A Comparison of the Effectiveness of Video Prompting and Self-video Modelling on the Reduction of Autistic Children's Symptoms

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Abstract

Aim: The present study was conducted to compare the effectiveness of video prompting and self-video modelling on the reduction of autistic children's symptoms.
Methods: The method of this research was using a quasi-experimental method using two experimental groups and one control group. The statistical population of this study included children with autism disorder aged 4-8 years who were treated at the Tehran Autism Centre from 2015 to 2017. According to the nature of this research, available sampling and random placement were used. At the end, 18 children were selected and randomly assigned into two experimental groups and a control group according to the inclusion criteria. Two video pieces that were previously prepared for teaching social communication skills in both video prompting and self- modelling were presented to participants during 24 sessions which lasted for 30 minutes. Prior to and after the intervention, the participants were tested for the skills mentioned above. The research instrument consisted of the Gilliam Autism Ranking Scale (Gares), Questionnaire of Sensory Profile, Video Modelling Intervention, and Self-Video Modelling Intervention. Collected data were analysed using MANCOVA test and Bonferroni's post hoc test and analysed by SPSS 24.
Results: After ensuring the non-violation of statistical assumptions and based on the results of MANCOVA test, there is a significant difference between the three groups in the post-test, in the areas of communication and interaction. Also, there was no significant difference between the three groups in the emotional responses in the post-test scores with the moderation of pre-test effect. Also, the results of Bonferroni's post hoc test indicated that there is no significant difference between the two methods.
Conclusions: The findings of this study emphasize the effectiveness of video prompting and self-video modelling on the reduction of communication and interaction problems of autistic children. Also, video modelling improves language deficiencies and restrictions, communication skills, verbal and nonverbal conversations, control of repetitive behaviours, spontaneous verbal requests, application commands, and daily life skills.

Keywords: Autism Spectrum, Video Prompting, Self-video Modelling, Communications, Interactions

Introduction

Autism disorder is a complex neurodegenerative disorder that is commonly evident in the first 3 years of life and affects the child's verbal and communicative abilities and is associated with symptoms such as limited, repetitive behaviours, activities and behaviours [1]. Autism can be considered in the context of a spectrum that affects children in varying degrees and different forms [2].

Findings from centres for disease control and prevention-sponsored Autism and Developmental Disabilities Monitoring (ADDM) indicate that the prevalence of autism is on the rise [3]. In epidemiological studies conducted in the 1980s, the incidence of this disorder was reported to be between 2 and 5 cases per 10,000 people [4]. However, in recent studies, according to the Centre for Disease Control and Prevention Report (2012), the prevalence of autism spectrum disorder among 8-year-old children was diagnosed in 1 child out of 68 children [5]. The prevalence of this disorder in boys (1 in 42) is 4.5 times more than in girls (1 in 189) [6]. In Iran, according to the National Screening Program, which was conducted for over 3 years on 1,300,000 5-year-old children, the prevalence of this disorder was reported to be 6.26 out of every 10,000, which is much lower than the global average [7, 8]. Researchers attributed this difference to the low age of the research community and the inappropriateness of the tools used for the Iranian culture. Nonetheless, clinical experience in Iran suggests an increase in the prevalence of autism [9].

This increase in the incidence of autism disorders in recent decades, which can be due to an increase in the experts' understanding of this disorder and the accuracy in diagnostic methods or a real increase in the incidence of this disorder [10], as well as the absence of an etiology and a definite treatment for this disorder has made autism an important neurological developmental disorder [2, 11].

Considering the importance of the autism disorder, it is necessary to develop research-based interventions that effectively educate the skills affected by the disorder, including social skills and communication [5]. Researchers have developed a series of interventions to improve the communication and language skills of people with autism spectrum disorder. These interventions include comprehensive behavioural therapy, educational strategies in the natural environment, peer education, response-based therapy, story reading, and modelling, etc. [12, 13]. In recent years, due to the advancement and development of computers and digital devices, multimedia methods have been used in many psychological interventions. Using a video model can be a promising intervention, provided which is suited to the learning abilities of students with autism [14, 15].

Children with developmental disabilities who receive special services and early intervention may be able to maintain their ability to learn and autonomy in the future [16, 17]. Considering the importance of teachings related to social and communicative skills in children with autism and the emphasis on video modelling on teaching these skills, the interventional method has been used in this study.

Video modelling is an observational learning method in which the desired behavior is learned by looking at the participant in a video presentation and then imitating the behavior model [18]. Video images and demonstration equipment have been used in this interventional method to create a visual image of the targeted skill or behavior. Types of video modelling include: video prompting, self-video modelling, and point of view video modelling. For users, video modelling is an effective and simple educational tool to motivate children to learn through a stimulating and entertaining visual device [19]. The main difference between the two video prompting and self-video modelling methods is in the subject pattern, so that in the first method, it is tried to create a video of a pattern that is most similar to the participant. Actually, the use of this method is to guide the participant in learning specific skills [20]. While in the self-video modelling method, the behavior of the participant is filmed and eventually edited to appear that the person was performing a certain activity. The video is then presented to him in a regular educational program to model the participant's behavior [21].

Evidence from internal and external studies suggests the effect of video modelling on reduction of autism spectrum symptoms. Khan Abadi, Tale' Pasand and Rahimian Bugar (2014) have shown that participating in 16 sessions of 15 to 20 minutes of video prompting can be effective in increasing communication skills and reducing the challenging behaviors of these children [22]. Hooshiar Mahboub, Yaryari and Moghaddam (2013), indicated that video modelling can improve the pioneering skills of social situations in children with autism [23]. The video modelling method greatly enhances social skills including verbal and nonverbal conversation, repetitive behaviors control, spontaneous verbal requests, application commands, and daily life skills [24].

Some others used video-based methods such as self-video modelling and video modelling with the purpose of teaching communicative, social, linguistic, and other skills to children with autism, and all emphasized the effectiveness of this therapy [25-30]. Also, a review of 19 studies conducted by using video modelling method has proven the effectiveness of this therapeutic approach [21]. Although the evidence in most studies suggests the effectiveness of video modelling in reducing autism symptoms, however, if one of the methods of video modelling is found to be more strongly correlated with the improvement of autistic children's impaired skills, it may be possible to partly deviate from time and costs associated with treatment planning. It seems that the results of different comparisons in relation to the superiority of the effectiveness of each type of video modelling method are still counter-contradictory. It should also be noted that most of the studies due to the specific circumstances of the statistical society have been of a case study type and therefore have low external validity, therefore, it is only through re-testing that the validity of these studies can be found. The purpose of this study was to compare the effectiveness of video prompting and self-video modelling on communication skills, social interactions, and emotional-social responses in autistic children.

Methods

The method of this research is using a quasi-experimental method using two experimental groups and one control group. The statistical population of this study

included children with autism disorder aged 4-8 years who were treated at the Tehran Autism Centre with autism from 2015 to 2017. According to the nature of the research, available sampling and random placement were used. At first, according to records in the Tehran Autism Centre, a contact was made with the parents of patients, and after explaining and describing the goals and conditions of the research, among children whose parents were willing to participate in the research, and had the entry criteria for research, such as diagnosis Moderate-intensity autism spectrum disorders that were attended by at least one clinical psychiatrist and a pediatric psychiatrist, lack of medical disorders associated with autism disorder and high school diploma for the mother; 18 children were selected and randomly assigned to two experimental groups and a control group. Two video pieces that were previously prepared for teaching social communication skills in both video prompting and self-modelling were presented to participants during 24 sessions of 30 minutes. Prior to and after the intervention, the participants were tested for the skills mentioned above.

Instruments

Gilliam's Autism Ranking Scale (GARS): The Gilliam Autism Ranking Scale (1995) is a scale designed to measure the severity of autism probability [31]. It can also distinguish between people with autism and other developmental disorders. This scale consists of four subtests of stereotypic behaviors, communication, social interaction, and developmental disorders. It also has three categories of 14 questions. Each question on the Likert spectrum is graded between zero and three. The maximum score of each of the three groups is 42 and the least is zero. High scores indicate the severity of the disorder and the low scores suggest its mildness. In Iran, the formal and content validity of this tool has been confirmed by Ahmadi, Safari, Hemmatian and Khalili (2011) [31]. Cronbach's alpha coefficient was equal to 0.9 for stereotypic behaviors, 0.89 for communication, 0.93 for social interaction, 0.88 for developmental disorders, and 0.96 for autism semiotics.

Questionnaire of Sensory Profile: This questionnaire was developed by Winny Dun (1999) and is a standard method for experts to measure the sensory processing abilities of children aged 5 to 10 years and to create a profile of the effects of sensory processing on the performance of daily life in children [32]. The standard and translated questionnaire of sensory profile consists of 125 items that are divided into three main parts: sensory processing, modulation, and emotional and behavioral responses. Molly, Nesaeeian and Asadi Gondmani (2017), using the Confirmatory Factor Analysis Method, the construct reliability of the sensory processing questionnaire was calculated [33]. The results indicated that the sensory processing questionnaire and its four factors had structural validity ($p < 0.001$). The internal consistency (Cronbach's alpha) was used to assess the reliability of the questionnaire. Cronbach's alpha values for the whole questionnaire were 0.879, sensory recording 0.818, sensitivity 0.885, feeling sensitivity 0.825 and sensitivity avoidance 0.812. Therefore, it can be said that the questionnaire and its four factors have a good reliability.

Video prompting: The present interventional program for children with autistic disorders in Tehran's Autism center was conducted during 24 sessions of 30 minutes. Each session began with a review of previous tutorials and continued with the presentation of new content, and was gradually finished with the assignments of homework. The sessions were weekly sessions, three times a week. A total of 24 sessions were held out and the overall implementation process lasted for 2 months. To prepare the video prompts, behaviors of another child was filmed once doing the homework. After editing the recorded videos, they were used as the content of each of the treatment sessions. Actually, the child was asked to perform the assignment in the video model after the observation, in the presence of the staff.

Self-video modelling: In this method, children's behaviors was used for video modelling. The films were recorded using a digital camera for personal modelling. A series of game meetings and desired behaviors were recorded on a tape. Raw films were edited by computer and using the editing program called Final Cut Pro to remove all unwanted behaviors and apparent guidance, to obtain sequences of correct implementation of the target behaviors by the participant. The final product was then used as the interventional content. The context of the implementation and the number of sessions of this interventional method was the same as the video prompting.

Results

As stated, the experimental and control groups are each comprised of six boys with autism, all of whom are with moderate-type autism in the severity of the disorder. On the other hand, all children had higher education than diploma. The mean and standard deviation of the control group's age were 67 and 9.6 months, respectively. These values were 56 and 6.2 months for the experimental group (self-modelling) and 58 and 7.26 months for the prompting group, respectively. In Table 1, descriptive indexes of the dependent variables of the research are presented in terms of the group and the measurement step.

According to Table 1, there are differences in the number of units between the scores of the experimental and control groups. Therefore, it should be shown with an appropriate statistical test that whether this difference in scores is meaningful and due to the intervention or not. To this end, multivariate covariance analysis (MANCOVA) was used. In this regard, at first, the assumptions of this test were examined.

Regarding the skewed values reported in Table 1, we can say that the distribution of all variables follows the normal distribution. So the first assumption is confirmed. In order to investigate the homogeneity assumption of covariance matrices among groups, the M Box scheme was used. The amount of box statistics was 11.79 and was

not significant, so the assumption is established (F = 6.88, p>0.05). The next assumption is the homogeneity of the variance between the two groups, which was examined by Levine test. The findings of this section are reported in Table 2.

According to Table 2, the variance of all variables is homogeneous between the experimental and control groups. The results of MANCOVA indicate that the multivariate F value (Pillais Trace) at the level of 0.05 is statistically significant (F = 4.50, df1 = 12 df2 = 10, p <0.05). Therefore, it can be concluded that there is a significant difference between the mean scores of the experimental and control groups in the post-test by adjusting the pre-test effect in at least one of the three variables. To test the hypotheses more precisely, the results of one-way covariance analysis were used in MANCOVA.

According to Table 3, there is a significant difference between the three groups regarding communication and interaction variables, and there was no significant difference in post-test scores on emotional responses with moderating the pre-test effects. In order to be more precise, Bonferroni's post hoc test was used. The findings are summarized in Table 4.

According to Table 4 for the communication variable, both self-modelling and prompting experimental groups have a significant difference with the control group. Therefore, these two interventions improve the scores of these variables in the sample population. This is while there is no significant difference between the two groups. This means that there is no particular superiority between the two methods of intervention. In the case of interaction variable, video prompting intervention and video self-modelling have caused significant changes, and there is no significant difference between the experimental and control groups regarding emotional-social responses.

Table 1. Descriptive data of the dependent variables of the study according to the group and the measurement stage

Group	Stage	Variable	Min.	Max.	Mean	SD	Skewness	Elongation
Control	Pre-test	Relations	15	31	21.33	6.59	.804	-1.365
		Interaction	8	27	17.16	7.41	.377	-1.405
		Emotional/social responses	8	45	29.66	6.92	-.293	-1.322
	Post-test	Relations	15	31	20.50	5.85	1.358	1.800
		Interaction	8	25	16.50	6.47	.199	-1.210
		Emotional/social responses	8	42	27.66	5.95	-.311	-1.866
Self-modelling	Pre-test	Relations	11	28	19	6.81	.085	-1.582
		Interaction	5	24	13.16	8.08	.592	-1.914
		Emotional/social responses	13	45	28.33	11.27	.302	-.213
	Post-test	Relations	7	21	13	5.69	.683	-1.565
		Interaction	4	19	8.88	5.91	1.318	.549
		Emotional/social responses	18	45	25.33	10.15	1.931	2.013
Video prompting	Pre-test	Relations	18	32	25.16	4.53	-.143	1.746
		Interaction	10	28	17.83	6.79	.517	-1.020
		Emotional/social responses	19	52	38.33	12.30	-.613	-.536
	Post-test	Relations	3	21	13.83	6.49	-.740	.785
		Interaction	4	23	12	6.16	1.037	1.841
		Emotional/social responses	17	46	31.33	10.81	8	.572

Table 2. Levin test results for homogeneous assumption of group's variance

Variables	F	Df1	Df2	Sig.
Relations	2.322	2	15	0.12
Interaction	1.025	2	15	0.383
Emotional/social responses	1.430	2	15	0.270

Table 3. One-Way Variance Analysis in MANCOVA

Source of changes	Dependent variable	Sum of squares	df	Mean square	F	Sig.	Size of the effect
Group	Relations	254.99	2	127.495	7.978	.006	.571
	Interaction	121	2	60.501	9.977	.003	.624
	Emotional/social responses	45.09	2	22.549	1.234	.326	.171
Error	Relations	191.77	12	15.981			
	Interaction	72.76	12	6.064			
	Emotional/social responses	219.25	12	18.271			
Total	Relations	3540	18	127.495			
	Interaction	16304	18	60.501			
	Emotional/social responses	747.111	17	22.549			

Discussion

The purpose of this study was to compare the effectiveness of video prompting and video self-modelling on reduction of autistic children's symptoms. In this study, the children's autism symptoms were defined as the emotional/social responses of interactions and communication. In order to test the research hypotheses, 18 children with moderate autism were randomly assigned to three groups (video prompting, self-video modelling and control).

The video interventions used in the present study provide models of communication and behavioral skills and appropriate approaches to dealing with different communication situations in relation to different people, especially the peer group and according to Bandura's social learning theory, to children with autism. These learning based methods can teach new and appropriate behaviors to kids for more efficient and effective communication, so that it can help to improve or correct their insociable behaviors which were stored in their treasury.

The results of the MANCOVA statistical test indicated that there is a significant difference between the three groups in the post-test phase in the areas of communication and interaction; also, there was no significant difference in the emotional responses between the 3 groups in the post-test scores and the moderating effect of the pre-test. Also, the results of Bonferroni's post hoc test indicated that there was a significant difference in the communication variable between the two self-modelling and video prompting groups with the control group. Therefore, these two interventions improved the scores of these variables in the sample subjects of the two experimental groups. But there was no significant difference between the two groups. This means that none of the two methods of video modelling and video self-modelling have a particular advantage in improving the communication of autistic children. In the case of interactions, video prompting and self-video modelling also caused significant changes (compared to the control group), and there was no significant difference between the two methods in improving interaction as well as communication. Also, there was no significant difference between the experimental and control groups regarding emotional-social responses. The findings of this study were consistent with the findings of previous researches [22-24, 34].

Findings of Khan Abadi's research, Tale' Pasand and Rahimian Bugar (2014) indicated that participation in 16 sessions of 15 to 20 minutes of video prompting can be effective in increasing communication skills and reducing the challenging behaviours of these children [22]. Previous studies have also shown that by using video modelling, you can teach a variety of skills, including shopping skills, expressive skills, collective skills, self-regulation skills, and gaming skills.

There are various possible justifications for the effectiveness of video modelling behaviours as an interventional method for the use of children in the autistic spectrum, including: Children with autism spectrum disorders are mostly visual learners, while video-based modelling methods are based on visual learning, unlike actual social situations in this method, children with autism feel more safe and comfortable, because there is no coercion or pressure. Behaviors can be divided into the smallest possible steps, which facilitates the learning process itself. It can be mentioned that by repeating watching a video, which is a feature of people with autism, learning is better. On the other hand, the children in the two education groups, according to mothers, used a fairly large amount of verbal statements in the film (for example, let's play together). According to Ganz (2009), this imitation of speech, even in the form of echoes, is a behavioral success because echoes of speech play an important role in cognitive and communicative functions [35] . With regard to the effectiveness of these methods on emotional / social responses, it can be argued that emotional effects are likely to be more difficult to convey in video images.

One of the limitations of this study was the low number of students with autism and the availability that led to using non-random sampling methods. Also, the small sample size, even in non-violation of statistical assumptions, can lead to some degree of statistical error. Future researchers are recommended to use larger instances that are chosen randomly. Also, according to the results of the present study, it is suggested that a video-based method based on other variables, such as stereotypical behaviors and academic education, should be used. In addition, it is suggested that similar studies be conducted on other groups of children with special needs, including mentally retarded children.

Conclusion

Findings have shown that video modelling improves language deficiencies and restrictions, communication skills, verbal and nonverbal conversations, control of repetitive behaviors, spontaneous verbal requests, application commands, and daily life skills.

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