

EFFECTIVENESS OF A PIVOTAL RESPONSE TRAINING PROGRAMME IN JOINT ATTENTION AND SOCIAL INTERACTION OF KINDERGARTEN CHILDREN WITH AUTISM SPECTRUM DISORDER

Abstract: The purpose of this study was to provide a training program based on pivotal response for children with autism spectrum disorder, which may affect positively on improving their joint attention and social interaction. Participants were six female children enrolled in public and private kindergartens and autism programs in Zulfi, Saudi Arabia for the second semester of the year 1435/1436 AH, who were diagnosed as having autism disorder. For data collection, Joint Attention Skills Inventory For Kindergarten Children with Autism Disorder, and Social Interaction Scale of Kindergarten Children with Autism Disorder were employed. A single group, pre-post and follow up design across participants was implemented. Six participants, data were obtained during pre, post-treatment, and at one-month follow-up. The study results showed that the pivotal response training intervention was effective in increasing joint attention skills (initiating and responding to signs, eye contact and follow the gaze of others, attract others' attention while playing, follow the instructions, Sharing feelings and emotional state and imitation) and social interaction (belonging to the group, communication, and cooperation) of all children participated in this study. Recommendations for further research were discussed.

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Keywords: pivotal response, joint attention, social interaction, kindergarten children with autism spectrum disorder

INTRODUCTION

Autism spectrum disorder is characterized by persistent deficits in social communication and social interaction across multiple contexts, including deficits in social reciprocity, nonverbal communicative behaviours used for social interaction, and skills in developing, maintaining, and understanding relationships (Abdullah and Mourad Ali Eissa 2014; American Psychiatric Association 2013). Deficits in communication and social interaction specified in Criterion A are remaining and permanent (Mourad Ali Eissa 2017), and in order to diagnose the neuro-developmental disorder there should be restricted, repetitive patterns of behaviour, interests, or activities (Mourad Ali Eissa 2018).

Bad joint attention with other people are important factors in the lack of social interaction among individuals with autism spectrum disorder (Rogers and Dawson 2009), as they rarely focus on joint activities while interacting with their other people such as peers, parents, and teachers. They turn into repetitive and stereotypical behaviours that are less relevant to their interaction and lack of preference for visual communication with the interactive partner and preference for visual attention to non-social stimuli, All of which are indicative of a social deficits of these individuals (Koegel, Matos-Freeden, Lang, and Koegel 2011).

Autism research has increasingly put great effort to joint attention as it is sign of a sign social skills deficiency, and this deficiency appears even before the child acquires language (Mourad Ali Eissa 2015). Substantial differences in early joint attention (JA) skills are likely to highlight the neural behavioral chain related to the disorder. The early interventions is therefore aimed to develop joint attention skills that are "pivotal" to the development of other vital areas, such as social and linguistic skills (Kasari, Gulsrud, Wong, et al. 2010). Pivotal Response Training (Pivotal Response Training) is one of the earliest early natural interventions of children with autism spectrum disorders to increase their social interactions and interpersonal skills (Humphries 2003). This approach is based on applied behavioral analysis, which may help reduce negative responses, develop social interaction, and joint attention. It also reduces reliance on the

abnormal stimuli of autistic children, while emphasizing holistic settings that include their interactions with ordinary people with the presence of natural stimuli. In the light of the lack of joint attention skills with the inadequacy deficits in other skills such as social skills among others in children with autism spectrum disorder, and the vital importance of these skills in improving the level of social and other skills of these children, the current research attempts to provide a training program based on pivotal response for children with autism spectrum disorder, which may affect positively on improving their joint attention and social interaction.

PROBLEM STATEMENT

An extensive study was conducted to investigate officially the statistics of autism within the Kingdom in recent years. This study was called the "National Project for the Study of Autism and Similar Developmental Disorders in Saudi Children (2002-2005)". It was shown the prevalence of autism disorders in Makkah was (1.0), the highest prevalence of autism disorders in the Kingdom (Al-Wazzna, 2005, 6). The number of autistic children in schools and institutes in the Kingdom is estimated at 203 students (General Secretariat of Special Education, 2004-2). This percentage increased to (408) in the year 1427/1428H, up to (488) in the year 1428/1429 (General Secretariat for Special Education, 2012). Thus, there is a clear increase in the number of children diagnosed as having autism spectrum disorders in the Kingdom.

According to the Centres for Disease Control and Prevention, the prevalence of autism spectrum disorders among children is estimated to be one per 68 children (Centers for Disease Control and Prevention 2017). This percentage varies among societies. In tracking the prevalence of autism in Saudi Arabia, approved by the Saudi Council of Ministers ranges from (30000-42,500) cases of unification, including at least (8200) classic extreme cases (Al - Mughaloot, 2004, 1). A growing body of research (e.g. Amin 2008; Belind and Joyne, 2007; Connie et al. 2006; Reitman 2005) has emphasized the need for early intervention programs for children with autism because of their positive impact on all aspects of

their development, and to overcome their communication deficits. In general, early intervention programs have been shown by a wide range of studies to be able to empower children with autism spectrum disorder and improve their behaviours.

Nevertheless, we are still in need to additional research into pivotal response with kindergarten children with autism spectrum disorder. This current study aims to investigate a pivotal response training programme and its role in developing joint attention and social interaction of kindergarten children with autism spectrum disorder. Our question was "What is the effectiveness of a pivotal response training program in joint attention and social interaction of kindergarten children with autism spectrum disorder?" This question is divided by the following sub-questions.

1. Is there a difference in Joint Attention Skills following an intervention?
- 2- Is there a difference in Joint Attention Skills after a month from the intervention?
- 3- Is there a difference in Social Interaction following an intervention?
- 4- Is there a difference in Social Interaction after a month from the intervention?

LITERATURE REVIEW

Pivotal Response Training. Pivotal Response Training (PRT) is a method for the systematic application of Applied Principles of Behavioral Behavior Analysis (ABA), which aims to develop communication and social adaptation among children with autism disorder within the natural instructional environment. Child's initiative and interest come first, and this method is particularly of great effectiveness in developing forms of communication, language, play, and social behaviors (Humphries 2003).

It helps to reduce negative responses, dependency on abnormal stimuli, and at the same time emphasizes holistic settings that involve dealing with ordinary people in the presence of natural stimuli. The training method uses a pivotal response to the basic skills that are necessary for many other skills. If the child becomes good at one of these basic skills, he will be good too at a variety of behaviors he has not been trained in before. The goal is for the child to learn how to

conclude the correct answer. This method identifies the main and key responses of children with autism disorder; namely motivation, and responsiveness to multiple stimuli (Koegel and Koegel 2006).

The application of pivotal responses training method has demonstrated the ability to make positive changes in these "core responses" related to language communication and social interaction. Moreover, basic skills training provides guidance for teaching skills, which have been very successful in social aspects of children's language among children with autism disorder.

Pivotal response is based on the principle that the child is the master of the treatment and not the specialist or parent. Motivation strategies are frequently used during the intervention period, including: the introduction of various tasks, the re-examination of tasks to ensure that the child has acquired certain skill in a good way, the reward when trying, and the use of natural reinforcers. The child determines the activities and work that will be used in the program. This method is usually applied by qualified persons such as special education teachers, and psycholinguists (Koegel et al. 2011).

Koegel and Koegel (2006) has identified four pivotal areas for intervention: motivation, responsivity to multiple cues, self-management, and self-initiations.

Motivation. Improved child motivation is associated with increased responsiveness to environmental stimuli, reduced response rate and emotional fluctuation. This has been shown to affect communication, attention and social interactions.

Responsivity to multiple cues. It focuses on teaching children how to respond to many stimuli in order to enable them to spread this skill in multiple settings, such as home, school, and society, as well as facilitate learning, and often the responses of autistic children are limited to a few set of elements and stimuli that are not interconnected in their environments. This is so-called "excessive choice of stimuli." For this reason, instructions to the child must contain more than one stimulant so that the child can pay attention to them. Therefore, lessons involving many stimuli provide children with instructions that contain more than one element.

Self-management. It focuses on teaching children how to recognize what is undesirable behaviour, collect data about their behaviour, and do self-promote before requesting rewards from others.

Self-initiations. It focuses on teaching children to take initiatives naturally resulting from environmental stimuli. Self-initiative training primarily involves teaching children to ask automatic questions in order to obtain information. Self-help questions include open-ended questions, help-seeking questions, and information request questions.

Joint Attention. Both Sullivan (2007) and Donna et al. (2008) have defined joint attention as a vital skill that develops at an early stage in an individual's life, through which social coordination is established with others, where experience is shared with others. They pointed out that joint attention is more than just two people looking at the same thing, but there is a synchronization between the participants to coordinate the attention between this thing and the other person, and this is done through many skills that include (alternating eye gaze, responding to the other). Joint attention affects many aspects of development (cognitive, social, linguistic and emotional). I, the researcher, will adopt the previous definition in this current research.

Children with Autism Spectrum lack attention to things that others are aware of. If these children are alerted to certain things, it is often by drawing attention from others. Therefore, they lack initiating joint attention and response to it, so the failure of the child to pay attention to the surrounding things makes him unable to communicate with others (Ibanez 2010). These children also lack the ability to pay attention to others faces. As a result, they do not receive social information provided by others, as in the case of joint attention. This, in turn, has something to do in understanding the shortcomings in social behavior associated with autism spectrum disorder (Gomez 2010).

The main function of joint attention is to communicate nonverbally with others, where the child shares with someone else to show interest in something (Boucher 2007). The social function of this is to stimulate the child's motivation to share with others the surrounding topics. There is also a link between joint attention skills and other social

behaviours such as visual communication, emotion, imitation and the child uses joint attention behaviors to share their interests or comment on something (Kasari, Paparella, Freeman and Jahromi 2008).

Some researchers (e.g. Hurwitz and Watson 2016) indicate that lack of joint attention among autistic children is correlated with lack of their social interactions. This is due to the fact that the early lack of joint attention deprives these children of social information at an early stage.

Social interaction among kindergarten children with autism disorder. Poor social interaction is one of the most common signs of autism. Khattab (2005), and Zeiton (2003) claim that the child with autism disorder suffers from severe loneliness, lacks response to others because of his inability to properly understand and use language, lacks attachment and communication with others, and response to others.

According to Smith et al. (2010) and Conroy et al. (2007), the development of social skills and social understanding for children with autism is a challenge for parents, teachers, caregivers, educational support workers, psychologists Educators, and leaders in educational well-being. These children need social support from their surroundings. Siklos and Kerns (2006) explains that social support for children with autism is represented in information that leads children to believe other appreciate, love and value them. Weiss (2007) argues that social skills are the most pressing goals that autistic children need to learn, as they represent the foundation for the success of these children.

METHODS

PARTICIPANTS

Participants were six female children enrolled in public and private kindergartens and autism programs in Zulfi, Saudi Arabia for the second semester of the year 1435/1436 AH, who were diagnosed as having autism disorder. Their IQ ranged from (65-75) on Arab Stanford-Binet individual intelligence test (2001), with an average of (70.3) and a standard deviation (1.1). They aged (4.6) years, with an average of (5.6) years, and a standard deviation (0.59). They were matched on mental age, level of joint attention, and level of social interaction.

DESIGN

A single group, pre-post and follow up design across participants was implemented. Six participants, data were obtained during pre, post-treatment, and at one-month follow-up.

INSTRUMENTS

Joint Attention Skills Inventory For Kindergarten Children with Autism Disorder (By the research)

. This inventory was developed particularly for this research with the aim of detecting level of joint attention skills for autistic children while interacting with others in different settings. In developing this inventory, the researcher reviewed literature regarding different instruments (e.g. Kasari, Paparella, Freeman and Jahromi 2008; Mourad Ali Eissa 2015). According to an empirical study, and literature review, the researcher developed the final inventory uses the Likert-type scale – Always (3), sometimes (2) and never (1). Composite score is 90. There are six domains in the inventory. They are: Initiating and responding to signs, eye contact and follow the gaze of others, attract others' attention while playing, follow the instructions, sharing feelings and emotional state, and imitation. The higher the child's score on the inventory, the higher the level of joint attention skills he has, and vice versa. The scale reliability was high (0.84).

Validity was estimated using internal consistency. Values were as follows: Initiating and responding to signs (0.690), eye contact and follow the gaze of others (0.773), attract others' attention while playing (0.785), follow the instructions (0.777), Sharing feelings and emotional state (0.815), and imitation (0.907), all of which were significant at the level (0.01).

Social Interaction Scale or Kindergarten Children with Autism Disorder (By the research). This scale was developed particularly for this research with the aim of detecting level of social interaction among autistic children. There are three domains in the scale. They are belonging to the group (5 Items), communication (5 Items), and cooperation (5 Items). Composite score is 30.

Reliability coefficient using test-re-test was (0.87). Validity was estimated using Inter-observer agreement which ranged from 90-100%.

TRAINING PROGRAM

The program was designed in accordance with a

set of principles of programs for the treatment of children with disorders. The program was evaluated according to the characteristics of children and their different abilities, taking into consideration the individual differences, needs and interests of these. A number of general, psychological, educational, social, neurological, and physiological foundations have been drawn. Considerations to be taken during the development and implementation of the program are as follows.

1. The diversity of the reinforcement used and be of the girl choice from among her favorite things.
2. Sequencing, organizing and arranging any skill before starting. Determining the roles of all (teacher, researcher and child).
3. Identify simple levels of behavior as a condition for providing reinforcement (desired behavior performance).
4. Knowing all the character of each child as much as possible to give her experiences appropriate.
5. Using passive reinforcement process of ignoring, simple punishment and temporary exclusion.
6. Using positive reinforcement, whether by means of material support or social support.
7. Using natural and realistic tools during training.
8. Training in different places that allow to perform these skills in order to disseminate the acquired skills.
9. Different trainers participate (teacher, researcher and child's mother).

TECHNIQUES AND STRATEGIES

Use of some behavioral therapy techniques: positive reinforcement, modeling, role play, modulation, simulation, role-playing, feedback. Besides some strategies: Getting attention, Providing options for the continuation of motivation, Variety of toys, Typical social behavior, Promoting attempts, Encouraging dialogue, Prolonging dialogue, Role sharing and Narrative games).

ACTIVITIES

1. Sensitive / dynamic activities for children to develop the skills of mobility, the development of social skills, social interaction and investment of child energy positively.
2. Activities for developing attention and skills of joint attention, awareness, concentration, thinking and education.

3. Various activities and programs aimed at training children in a pivotal response (increased motivation, response to multiple stimuli-self-initiation, playful teaser-significant enhancement of child's successes and material reinforcement).

MEANS AND TOOLS USED IN THE PROGRAM

A dark box - a wooden box with children's favourite toys, brochures with prominent drawings, toys of different sizes and colours, pencils, watercolour, blank plastic bottle, water bottle filled with water, perfume bottles in different shapes, pictures, models to express the experience to be reached, cubes, chords, lighting batteries, animals made of plastic, which produce sounds and bright colours, plastic household goods, plastic fruit, photo of pets and domestic birds, pictures of some people familiar to the child, beans, colored beads, cups of different colors and sizes, plastic dishes, plastic baskets, mirror, baby photos, plastic clips in different colors, stairs, a number of tables and chairs of

different sizes, some of the children's clothes (bibs, socks, jacket, hair cover).

FINDINGS

This study aimed at investigating if there is a difference in Joint Attention Skills following the intervention. The treatment consisted of pivotal response training. The Joint Attention Skills was assessed before and after the program application. As shown in Table 1. z-score results indicated that there was a difference in Joint Attention Skills following the intervention. The z-score results were (2.236) for initiating and responding to signs, (2.331) for eye contact and follow the gaze of others, (2.330) for attract others' attention while playing, (2.299) for follow the instructions, (2.197) for Sharing feelings and emotional state (2.189) for imitation and (2.150) for the composite score, $P < 0.01$. That is the pivotal response intervention could develop joint attention skills in children with autism positively.

Table 1. Comparison of Joint attention skills among treatment control groups (following the intervention)

Variables	Negative Ranks		Positive Ranks		Z Value	Sig.	Effect Size
	Mean	Sum	Mean	Sum			
Initiating and responding to signs	4.5	36	Zero	Zero	2.236	0.01	0.92
eye contact and follow the gaze of others	4.5	36	Zero	Zero	2.331	0.01	0.95
attract others' attention while playing	4.5	36	Zero	Zero	2.330	0.01	0.95
follow the instructions	4.5	36	Zero	Zero	2.299	0.01	0.94
Sharing feelings and emotional state	4.5	36	Zero	Zero	2.197	0.01	0.90
imitation	4.5	36	Zero	Zero	2.189	0.01	0.90
Composite	4.5	36	Zero	Zero	2.150	0.01	0.88

The difference in joint attention skills after a month from the intervention was examined and measured. As shown in Table 2. z-score results indicated that there was no difference in Joint Attention Skills following the intervention between post and follow-up test. The z-score results were (1.321) for initiating and responding to signs, (1.331) for eye contact and follow the

gaze of others, (1.436) for attract others' attention while playing, (1.321) for follow the instructions, (1.436) for Sharing feelings and emotional state (1.543) for imitation and (1.414) for the composite score, p-values were not significant. This means that children with autism could, and still be able to develop their joint attention skills.

Table 2. Comparison of Joint attention skills among treatment control groups (after a month from the intervention)

Variables	Negative Ranks		Positive Ranks		Z Value	Sig.
	Mean	Sum	Mean	Sum		
Initiating and responding to signs	1.5	3	Zero	Zero	1.321	Not
eye contact and follow the gaze of others	1.5	3	Zero	Zero	1.331	Not
attract others' attention while playing	1.5	3	Zero	Zero	1.436	Not
follow the instructions	1.5	3	Zero	Zero	1.321	Not
Sharing feelings and emotional state	1.5	3	Zero	Zero	1.436	Not
imitation	1.5	3	Zero	Zero	1.543	Not
Composite	1.5	3	Zero	Zero	1.414	Not

As for the third question "Is there a difference in Social Interaction following an intervention?", z-score results, as shown by Table 3 indicated that there was a difference in social interaction following the intervention. The z-score results were (2.239) for belonging to the group, (2.218)

for communication, (2.215) for cooperation, and (2.321) for the composite score. $P < 0.01$. That is the pivotal response intervention could develop social interaction in children with autism positively.

Table 3. Comparison of social interaction among treatment control groups (following the intervention)

Variables	Negative Ranks		Positive Ranks		Z Value	Sig.	Effect Size
	Mean	Sum	Mean	Sum			
belonging to the group	4.5	36	Zero	Zero	2.239	0.01	0.92
communication	4.5	36	Zero	Zero	2.218	0.01	0.89
cooperation	4.5	36	Zero	Zero	2.215	0.01	0.92
Composite	4.5	36	Zero	Zero	2.231	0.01	0.94

The difference in social interaction after a month from the intervention was examined and measured. As shown in Table 4. z-score results indicated that there was no difference in social interaction following the intervention between post and follow-up test. The z-score results were

(1.414) for belonging to the group, (1.633) for communication, (1.312) for cooperation, and (1.416) for the composite score, p-values were not significant. This means that children with autism could, and still be able to develop their social interaction.

Table 4. Comparison of social interaction among treatment control groups (after a month from the intervention)

Variables	Negative Ranks		Positive Ranks		Z Value	Sig.
	Mean	Sum	Mean	Sum		
belonging to the group	1.5	3	Zero	Zero	1.414	not
communication	1.5	3	Zero	Zero	1.633	not
cooperation	1.5	3	Zero	Zero	1.312	not
Composite	1.5	3	Zero	Zero	1.416	not

DISCUSSION

This study aimed at exploring how effective was pivotal response training intervention in joint attention skills and social interaction of children with autism spectrum disorder. Findings from this study showed that the pivotal response training strategy had great effectiveness on increasing joint attention skills (initiating and responding to signs, eye contact and follow the gaze of others, attract others' attention while playing, follow the instructions, sharing feelings and emotional state and imitation) and social interaction (belonging to the group, communication, and cooperation) of all the target children.

This study had many implications for the effectiveness of pivotal response literature. First, the pivotal response training was the only intervention employed to develop joint attention skills and social interaction of children with autism spectrum disorder. Consistent with this finding were other studies which addressed joint attention skills among children with autism (e.g. Amin 2008; Kasari et al. 2008; Jamison 2011; Jones, et al. 2006; Luckevich 2008), and social interaction (e.g. El Shakhseh et al. 2015; Feldman and Matos 2013; Kamil 2017; Nefdt et al. 2010; Thorp et al. 1995). Second, pre-post follow –up, single group design was employed in our study. Other studies have employed pre- post two (experimental – control) groups designs that are not assessing the continuation of learning effect. Furthermore, I did not give children with autism spectrum any reinforcers because they participated in the training sessions. This might influence the outcomes of the experiment. Thus it can be said that it was the pivotal response training intervention which did make the difference in the joint attention skills and social interaction of children with autism spectrum disorder who participated in the current study.

LIMITATIONS

Although this study has strong design and excellent statistics, there are some limitations that are believed to affect the study findings. They were: a) The small number of children (6 girls) who participated makes generalizability to other children difficult. So, future studies must consider investigating larger samples before the researchers

can make broad conclusions, b) Second, this study included only girls, this did not give us opportunity to investigate gender differences. Future research should address this concern.

RECOMMENDATION FOR FURTHER RESEARCH

We, in the field of special needs children still in need to investigate the advantages and usefulness of pivotal response training intervention for children with autism spectrum disorder. Researchers may involve large sample, and investigate gender differences.

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