so forth. Therefore, the aim of naturalism can be considered the involvement of all senses of the audience (vision, hearing, smell, touch, and taste) to create a balance in the perception. Thus, different approaches have been considered in naturalism, such as sound therapy, color therapy, aromatherapy, hydrotherapy, play therapy (Shah Rafati et al., 2016, p. 203), horticultural therapy, work therapy, and natural massages, as a gestalt of all the favorable sensory stimuli.

As previously mentioned, one of the useful opportunities in naturalist design is considering aroma as a supporting tool of treatment (Kilroy, Aziz-Zadeh, & Cermak, 2019, p. 71). Aromatherapists try to take a step using smells and specific oils to reach a physical desire, favorable emotional mood, or help in the treatment of a disease. In this method, aroma (the recognized smell by the individual) will cause a balance in the body, psyche, and mind after being received by the senses and entering the body while affecting the nervous system (Tayebi, Dehkordi, Ebadi, Sahraei, & Einollahi, 2015, p. 66). Besides aromatherapy, sound therapy is also one of the other effective measures used in naturalism (AbediKoupaei, Poushaneh, Mohammadi, & Siampour, 2013, p. 626) as the sound vibrations with waves in different frequencies lead to creating or controlling emotions through affecting the heartbeat and breathing and can be effective in the recovery and treatment process. In this regard, the sounds with the frequency above the human hearing threshold can be effective in the human's feeling of the environment. Therefore, this capability in nature

is of considerable significance due to the existence of natural sound systems (birds' voice, wind blow, the rustling of leaves, etc.) (Linke, Keehn, B. Pueschel, Fishman, & Müller, 2018, p. 118).

One of the other aspects of using nature in facilitating and accelerating the process of recovery and treatment is horticultural therapy. In this method, while an individual establishes a physical relationship through the beautiful and harmonic arrangement of a group of plants, they also establish a close relationship with nature that considers themselves as a part of it (Hitter, Cantor, & Buta, 2017, p. 56). The most effects of horticultural therapy in stimulating and improving human emotions and feelings are through observing, touching, contacting, tasting, and smelling the flowers and plants. Improving the ability of concentration, learning new skills, improving the abilities of planning and problem-solving, practicing learning and increasing the level of satisfaction, increasing self-confidence, reducing the anxiety and mental distresses,

and reducing the time of the treatment process are among the results of using this naturalist method (Marcus, 2016, p. 173).

2.2. Landscape Therapy

Landscape therapy is the crossing point of landscape design and medical purposes (Shahcheraghi & Bandarabad, 2015, p. 422). As Cooper Marcus stated (Cooper Marcus, 2016, p. 173), in creating the spaces supporting treatment, "design and construction of space" and "facilitating the treatment process" are considerable. These are two overlapping aspects that are the responsibilities of the landscape and environmental designers. In other words, it is necessary to recognize the design and organize the space as a part of the treatment process as when a human is under pressure, a set of situational changes occurs within him/her. These changes affect his/her perception and, consequently, will affect his/her responses to various environmental stimuli. These relations were presented in Figure 1.

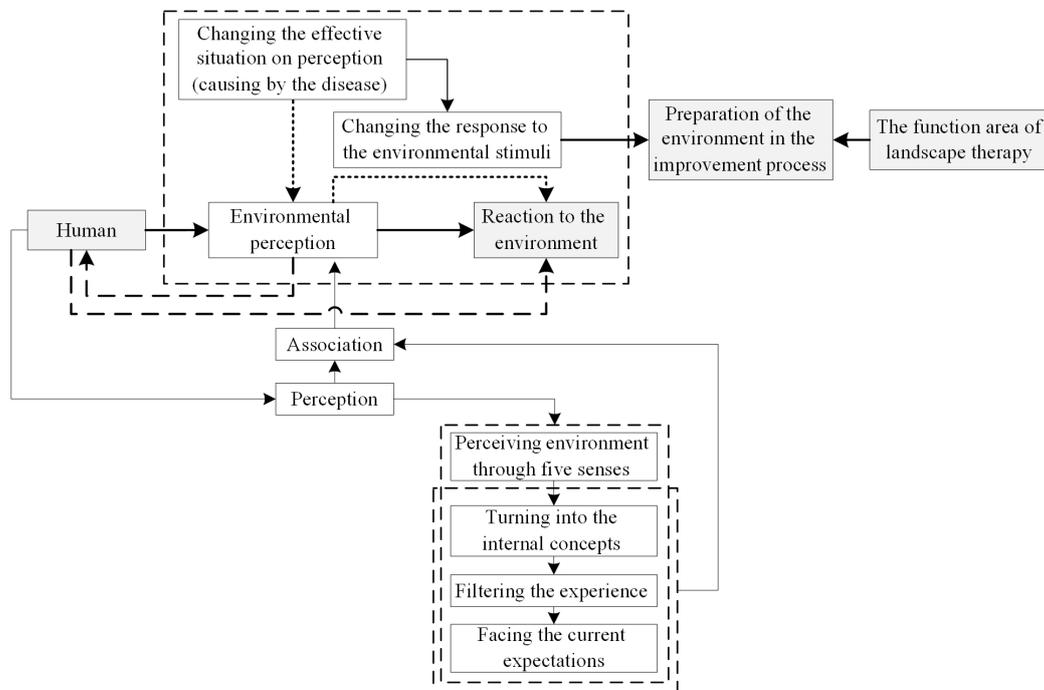


Fig. 1. The Interactive Relationship between the Perception and Reaction to the Environment in Landscape Therapy

As Figure 1 shows, the individuals' experience enters their minds in two stages. First, it is the perceptions resulted from the environment through the five senses. This group of information is filtered unconsciously as soon as received and enters the second stage, which is the association of the first perceptions (Ulrich, 1999, p. 63). It is due to the fact that the phenomena are translated to the inner concepts after receiving through the senses and are filtered by previous experiences and current expectations of a person. Considering the interaction between the real received environment and perceived environment is of the important matters of

designing therapeutic spaces. Understanding these interactions directs different stages of the design and results in a healing design (Cooper Marcus, 2016, p. 172). In other words, the basis of the landscape design philosophy supporting the treatment is to find out the perceptual features of the users (Barakat, Bakr, & El-Sayad, 2018, p. 353).

Furthermore, identifying, considering, and applying the nature forces supporting the process of perception formation is of significant importance (Volker, Heiler, Pollmann, Claben, Hornberg, & Kistemann, 2018, p. 3). That is to say, the landscape and environment designer

must consider these influential external forces as forces effective directly in the special audiences (patients) while being aware of the symbolic meanings of the environment (Said, 2003, p. 65). According to recent studies, the natural elements not only lead to reduce psychological and mental distresses but also affect the blood pressure and tension of the muscles. It means the direct effect of the physical changes on the psyche that, in case of guidance, can be applied as a treatment measure (Motallebi & Vejdani Zadeh, 2015, p. 44; Zahedi Abghari & Akouchekian, 2017, p. 29; Zojaji, Nikbakht, & Kafi, 2016, p. 313). This effect is due to the permanent changes of nature, leading to involving the audience's senses (due to the change in odors, sounds, colors, forms, and shapes), and consequently, affecting the activity of different organs of the body (Li et al., 2019, p. 72). Thus, (Ulrich, 1999, p. 29) considers healing landscape a common and possible concept in any scale that helps the process of human recovery by creating positive impacts on user regarding different types of landscape, including components with natural nature, such as green plants, herbal medications

(Svanberg, Söukand, Uczaj, Kalle, Zyryanova, Dénes, Papp, Nedelcheva, Šeškauskait, KoŁodziejska Degórska, & Kolosova, 2012, p. 345), and water (Van den Berg, Saliassi, Jolles, de Groot, Chinapaw, & Singh, 2018, p. 2). On the other hand, the most important purpose of these landscapes is to help the patients or the residents of the treatment centers to achieve or maintain the highest level of mental and physical land uses along with their general recovery (Tyson, 1998, p. 47). Also, according to Cooper Marcus, the immediate experience of these therapeutic landscapes by the patients during conducting immobile or sedentary activities, such as watching, listening, walking, sitting, or walking in the spaces free of ambiguity and legible (Cooper Marcus, 2016, p. 174; Jonveaux, Batt, Fescharek, Benetos, Trognon, Bah Chuzeville, Alina, Christel, Manon, Laetitia, Laure, Gabriel, & Bouvel, 2013, p. 334) will lead to the emergence of the signs of physical comfort, reduction in stress or increase in their sense of recovery. According to the abovementioned, Figure 2 shows the axes of the landscape therapy in modifying the users' five senses:

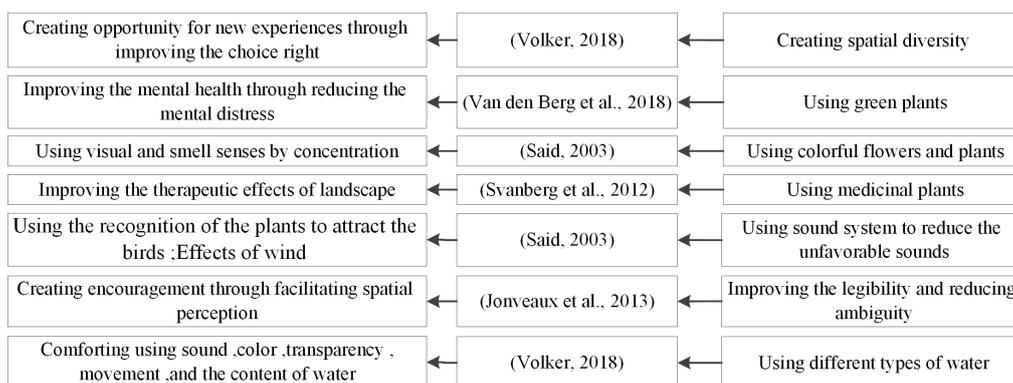


Fig. 2. The Axes of Landscape Therapy in Modifying the Five Senses

2.3. Autism Spectrum Disorder

Autism is a neurodegenerative disorder in children with potential for behavioral disorders; neurodevelopmental disorder is known as the most common developing developmental disorder of unknown origin (Varvani Farahani et al., 2016, p. 1550). According to the American Psychiatric Association, 1 in 88 people develop autism, and boys have 4 to 5 times more autism than girls (American Psychiatric Association, 2000). This disorder is classified as a profound developmental disorder that has three main characteristics, all of which emerge before three years old in children. These features are as follows: A) the qualitative damage in the interactive social function, B) Damage in the mental activities and communication, C) the utmost limits in activities and interests (Rajabi, Pourmohamadreza Tajrishi, Haghgoo, Vosuqi, & Biglarian, 2014, p. 51). It must be noted that the main area of damage in the children with this disorder is the social-communicative damages, leading to the low function in these children, resulting in isolation, and eventually, their seclusion

from the crowd. Along with these factors, other behavioral disorders are also common among children with autism, such as learning problems, anxiety disorders, depression, sleep disorders, nutrition, and self-harm (Yang, Jing, Xiu, Cheng, Wang, Bao, & Wang, 2011, p. 1363). Since the pharmacological treatment of this disease has other side effects, such as reduction in appetite and weight, being restless and nervous, fatigue, dizziness, dry mouth, and liver damages (Mardante & Kliegman, 2015, p. 618), using new and complementary treatments, such as supporting natural treatments (using natural forces) and utilizing the nutritional supplements have been more considered (Rahimian, Amin Yazdi & Edalatmanesh, 2016, p. 91; Varvani Farahani et al., 2016, p. 1554).

3. CONCEPTUAL FRAMEWORK

According to the previously mentioned and considering the research purpose, Figure 3 presents the conceptual framework of the research.

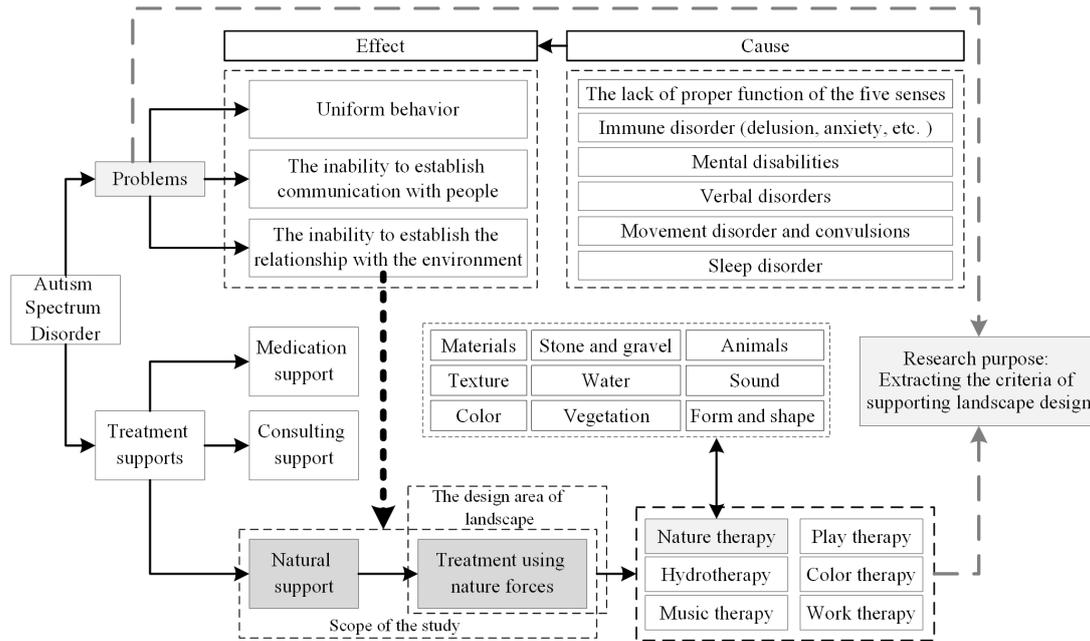


Fig. 3. Conceptual Framework of Research

4. RESEARCH METHOD

The current research was an applied-theoretical study, and it was conducted using a qualitative-quantitative approach and case study. The data collection tool included library studies on relevant research to achieve a strong theoretical framework, behavioral observation, and the structured interview in the form of filling the raised questions by the participants. The target population in the structured interview included 30 psychologists and experts in the children with autism in Tehran selected purposively and non-randomly. The number of the interviewees was determined based on saturation (King & Horrocks, 2010, p. 67). The reason for selecting the Delphi method of the interview with experts was the lack of proper responses from the patients. This decision was made due to their inability to communicate and avoiding to speak with strangers. The recorded interviews with the experts were organized

using NVivo software (recording, classifying, and coding) after implementing in a text, and the graph analysis was conducted using turning the qualitative data into quantitative data. Also, the data obtained from the behavioral observations through analyzing photos were evaluated. The findings obtained from different methods led to improving the validity of the results using the triangulation method.

5. ANALYSIS AND DISCUSSION

Despite the physiological complexes of the autism disorder and the fact that there is no exact census on the main causes of the emergence of this disorder (Almandil et al., 2019, p. 659), the results obtained from the conducted analysis using NVivo software on the data collected from the structured interviews with the experts and relevant specialists (Delphi method) were presented in bar graphs.

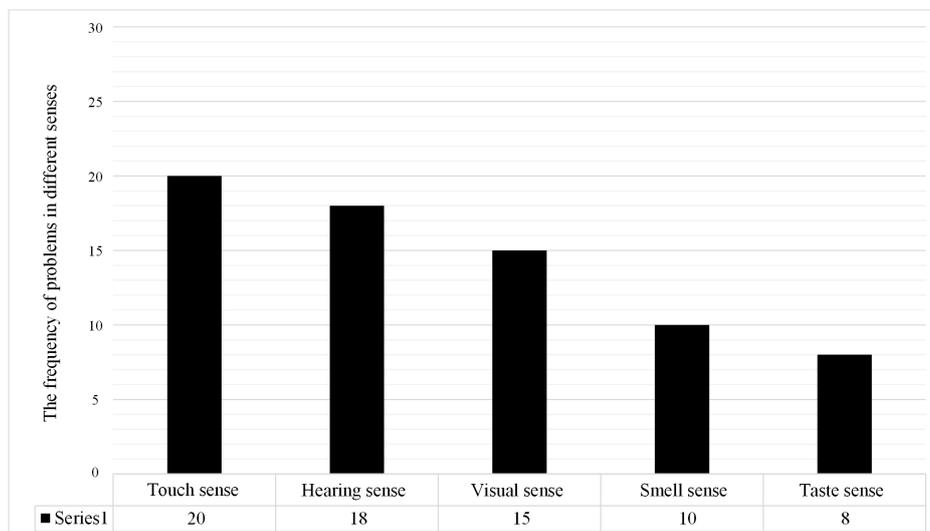


Fig. 4. The Problems Frequency of the Children with Autism in Five Senses

As Figure 4 shows, the touch sense has the maximum frequency by mentioning 20 times by the participants, and hearing and eyesight senses ranked next with 18 and 15 frequencies, respectively. However, the taste sense problems in these children showed a minimum

frequency (8 times). This finding reveals that the proper stimulation of the touch sense, as one of the main problems of children with autism, is of significant importance in designing the spaces related to this disorder).

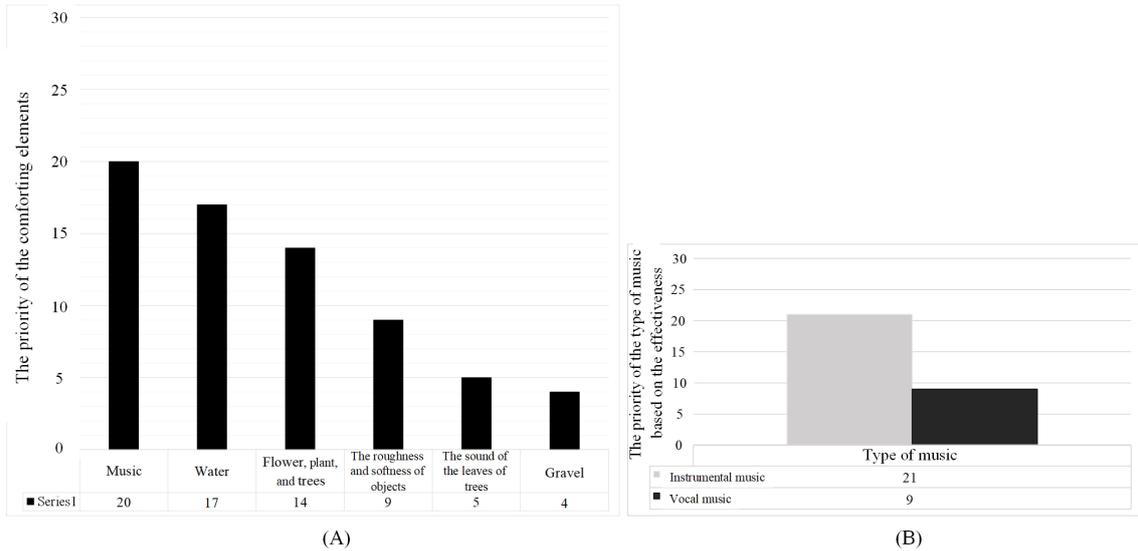


Fig. 5. (A) The Priority of the Comforting Elements for the Children with Autism and (B) the Type of Effective Music

Moreover, as Figure 5 (A) shows, music was considered the most effective comforting element for children with autism. However, due to the hearing problems in these children (Figure 4), instrumental music is preferred rather than vocal music (Figure 5 (B)). Along with music with the maximum frequency (20 times), water and flowers, plants, and trees ranked the next as significant mentioned 17 and 14 times by the participants. As Figure 5 (A) presents, the elements, such as gravel with 4 times, have the minimum frequency that is in accordance with the touch problem

mentioned in Figure 4. In this stage, the experts were asked an open question to describe different types of trees, flowers, and plants favorable and effective in this disorder by mentioning their therapeutic causes. The results of these data were presented in a Table of results. After investigating the problems related to the senses and the comforting and efficient elements to support the improvement process of the senses, the type of comforting and favorable spaces for these children was questioned (Fig. 6).

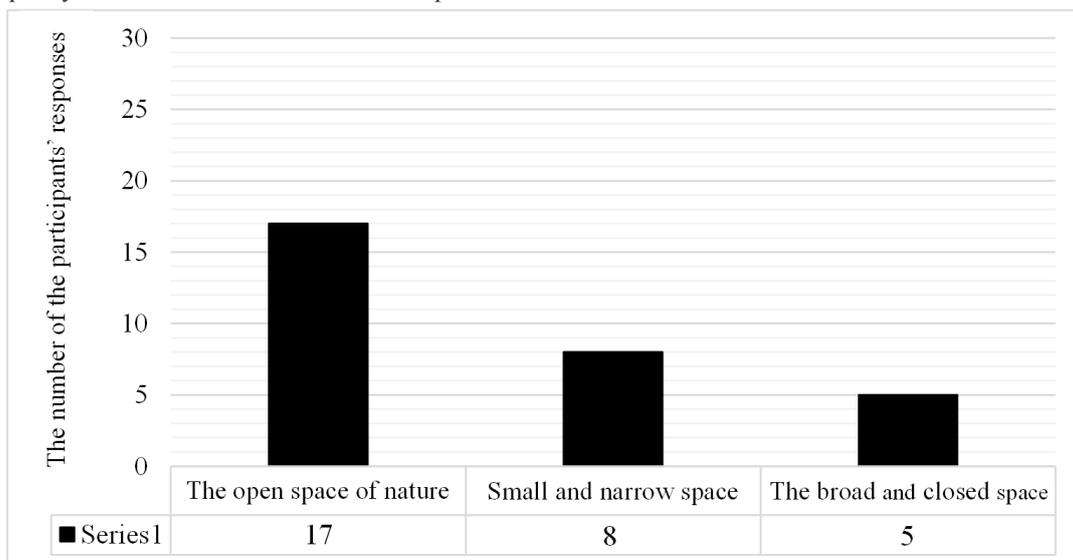


Fig. 6. Frequency of Problems of Children with Autism in the Five Senses

As Figure 6 shows believe in the significance of the supporting natural spaces is obvious in most answers of the participants so that the open natural spaces with 17 frequencies reveal the highest priority in comforting, and on the other hand, the closed and broad spaces show the least effectiveness. This finding presents the importance of the natural supports mentioned in the

conceptual framework of research (Fig. 3) very well. In line with this finding, understanding the importance of creating the accessibility or not accessibility of these children to other creatures and their types in the open space of nature was considered. Therefore, Figure 7 represents the analysis of the participants' answers in the structured interview in this regard.

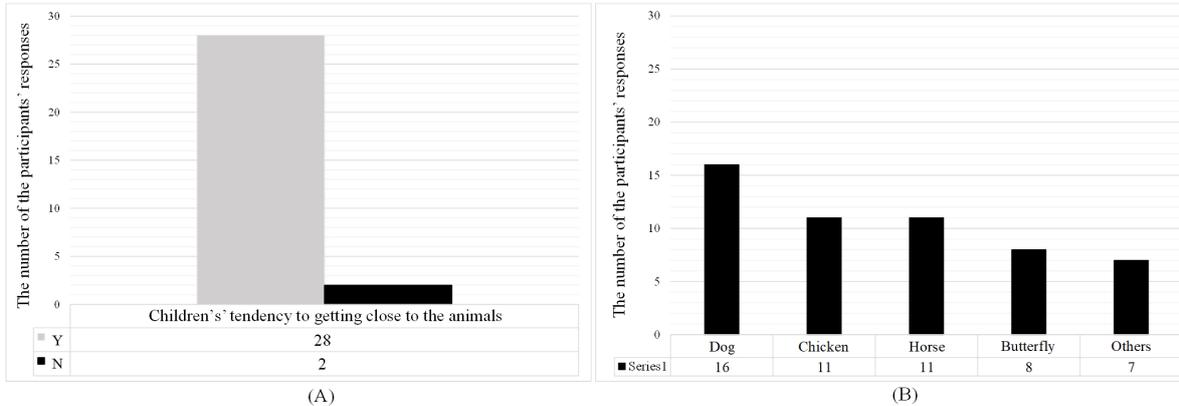


Fig. 7. (A) The Tendency of the Children with Autism towards being close to the Other Animals; (B) The Type of the Animals that These Children Show More Interest in them

According to the conducted analysis based on the data obtained from the participants' answers in the structured interview, the children with autism disorder have the utmost tendency (28 out of 30 experts interviewed) to be close and establish a communication with the animals (Fig.7. A). Therefore, utilizing this tendency in guiding the natural force to support the treatment process is of significant importance. The participants' responses showed that the highest interest was in the dog with 17 frequencies, and then chicken and horse

with the same frequencies of 11. However, the butterfly with the frequency of 8 and other animals and insects attracted the least attention of these patients. Besides identifying the favorable type of space effective in the treatment of the children with autism disorder and recognizing the other animals desired by the patients, identifying the visual features of these spaces will be also significantly important. Thus, Figure 8 presents the positive impact ability of these patients by the main colors and the type of these colors.

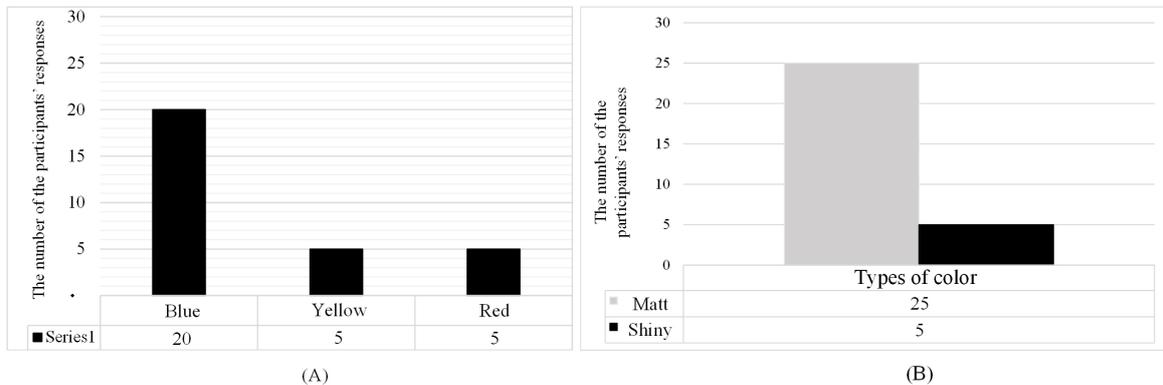


Fig. 8. (A) The Impact Ability of the Autistic Patients by the Main Colors, and (B) The Effective Type of Colors (Color Therapy)

As Figure 8 (A) represents, it can be seen that the blue color was mentioned by the participants (20 times) as the most considered main color by the patients with autism. It is in total accordance with the collected data through the observation method. Meanwhile, yellow and red ranked the next with the same frequency (5 times). Considering the significance of determining the type of color in the spaces related to these patients as presented in Figure 8 (B), the positive effect of the matt colors (25 times) has had the maximum frequency

among the participants' responses. This finding provides a part of the criteria considered in the research purpose (Figure 3). After identifying the problems and analyzing the data related to extracting the criteria of the favorable spaces abovementioned, a more proper understanding of these children's activities is very important to receive the design codes for the designers. Thus, the type of activities of these patients was asked of the experts participating in this research. Figure 9 presents an analytical graph about this question.

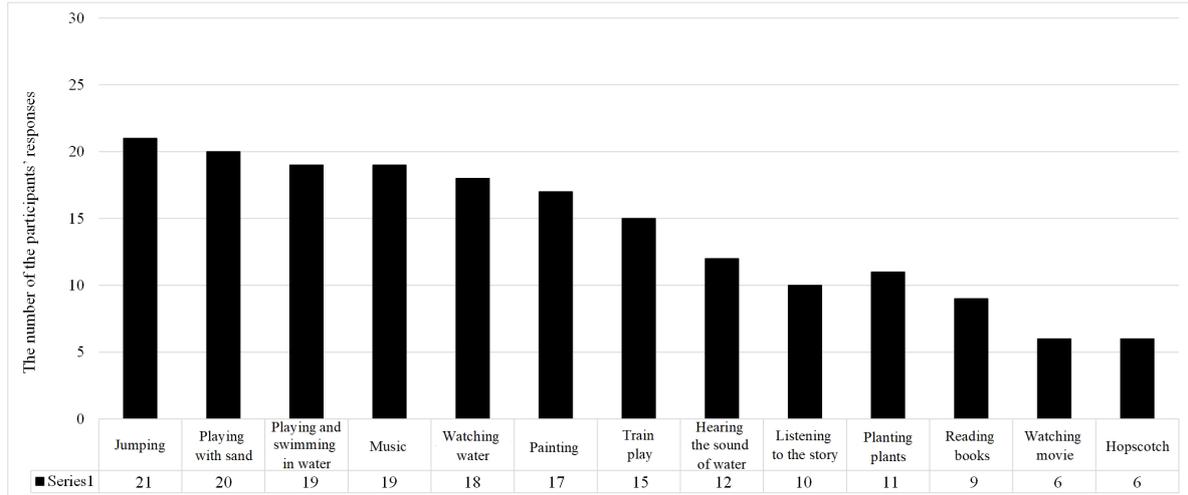


Fig. 9. The Frequency of the Activities Considered by the Children with Autism Disorder (Play Therapy and Work Therapy)

As Figure 9 presents, the most interest of these children was in the mobile activities, such as jumping, playing with sand, playing, and swimming in the water with the frequencies of 21, 20, and 19, respectively. However, the activities, such as watching television, hopscotch (each with 6 frequency), were less welcomed. That is to say, the activities that need more concentration were less desired by these children. This finding is consistent

with the issues mentioned in the research literature and the findings obtained by the observation tool. This result (the lack of concentration) shows that it is necessary to consider the ability of these children when facing diversifying and changing the space and activity as well. Figure 10 represents the results of the analysis of the participants' responses in this regard.

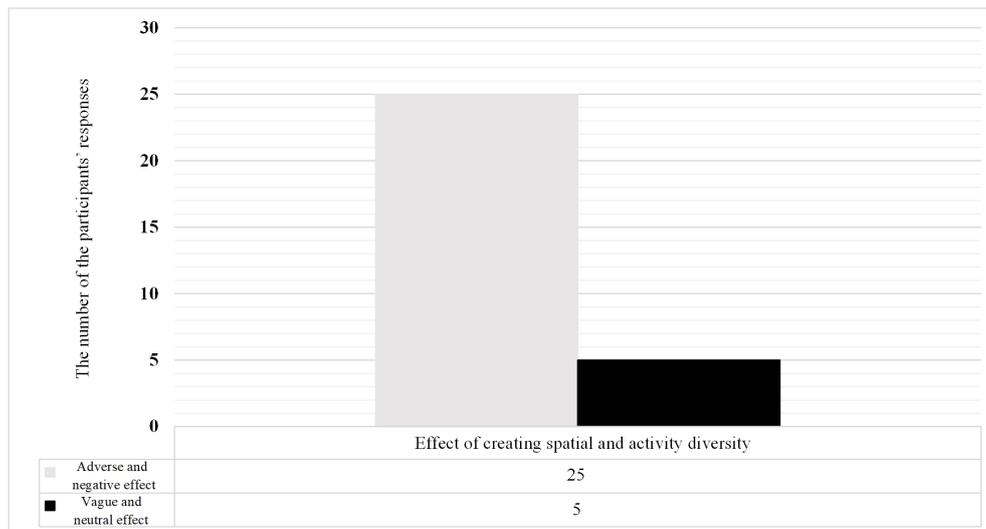


Fig. 10. The Effect of Creating Activity and Spatial Diversity

According to the results of Figure 10, most participating experts (25 people) believed that creating diversity in the activities and spaces of the presence of these children leads to emerging negative and inappropriate effects on the children and their recovery process. Thus, according to this finding, the positive effect of the uniform and fixed activities and spaces can be expected in the improvement process of these patients. Therefore, it was required to take measures regarding

the effect of this defect on the design process of the therapeutic landscape of the autistic children and the necessity to extract the design codes related to this finding. One of the significant physical aspects in dealing with this defect is recognizing the necessity or not necessity of determining the movement path of the patients in nature. Figure 11 represents the analysis of the experts' responses participating in this regard.

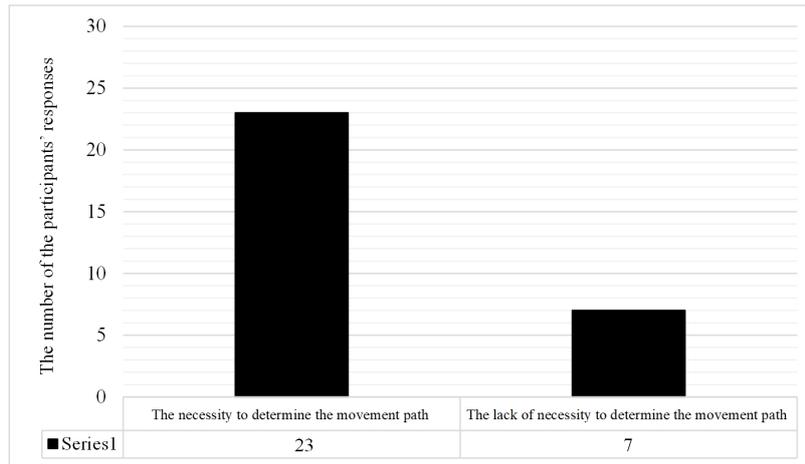


Fig. 11. The Necessity of Determining the Movement Path of Autistic Patients in Nature

As Figure 11 shows, a large group of participating experts (with the frequency of 21) emphasized the necessity of determining the movement path in nature to meet the lack of creating the unwanted diversity, and a small group of them (7 frequency) did not consider this matter necessary. It might be due to that the children with this disorder do not have the required

concentration and focus on more than one element or subject (Fig. 12). As mentioned in Figure 12, most participants in the structured interview mentioned this disorder and considered it important to take into account in implementing the plan of landscape therapy for these children.

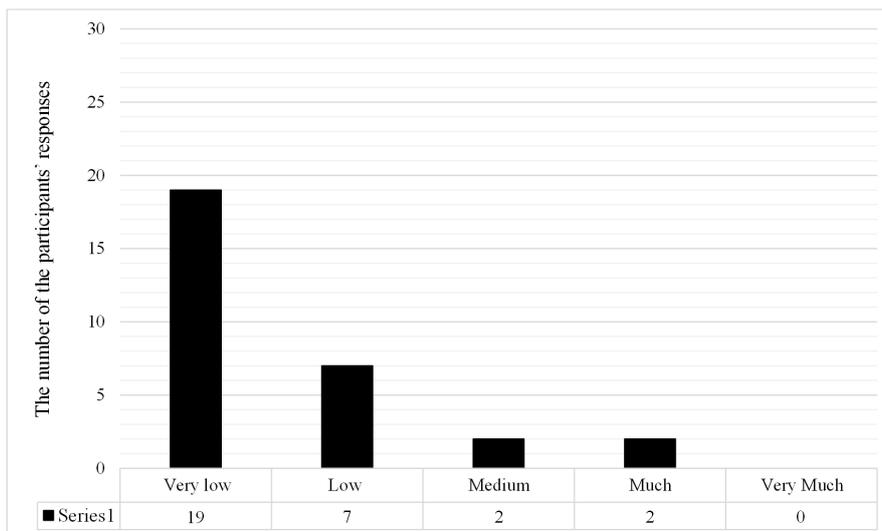


Fig. 12. The Ability of Concentration and Focus of the Children with Autism on More Than One Element

According to the finding above, none of the interviewees approved the ability of these children to focus on two elements simultaneously. However, 26 participants confirmed the patients' inability with the degrees of very low ability and low ability. Nevertheless, it will be important that, considering the necessity to determine the path for the patients in nature and their lack of ability to concentrate and focus on the environmental elements simultaneously, what forms of paths will be useful in designing the therapeutic landscape for the

children with autism. Figure 13 represents the bar graph related to the analysis of the interviewees' answers to the visual question related to this subject.

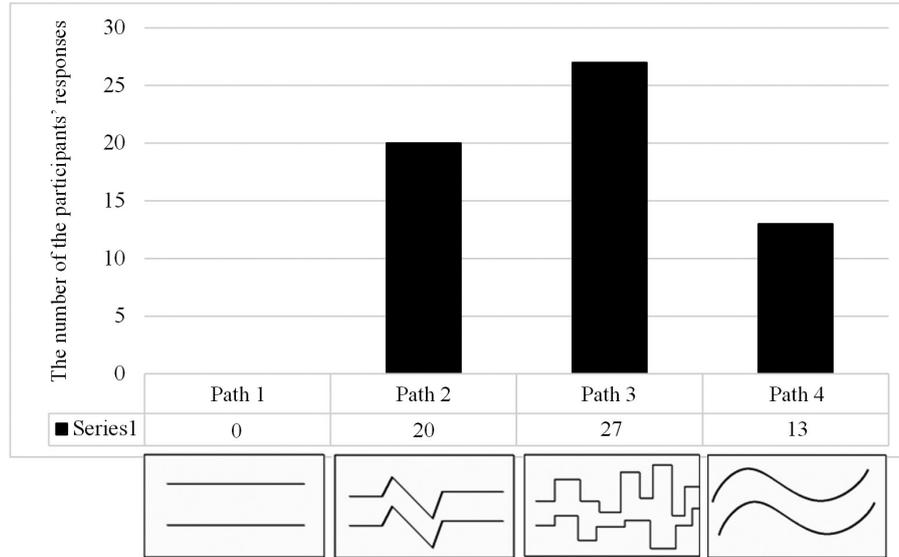


Fig. 13. Analysis of Participants' Responses to the Form of Movement Paths That Challenge the Minds of Autistic Patients Affecting the Treatment Process

As it was revealed in Figure 13, Figure 3 with the frequency of 27 was approved by most interviewed experts. It is due to that the challenging paths prevents creating concentration and focus on the far-off and helps the patient remain concentrated on one space. This spatial feature was considered in accordance with the abilities of the children with autism in paths numbers 2 and 4 and with 20 and 13 frequencies. However, the direct path, which has neglected the child's inability in

the lack of simultaneous concentration on the elements, was rejected. Thus, this finding can be used as one of the codes of the research purpose. This category can be applied in other forms used in therapeutic landscapes. Therefore, the effectiveness of the different systems of using water was also a matter of question in the structured interview of this research. Figure 14 presents the analysis related to this subject.

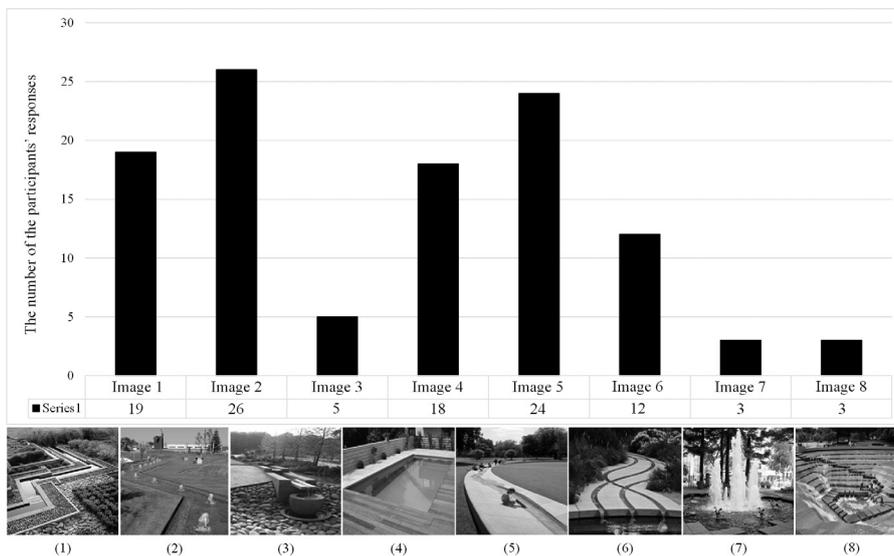


Fig. 14. The Effectiveness of Different Modes of the Water System on the Treatment Process of Children with Autism (Hydrotherapy)

According to the conducted analysis on the effects related to the designable water systems in the landscapes (Fig. 14), the design system used in Figure 2 (with the frequency of 26) and Figure 5 (with the frequency of 24) have the most proper effect on the treatment process of the autistic children in the related therapeutic landscape according to the experts. The

reason for this can be considered in the possibility of watching the water, security, easy movement, and the mild sound of the small fountains and water flow. These are the factors that are in accordance with the mental and physical needs of these patients. Then, Figures 1 (concentrative with the ability to create focus) and 4 (with the ability to swim) have relative

acceptability and can be considered as the secondary design options. The bumpy texture of the ground (Fig. 1) and the possibility to fall (Fig. 4), along with the lack of perceptible sound and flow, can be considered the weaknesses of these two factors. Also, as Figure 14 shows, Figure 7, due to creating the loud noise, and Figure 8, due to creating great spatial diversity, difficulty to move, and lack of sufficient security, had the minimum frequency.

6. CONCLUSION

After analyzing the collected data and discussing the obtained findings, to answer the first question of the research, the research results show that the criteria, including proper use of water in landscape design (proper implementation and design of the river, fountain, causeway, and pool), providing music instruments in the flooring and wall along with providing the opportunity to form the rustling leaves, water drip, and birds sound, implementing the gravel texture in the space, and playing instrumental music can have positive effects on the treatment process of the patients with autism disorder or its facilitation and

acceleration. Also, the research results indicate that creating proper spatial conditions with colors desired by these patients will be proper to form the individual and group games along with equipping the space with the tools related to trampoline, fitness ball, appropriate net for creating moveable surfaces, and rock climbing. According to the findings of this research, creating the opportunities in the space for planting and harvesting the fruits of trees and picking flowers and plants by the patients along with creating the possibility for safe play of these people with some livings are of other natural components supporting the treatment process of the autism disorder. The answer to the second question was presented in Table 1 (recommendations).

7. RECOMMENDATIONS

As the results show, placing the children with autism in natural spaces with specific qualitative details and accordance with their mental and psychological needs will be more effective in their treatment process. Thus, Table 1 provides the related recommendations to reach the research purpose and answer the second question of the research.

Table 1. Comparative Study of Sadeghi House Architecture in Both Safavid and Qajar period

Natural Support of Treatment	Design Guidelines/ Spatial Guidance (Findings)	The Recommended Quality and Details of the Research (Findings)	The Target Activities	Therapeutic Effect
Water and Hydrotherapy	-Proper implementation and design of the river, fountain, causeway, and pool.	-Utilizing water as pool and shallow rivers -Avoiding using large and tall fountains with loud noise	Swimming Hearing the sound And watching water	-Reducing stress and anxiety -Helping the development of visual, audio, and touch senses -Improving the physical activity and movement disorder
Music Therapy	-Providing music instruments in the flooring and wall -Creating the opportunity to form the rustling leaves, water drip, and birds sound -Implementing the gravel texture -Playing instrumental music	-Paying attention to the safety and ease of use. -Utilizing deciduous trees -Using vegetation diversity to attract birds -designing details related to the water system to create the controlled sound -Providing proper equipment to play the considered music.	-Listening to the music (Nature sound and instrumental music) -The experience of playing or creating sound.	- Creating harmony between the senses -Helping develop the audio and touch senses -Stimulating the motivation.
Play Therapy	-Creating spatial conditions to form the group and individual games	-The necessity to repeat and stimulate the five senses (such as playing with sands and train game due to the abundant repetition and reducing the obsession)	-Playing favorable and effective individual and group games such as train game, sand game, swinging, and hopscotch	-Developing cognitive development -Relieving anxiety -Increasing social skills -Helping develop audio, visual, and touch senses
Work Therapy	-Installing equipment related to trampoline, fitness ball, appropriate net to create portable surfaces, and rock climbing.	-Paying attention to the safety and ease of use. -Creating the opportunity for the accompany of the carer	-Doing regular activities	-Creating independence -Increasing self-confidence -Reducing stress -Increasing comfort -Developing physical ability -Improving the involved senses

Natural Support of Treatment	Design Guidelines/ Spatial Guidance (Findings)	The Recommended Quality and Details of the Research (Findings)		The Target Activities	Therapeutic Effect
Color Therapy	-Creating proper space and surface to play with colors	-Using blue color (preferable) -Using Matt colors		-Touching colors and playing with them using painting with hands in the provided spaces	-Reducing anxiety -Stimulating the sense of curiosity -Encouraging to walk in the environment -Solving the visual problems -Helping develop the touch sense
Nature Therapy	-Planting and harvesting the fruits of the trees -Picking flower and plants -Installing, designing, and protecting the safety of some livings	Trees	Walnuts, almonds, ginkgo biloba, black, and yellow myrobalan, and apples	-Planting and harvesting the fruits of trees -Picking flowers and plants	-Reducing stress -Creating independence -Helping solve the problems of five senses
		Plants	Mint, nigella seed, ginger, galangal, saffron, and lavender		
		Flowers	Narcissus, Valerian, Jasmine, Rose, and Muskwillow	-Watching and playing with the selected animals	
			-Providing the possibility of establishing a safe relationship with the dog, chicken, horse, and the possibility of seeing and playing with some insects like butterfly		

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