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The Effectiveness of Music Therapy Methods on Behavioral Disorders and Social Skills of Children with Autism Spectrum

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Abstract: *The purpose of the current study was to investigate the effectiveness of music therapy methods on behavioral disorders and social skills of children with autism. The research population consisted of all children aged 8 to 13 years from Imam Ali Autism Center, which included 60 children with autism. Of these, 15 were considered as experiment group and 15 were considered as control group. Data were collected using Gars-2 questionnaire, Social Skills Assessment Scale and the Vineland Social Development Scale. Multivariate analysis of covariance method in data analysis showed that music therapy methods had significant effect on improving social and communication and also on behavior disorders of children with autism.*

Keywords: *Autism, Music Therapy, Social Growth, Behavioral Disorders.*

INTRODUCTION

Until the middle of twentieth century, there was no name for the disorder that has now been called the Autistic Disorder. Henry Moudsley was the first psychiatrist who seriously considered the young children with severe mental disorder in 1867. In 1938, Hans Asperger took the term Autism from the technical terms of Blueler and applied it in German culture in child psychology (Asperger, 1938). For the first time, Leo Kanner also used the term Autism in English culture; he described a group of 11 children who showed a very specific pattern of certain symptoms of themselves, while they were distinct from children having other childhood disorders. Kanner named this severe form of child psychological pathology as "Early Infantile Autism" (Kanner, 1943). The children he described were obviously isolated and secluded from the beginning of their lives. These children, like a few months old babies, did not go to anyone's hug, they were outraged of being kept, and they were not resting in their parents' arms and prefer more to be alone. These children did not react to people and also the environment; they often manipulated things in a uniform and identical manner, and did not have a proper game. Kanner also noted that these children could not speak correctly; moreover, most of these children showed late Echolalia, and had problems in using pronoun in the sentence. Also, the described children showed anxious insistence of themselves about uniformity in the environment, good memories of the past and normal physical appearance, and had a good cognitive ability. Later on, Eisenberg and Kanner, in a comparison, limited the main symptoms into two primary characteristics:

1- Severe loneliness, and 2- Obsessive insistence to maintain uniformity; therefore, linguistic abnormalities that were previously considered as the main symptoms of syndrome were eliminated (Najarian, 2005).

In the late 1960s, Autism was established as a distinct syndrome and was differentiated from mental retardation, schizophrenia, and other growth disorders. It was also stated that interventional patterns are effective in active programs of the treatment (Fombonne, 2003).

More than four decades have passed since Autism was identified by Kanner. A lot of information has been obtained about this syndrome. Autism occurs in about 5.4 out of 10,000 live births. Autism has been characterized by intense secluding, penetrating imperfections in language, social behavior, attention and the appearance of strange or repetitive behaviors. Autism is usually diagnosed between the ages of 2 and 5 years old (Najarian, 2005).

None of the two children with autism show similar symptoms of themselves. The Diseases Control Center in December 2009 estimated that, in every 110 American children, one of them has different ranges of autism disease. At present, Autism has affected the lives of one and a half million Americans, and the number of people affected by the disease shows 10 to 17 percent growth annually (Kashani, 2011).

Autism Diagnostic Criteria According to the Diagnostic Manual of DSM IV

A child has the diagnostic criteria of Autism provided that he/she shows at least six cases of the categories provided below from at least two cases of the first category and one case of each one of the second and third categories. The onset of these disorders should be before 3 years of age.

First Category: Quality Disorder in Social Interaction

● Clear disorder in a few non-verbal behaviors, such as eye-to-eye look, facial expression, physical states, and head and hand movements to control social interaction.

● Inability to build relationship with peers, tailored to the level of growth

● Lack of spontaneous effort to involve other people in their happiness, interests or progress

● Lack of social or emotional Reciroctiy

Second Category: Qualitative Disorder in Communication

● Delay or complete lack of the growth of verbal language in people with speaking power

● Obvious disorder to be able to initiate or maintain conversation with others in people with speaking power

● Repetitive or stereotypic use of language or Idiosyncratic

● Lack of various spontaneous make-believe game or social imitation game proportional to the level of growth

Third Category: Behavioral Pattern, Stereotypic, Repetitive, and Restricted Interests and Activities

● Full and continuous mental preoccupation with one or more than one stereotypic and limited pattern(s) of interests that are unusual in respect of intensity or orientation

● Following the affairs or specific and inefficient habit apparently compulsive

● Repetitive motion mannerisms and stereotypes (for example, shaking the head, finger, complex movements of the whole body)

● Continuous mental engagement with object components (Rezaie, 2015)

Treatment of Autism and its Types:

While no definite treatment has been found for autism yet, there are proper treatment procedures whereby these children can be helped so that they benefit from more capabilities and even some examples of complete

recovery have been observed. Among these training and self-help methods include: ABA, TECCH, PECS and so on.

Complementary Treatments: Although early diagnosis and early treatment of Autism are the best methods to help and treat these children, some parents and researchers believe that there are also other complementary treatment methods that can improve the child's relationship with the world around and others and improve their behaviors. These treatments can work individually or by working with the child or can be performed in special centers collectively. In all these methods, communication power enhancement, social relationships improvement, and self-confidence enhancement are common. These methods also help the child establish safe and useful relationship with his/her therapist and others and be familiar with them. Among these treatments are music therapy, horse therapy, play therapy, massage therapy, art therapy and so on.

Music Therapy: Music is a phenomenon that has arisen from us and has an effect on us and that is why it is used as a treatment approach. Gaston, one of the early founders of music therapy, emphasizes the fact that music is human behavior, not because human being creates it, but as human being creates his attachment and communication with it. Music therapy is the prescribed and structured use of music or its activities for maladaptive states under the supervision of trained personnel to help clients reach the therapeutic goals (Rafeie, 2006).

The application of music in healing patients has an old and historical root and has been used in a way in all ancient cultures and civilizations. In general, two groups of civilization are involved in the development and growth of music therapy. The first one was the ancient Greek and Roman civilizations that had a scientific and medical attitude towards the music. The Greeks believed in the Apollo God, who was the goddess of medicine and music. The Apollo musical force regulated irregularities and disorders of body and returned health to the patients, and the thought that the disease is a kind of lack of coordination and harmonic music itself leads to healthiness is the first scientific attitude to the music (Joharifard, 2007).

Methodologically, music therapy is defined as a prescribed and structured intervention that utilizes musical instrument for therapeutic purposes (Jacqueline Tappers, 1992).

In general, seven major methods have been used for music therapy and music interventions around the world. These methods are:

1. Passive Music Therapy (PMT)

In this method, people can hear their favorite and selected music. In some cases, hearing is intended, and people can control the sound of tape recorder or computer and manipulate it. Among the main goals and applications of this method, the reduction of pain, anxiety and stress caused by the disease, helping numbness and shortening the duration of drug use and hospitalization can be mentioned.

A variant of this method is called the therapeutic theme (Joharifard, 2006).

2. Active Music Therapy (AMT)

People in this method actively participate in musical activities such as playing, singing, physical movements and so on. The importance of the two mentioned methods is to the extent that, in a comprehensive and common classification, they divide music therapy into two active and passive methods. In an active method, musical instruments are structured for the relationship of sensory organs of the body so that appropriate motor and emotional responses are obtained from them. This method is well applied in the treatment of Parkinson disease as a psycho-motor disorder (Pacchety et al., 1998). Among the results of this treatment, pain reduction, motor abilities enhancement, strength and duration of movement enhancement in muscle deficiencies and respiratory capacity increase can be named.

3. Music Therapy and Counseling

In this method, by playing music with the moral maker theme, the memories and emotions of people can be incited and treatment relationship can be deepened. Unconscious analysis and central beliefs have always been accompanied by alert resistances by the clients. Moral maker themes by crossing alert boundaries facilitate access to obscure materials (psychoanalysis approach) and central beliefs (cognitive approach).

4. Music and Educational and Evolutional Issues

In this method that is often used for normal and sometimes retarded children musical instrument is used along with educational lyrics and musical exercises to strengthen and shape the desired behaviors (behavioral approach), self-assistance and learning.

5. Music and Stimulation

In this method various musical instruments are exploited to stimulate and enhance sensations such as hearing, touching and vision, and to increase the psycho-motor function of the individual. In some cases, this method is used to guide one's imagination and consciousness in order to reduce anxiety and depression.

6. Music along with Biofeedback

Biofeedback techniques by providing objective and measurable information to a person about one or more physiological processes, are trying to make him/her able to gain some degree of control over his/her physical functions that act naturally and out of consciousness (Kaplan and Sarouk, 1999). This technique is used in music therapy, through accompaniment of music with patient's biofeedback and increasing the optimal responses and reducing the physiological discomfort. The use of relaxation themes in this method can be effective. The effect of this method on the reduction of tension headaches has been specified.

7. Musical Group Activities

In this method, musical instrument can be used to increase interpersonal communication and group dynamism. The use of moral maker and physical maker themes can stimulate emotions and increase the mobility of each group. On the other hand, people can be invited to perform collective anthem, group improvisation and artistic debates (Joharifard, 2007).

In recent decades, researchers and scholars have studied the effect of music therapy on various mental and physical illnesses. So far, more than two thousand systematic researches have been done on the impact of music on various psychiatric, medical and rehabilitative acts and fields that generally show the positive effect of musical activities.

Pennkins, Aubi, Perts, Barrios, Armonia and Concha surveyed the difference of the sound of telephone and music, and showed that music impacts on various parts of the brain in the anterior part of temporal superior torticollis (Anglo, 2014). Edward and Michael in a research revealed that the effect of music therapy and social stories on autistic children causes their improvement in the perception and generalization of learning behavior and social information (Simpson, 2013).

During a research in 2015, it was shown that music is effective in learning output of children with Autism. They worked on 22 children (with the age mean of 9.5) in a controlled randomized crossover plan, working in a computer-based intervention in reading and speaking conditions. The results of this research showed that children with Autism tend to sing in singing conditions more than in tentative conditions, and stated that music techniques and art therapy have an important impact on the education and training system of children with special problems (Maria Petrota, 2015)

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Although these researches have not achieved the theoretical determinant in recognizing the fundamental reasons of psychological impact of music, the process of influencing in some ways such as evacuation and change of emotions, emotions strengthening and enrichment, creating energy and motivation, strengthening coordination in physiological actions, change in the levels of various hormones, communication and interest in the environment and creating comfort are practically observed. Among numerous researches that have been performed on the effect of music therapy on growth disorders, it can be seen that music stimulates emotions, and on the other hand, it is believed that listening to the music also leads to one's emotional reactions. Studies have shown that listening to the music reduces the muscles contraction of autistic children and adolescents (Skeel and Wigram, 1995).

Basatian (2005), in his investigation of the blinds, found that the music therapy program compensates the deficiencies due to blindness in various ways. Musical movements and exercises encourage blind children to move and search the surrounding and find the source of sound. Musical movements reinforce their imagination of their bodies, which is necessary for success in space, and bring them closer to the reality and objectivity of the surrounding.

Annette Coulen, in a research in the Intensive Care Unit (ICU) of hospital in 1994 reports that music penetrates into consciousness levels, while communication and talking is ineffective. Music helps patients who are immersed in themselves and feel severe loneliness to reach some levels of awareness to the realities and make communication with people while feeling pain and distress (Shariatzadeh Joneidi, 1999).

Wigram (2006), in another study also found that music therapy affects the autonomic nervous system and blood pressure of these autistic people.

According to the results obtained from Fermysano et al. (2001), music is a real healing device and is a pleasurable and intrinsically motivating activity. In this method, people express their feelings in a safe and enjoyable manner by playing music and rhythmic movements along with music.

Also, music therapy can reduce the autistic children's problems by activating brain mirror neurons; because some researchers believe that many autistic children's problems are due to the violation of mirror neurons function (Katherine et al., 2010).

Kapline and Steel (2005) during a two-year, exact study investigated the effect of music therapy on various life aspects of autistic people. During this study, they performed a regular music therapy program on 40 patients with autism disorder in the range of 2- 49 years old. The results indicated that music therapy had the highest impact on linguistic, relationship (41%), psychological-communication (39%), cognitive (8%), musical (7%) and perceptual-motor skills (5%).

Ritman (2005) in a study investigated the effect of music therapy interventions on autistic children's attention skills. The research was conducted on children aged 4 to 10 years and over two years, the results of which showed that music therapy and music training has been effective on the attention of autistic children.

Jina Kim et al. (2008) compared the effect of music therapy method and play therapy on increasing the attention of autistic children, the results of which showed that music therapy has a greater effect on the attention increase of autistic children compared to play therapy. Also, the results of this study indicate the effect of music therapy on non-verbal social communication.

Lanquist et al. (2009) also in their study investigated the impact of music on the challenging behaviors of autistic and developmental disorders people. The results of this research indicated that listening to the relaxing music has reduced all three ranges of the stereotypic behavior, aggressive behavior and self-harm behavior.

According to the previous studies, it can be concluded that teaching music and music therapy can be effective in reducing the behavioral problems of people with autistic disorder.

In this article the effectiveness of music therapy methods on behavioral disorders and social skills of children with autism spectrum is investigated, and the importance of this research is the annual increase of this disease in children, and also the importance of treatment and the improvement of their behavioral performances to enter the society and having the least normal life.

Research Method

Statistical Population and Sample

The statistical population of present research was all children aged 8 to 13 years old at Imam Ali (PBUH) Training and Maintenance Center. The total number of these children was 50, out of which 15 people were taken as the control group and 15 people participated in the control group of research.

Research Tool

Garz Questionnaire:

Garz Test is a checklist that helps identifying autistic people. This test is normalized among the 1092 subjects that represent autism topics in 46 states of Columbia, Proto Rica, and Canada. The Garz or Gars test is suitable for people aged 3 to 22 years. Completing this scale is easy for parents, teacher, and those who know these behaviors, and the examiner who has the opportunity to observe. This test consists of four sub-tests, each of which consists of 14 items. Each sub-test describes behaviors that indicate autism.

These subscales include: stereotypic, relationship behaviors (verbal and non-verbal behaviors), social interaction, and growth disorders. In this test, that has a high internal coordination, for the subscales of stereotypic behaviors, social interaction, and autism ratio, Cranbach's alpha of 0.9 and higher has been achieved. For the subscale of relationship, the ratio of 0.89 close to 0.9 and for the sub-scales of growth damages 0.88 and for the total score (all 56 questions with 0.96 alphas) were calculated. The test was conducted again on a sample of 11 people, including 9 boys and 2 girls with an average age of 9.5 who had autism by their teachers, and after two weeks the test was re-implemented.

All the test-retest correlations were achieved at a significant level of 0.01 which indicates the high reliability of the Garz. In this test for validity, the following average coefficients were obtained: the stereotypic behaviors: 0.61, relationship: 0.65, social interaction: 0.69 and growth damages: 0.61, all of which were statistically significant ($p<0.01$). Based on these results, it can be said that the clean coefficients of Garz are acceptable (Ahmadi et al., 2012)

Social Skills Rating Scale Questionnaire of Teachers' Form:

The Social Skills Rating Scale of Teachers' Form is a test of 56 phrases composed of a set of the three sub-scales of inadequacy, social skill and relationship with peers. This scale is created to assess various aspects of effective childhood communication, including leadership and follow-up ability, the level of active participation in organized activities, self-confidence and stability in social situations, social perception and tact in interpersonal relationship, and is used by teachers to specify if the desired phrase is true about the students or not.

The reliability of the lack of social inadequacy subscale based on the alpha coefficient in the sample group of 1226 people has been reported to be 0.89. In the lack of social skill subscale based on the alpha coefficient in the sample group of 1226 people, it has also been reported to be 0.81. The reliability obtained from the re-testing of the social skills subscale has also been reported to be 0.91. The validity of this test, which was carried out to assess the validity of children's personality, showed that this scale distinguishes six groups

of delinquent, overactive, cerebral palsy, suffering physical disorder, backwardness, and psychosis from each other. Other researches also indicate the desirable validity of this questionnaire (Trask, 1989).

Whiteland's Social Growth Scale Questionnaire:

The Whiteland's Social Maturity Scale, one of the developmental scales, deals with the individual's ability to meet his/her practical needs and accepting responsibility. Although this scale includes the age scope from birth up to higher than 25 years of age, and has separate questions up to twelfth years for each year, it has common questions from the age of 12 onward, between the age of 12 to 15, from 15 to 18, from 20 to 25, and from the age of 25 onward. However, it has been shown that its efficacy at lower ages, and in particular in the mentally retarded groups, maximizes. This scale has 117 items divided into one-year groups.

In each item, the required information is obtained not only through testing situations, but also by interviewing the informed people with the subject himself. The basis of scale is founded on the point that what a person can do in everyday life. The items of scale can be divided into eight categories: general self-help, self-help in eating, self-help in dressing, self-direction, employment, linguistic communication, locomotion, and socialization. According to the individual's scores on the scale, the Social Age (SA) and Social Quotient (SQ) can be calculated. This scale was first translated by Dr. Baraheni and Dr. Okhovat for using in orphanages of Tehran and adapted to the characteristics of Iranian culture.

The credibility of this scale is that it is normalized on 620 people (including 10 men and 10 women) in each age group from birth to age 30. It should be mentioned that in this sample the number of individuals in each age group was low, and also considering that most of the tested people were of the middle class of society, such a sample cannot be regarded as the representative of the whole society. The reliability coefficient of 123 people has reported as 92%, with the explanation that the retest interval has been from one day to nine months (Baraheni, 2003).

Investigated Research Questions Are:

- Does music therapy have a positive effect on behavioral disorders in children with autism?

- Does music therapy affect the social skills of children with autism?

Procedure

In the present research, the Whiteland's Social Skills Growth Questionnaire (WHI) and the Social Skills Rating Scale of Teachers' Form were completed by using their instructor, and the Social Skills Questionnaire of Teachers' Form, Rutter's Behavioral Disorders, and Thailand's Social Skills and Gars Questionnaire were done by parents. The treatment was performed during 6 months (two days a week), that the experimental group consisted of 15 young children, 12 boys and 3 girls with various class levels. It should be mentioned that three of the young children were able to speak and in terms of the severity of autism twelve people were among the level three (requiring very high support), and teaching has been done individually.

The items of treatment sessions were determined on the basis of the child's level and need, which the trainings were performed, ranging from level three (requiring very high support) to level one (need for support) respectively, including exercises: eye contact, attention and concentration, eye and hand coordination, comprehensive interaction and imitation of instructor's movements, social skills and group placement, and performing movement exercises with rhythm, understanding rhythm along with playing instrument as improvisation, enhancing auditory memory by memorizing poem with rhythm, enhancing visual and auditory memory by teaching to play Belz's instrument (through colors, numbers, the alphabet of music) and ultimately enhancing all skills by playing and reciting memorable poem simultaneous with it.

Findings

The Multivariate Analysis of Covariance (MANCOVA) method was used to assess the effectiveness of music therapy on social growth, social skills, and behavioral disorder in children with autism. This test is a kind of nonparametric tests, and to perform it the needed assumptions for this test were investigated. Shapiro-Wilk and Kolmogorov-Smirnov tests were used, and the results showed that the significance is more than 0.05, so the assumption of the distribution normality of research data was provided.

Boxes Test was also used to investigate the homogeneity assumption of the covariance matrix of dependent variable, which shows that the covariance matrix of dependent variable is equal for the independent variable levels (group) ($P < 0.05$). The equivalence assumption for covariance was also investigated by the Bartlett's Test of Sphericity, which showed that this assumption exists and there is adequate correlation between the dependent variables ($P < 0.05$). The mean and standard deviation of social growth scores from birth to age 6, the sub-scales of social skills, behavioral disorder and autism symptoms in children with autism in both the experimental and control groups in the pretest and posttest phases have been reported in table 1.

Table 1. Descriptive Indicators of the Components of Social Growth, Social Skills, Behavioral Disorders and Autism Symptoms in the Experimental and Control Groups in the Pretest and Posttest

Variable	Component	Phase	Experimental		Control	
			M	SD	M	SD
Social Growth	Growth Birth to 1 Years Old	Pretest	17.00	3.22	15.33	2.22
		Posttest	16.60	0.72	16.13	0.72
	Growth from 1 to 2 Years Old	Pretest	13.00	5.04	8.67	4.85
		Posttest	10.20	0.94	7.46	0.94
	Growth from 2 to 3 Years Old	Pretest	4.20	3.52	1.93	2.63
		Posttest	5.73	0.80	1.86	0.80
	Growth from3 to 4 Years Old	Pretest	1.93	1.98	1.47	1.88
		Posttest	4.33	0.70	1.06	0.70
	Growth from 4 to 5 Years Old	Pretest	0.87	1.76	0.40	0.73
		Posttest	1.60	0.43	0.46	0.43
	Growth from 5 to 6 Years Old	Pretest	0.73	1.73	0.13	0.35
		Posttest	1.06	0.35	0.26	0.35
Social Skills	Inadequacy	Pretest	12.73	4.92	10.66	2.76
		Posttest	11.33	0.67	10.60	0.67
	Social Skill	Pretest	12.26	3.03	11.53	1.80
		Posttest	13.06	0.58	10.80	0.58
	Relationship with Peers	Pretest	6.13	2.58	6.60	1.29
		Posttest	6.80	0.42	6.73	0.42
Behavioral Disorders	Aggression and Overactive	Pretest	6.46	3.64	6.46	3.54
		Posttest	5.67	0.64	6.80	0.64

	Anxiety and Depression	Pretest	5.40	1.84	4.20	1.85
		Posttest	3.50	0.33	4.99	0.33
	Social Incompatibility	Pretest	6.66	2.58	6.00	2.07
		Posttest	5.77	0.22	6.03	0.22
	Anti-Social Behavior	Pretest	2.80	2.83	3.60	2.52
		Posttest	2.05	0.50	3.34	0.50
	Attention Deficit Disorder	Pretest	2.26	2.43	6.66	2.22
		Posttest	6.01	0.38	6.25	0.38
Autism Symptoms	Social Skill	Pretest	17.60	8.12	19.80	8.83
		Posttest	24.40	2.30	21.06	2.30
	Relationship	Pretest	5.80	7.66	3.00	4.55
		Posttest	8.06	1.94	3.33	1.94
	Stereotyped Movements	Pretest	13.00	6.35	17.8	7.10
		Posttest	17.86	2.16	18.73	2.16

The results of multivariate tests of Pillai's trace, Wilks' lambda, Hotelling's trace, and Roy's largest root showed that there are significant overall effects for social growth subscales (η^2_p =0.39, p= 0.049, p =2.53, $F_{(1.29)}$ = 2.53). In table 2 the analysis results of intergroup impacts to investigate the impact of membership group on social growth scores in the posttest phase are observed. These findings show that the observed difference between the social growth scores of 1 to 2 years (η^2_p = 0.13 p= 0.049, $F_{(1.29)}$ = 4.21, 2 to 3 years is η^2_p=0.29, p=0.002, $F_{(1.29)}$ = 11.43), and social growth of 3 to 4 years (η^2_p =0.27, p= 0.003, $F_{(1.29)}$ =10.76), in terms of group membership (two experimental and control groups) in the posttest phase is significant.

The social growth rate of 1 to 2 years in the experimental group was significantly higher than (M=10.20, SD=0.94) the control group (M=7.46, SD=0.94) at the posttest phase, and 13% of resulting changes of social growth of children with 1 to 2 years old with autism have been created by teaching music therapy. In addition, the social growth rate of 2 to 3 years in the experimental group was significantly higher than (M=5.73, SD=0.80) the control group (M=1.86, SD=0.80), in the posttest phase, and based on the obtained impact size it can be said that 25% of the resulting changes in the social growth of children with 1 to 2 years old with autism have been created through teaching music therapy. Finally, the social growth of 3 to 4 years old in the experimental group (M=0.70, SD =4.33) was significantly higher than the control group (M=1.06, SD =0.70), and 27% of this change in the growth of 3 to 4 years is exclusively created by horse therapy. Social growth at other levels did not show any significant difference in terms of group membership (two experimental and control groups) in the posttest phase (P <0.05).

Table 2. Social Growth Covariance Analysis in Terms of Group after Adjustment of Pretest Scores

	Dependent variables	**Average squares**	**Degree of freedom**	**Average squares**	**F statistic**	**Sig**	**Impact size**
Group	Growth, birth to 1 year	1.63	1	1.63	0.20	0.665	0.007
	Growth, 1 to 2 years	56.03	1	56.03	4.21	0.049	0.13
	Growth, 2 to 3 years	112.133	1	112.133	11.43	0.002	0.29
	Growth, 3 to 4 years	80.03	1	80.03	10.76	0.003	0.27
	Growth, 4 to 5 years	9.63	1	9.63	3.40	0.07	0.10
	Growth, 5 to 6 years	4.80	1	4.80	2.59	0.19	0.08

The results of multivariate tests of Pillai's trace, Wilks' lambda, Hotelling's trace, and Roy's largest root about social skills showed significant effects (η^2p = 0.25, p= 0.049, $F_{(1.29)}$ = 2.98). In table 3, the results of intergroup analysis to investigate the effect of group membership on social skills scores in the posttest phase is observed. These findings indicate that the observed difference between the second sub-scale of social skills (η^2_p = 0.21, p= 0.010, $F_{(1.29)}$ = 7.63), in terms of group membership (two experimental and control groups) is significant in the posttest phase.

In the sense that the rate of second subscale of social skills in the experimental group was significantly higher than (M=13.06, SD =0.58) the control group (M=10.80, SD=0.58) in the posttest phase, and 21% of the resulting changes in the second scale of social skills of children with autism have been created through teaching music therapy. Social skills at other levels did not show a significant difference in terms of group membership (two experimental and control groups) in the posttest phase (p <0.05).

Table 3. Covariance Analysis of Social Skills in Terms of Group after Adjustment of Pretest Scores

Changes source	Dependent variables	Average squares	Degree of freedom	Average squares	F statistic	Sig	Impact size
Group	Inadequacy	4.033	1	4.033	0.59	0.44	0.021
	Social Skill	38.533	1	38.533	7.63	0.010	0.214
	Relationship with Peers	0.033	1	0.033	0.012	0.913	0.00

The multivariate tests of Pillai's trace, Wilks' lambda, Hotelling's trace, and Roy's largest root about behavioral disorders also showed significant effects (η^2_p = 0.50, p= 0.014, $F_{(1.29)}$ = 3.84). In table 4, the results of intergroup effects to investigate the effect of group membership on behavioral disorders in the posttest phase are observed. These findings indicate that the observed difference between the sub-scale of depression and anxiety (η^2_p = 0.25, p= 0.010, $F_{(1.29)}$ = 7.82), in terms of group membership (two experimental and control groups) is significant in the posttest phase.

In the sense that the rate of depression and anxiety in the experimental group was significantly lower than (M=3.50, SD=0.33) the control group (M=4.99, SD=0.33) in the posttest phase, and 25% of the resulting changes in reducing the depression and anxiety of children with autism have been created through teaching music therapy. Behavioral disorders at other levels did not show a significant difference in terms of group membership (two experimental and control groups) in the posttest phase (p>0.05).

Table 4. Covariance Analysis of Behavioral Disorders in Terms of Group after Adjustment of Pretest Scores

Changes source	Dependent variables	Average squares	Degree of freedom	Average squares	F statistic	Sig	Impact size
Group	Aggression and Overactive	6.549	1	6.549	1.32	0.261	0.055
	Anxiety and Depression	10.437	1	10.437	7.82	0.010	0.254
	Social Incompatibility	0.336	1	0.336	0.57	0.456	0.024
	Anti-Social Behavior	8.21	1	8.21	2.74	0.111	0.107
	Attention Deficit Disorder	0.227	1	0.227	0.16	0.69	0.007

Finally, the multivariate tests results of Pillai's trace, Wilks' lambda, Hotelling's trace, and Roy's largest root showed that significant effects for the subscales of autism symptoms also exist (η^2_p = 0.60, p= 0.000, $F_{(1.29)}$ =11.86). In table 5, the results of intergroup effects to investigate the effect of group membership on the scores of autism symptoms scales in the posttest phase are observed. These findings indicate that the

observed difference between the sub-scale of skill (η^2_p =0.55, p=0.000, $F_{(1.29)}$ =34.07), in terms of group membership (two experimental and control groups) is significant in the posttest phase.

Also, the observed difference between the two experimental and control groups in terms of the subscale of relationship is also significant (η^2_p = 0.19, p= 0.021, $F_{(1.29)}$ =6.06). In addition, the observed difference between the two experimental and control groups in terms of stereotypic movements scale is also significant (η^2p = 0.07, p= 0.01, $F_{(1.29)}$ =1.99). It means that the rate of the subscale of social skill of autistic symptoms in the experimental group was significantly higher than (M=24.40, SD = 2.30) the control group (M=21.06, SD = 2.30) in the posttest phase, and 55% of the resulting changes in the skill of children with autism have been created through teaching music therapy.

In addition, the relationship subscale of autism symptoms in the experimental group was significantly higher than (M=8.06, SD =1.94) the control group (M=3.33, SD=1.94) in the posttest phase, and based on the obtained effect size it can be said that 19% of the resulting changes in the relationship of children with autism have been created through teaching music therapy. It should be mentioned that the subscales of the stereotypic behaviors of autism symptoms in the experimental group were significantly lower than (M=17.86, SD =2.16), the control group (M=18.73, SD =2.16) in the posttest phase, and based on the obtained effect size it can be said that 7% of the resulting changes in the stereotypic behaviors of children with autism have been created through teaching music therapy.

Table 5. Covariance Analysis of Autism Symptoms in Terms of Group after Adjustment of Pretest Scores

Changes source	Dependent variables	Average squares	Degree of freedom	Average squares	F statistic	Sig	Impact size
Group	Social skills	160.272	1	160.272	34.07	0.000	0.55
	Relationship	11.34	1	11.34	6.06	0.021	0.195
	Stereotypic movements	55.145	1	55.145	1.99	0.01	0.074

Discussion and Conclusion

The results of present research showed that music therapy has been significant on social skills and the relationship of autistic children after six months of music therapy and teaching music, which is consistent with the results of research by Lanquist et al. (2009). Also, the researches of Basatian (2005), according to the findings, found that oscillatory movements are one of the most common stereotypic behaviors and habitual behaviors of the blinds. By playing musical instruments and engaging in motor activities, the music helps them to reduce their stereotypic behaviors and replace them with desirable behaviors.

Also, in the present research, the effect of music therapy on behavioral disorders (depression and anxiety) has become significant, which is consistent with the studies by Rüütel, Ratnik, Tamm, and Zilensk (2004), which showed the effect of teaching music and music therapy on reducing the anxiety of people with autistic disorder. The stereotypic movements of autistic children are mostly due to their lack of sense integrity, which by the movements and activities performed with rhythmic movements associated with rhythmic music, many of the vestibular and deep stimuli and senses can be created in these children, and led them to more sensory integrity, as a result of which we will witness the reduction of stereotypic behaviors in these children.

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