The Effectiveness of A Joint Attention Training Program On Improving Communication Skills Of Children With Autism Spectrum Disorder

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Abstract
The Purpose of this study was to explore the effect of a joint attention intervention program on improving joint attention and communication skills in children with autism disorder. Participants were ten children between the ages of five and seven who attended a school for children with developmental disabilities (Tarbya Fekrya). A pre- post design was used to examine the joint attention intervention program on improving joint attention and communication skills of the target students. Findings from this study indicated the effectiveness of the joint attention intervention program on joint attention and communication skills in children with autism disorder. On the basis of the findings, the study advocated for the effectiveness of the joint attention intervention program on joint attention and communication skills in children with autism disorder.

Keywords *Joint attention, communication skills, children with autism disorder*

Introduction

One of the major diagnostic criteria associated with Autism Spectrum Disorder focuses on impairments in communication development. Therefore, issues related to communication should elicit specific attention from those individuals working with ASD. The development of communication in a neuron-typical individual must be comprehended in order to fully understand the extent to which such impairments affect individuals with ASD. Hart (1993) recognized three major categories subsumed within the area of communication as communication, language, and speech.

In the context of ASD, deficits accompanying the development of communication skills involve both the spoken and written word (Autism Society of America, 2006). Many individuals with ASD have difficulty understanding the rules of communication, and therefore, experience complications when trying to participate in joint communication.

Language difficulties commonly occurring within the spectrum include using only nonverbal forms of communication, having delayed speech, participating in the use of echolalia, using only single words to communicate, and exercising other abnormalities in the use of language. These difficulties often contribute to many of the behavioral issues observed in ASD because the individuals become frustrated with the task of trying to portray the appropriate message to others.

Fahey and Reid (2000) further discussed the implications of ASD on the development of communication characteristics. Some children may produce words in early infancy but experience regression in their language between 18 and 30 months. This can, most likely, be attributed to the variation of disorders found along the spectrum. The authors noted that approximately 50 percent of individuals diagnosed with ASD would never develop functional language production. Characteristics observed in those individuals who do learn to speak may include:

(*a) the use of echolalia (i.e. immediate or delayed repetition of part or all of someone else's language); (b) improper use of pronouns to refer to self (e.g., .you,. .she,. .he.); (c) repetitive speech without apparent functional value; (d) monotonous inflection, rhythm, pitch, rate, and articulation; (e) confusion in grammar and meanings; and (f) impaired understanding of nonverbal gestures, facial expressions, and physical distance from others (Fahey and Reid, 2000, p. 278).*

Additional setbacks regarding communication may occur in the individual's ability to understand abstract concepts such as time, to interpret figurative language, to comprehend

what has been read, and to write with meaning (Adel Abdulla, M.& Mourad , A. Eissa, 2014).

Joint attention deficit in autism

Joint attention refers to the ability to "coordinate attention between interactive social partners with respect to objects or events in order to share an awareness of the objects or events" (Mundy et al., 1986, p. 657).

Joint attention behaviors include sharing attention (e.g., through the use of alternating eye gaze), following the attention of another (e.g., following eye gaze or a point), and directing the attention of another. Many infants display all of these skills by 12 months of age (Carpenter et al., 1998), and some infants display some aspects of joint attention (e.g., matching the direction of the mother's head turn to a visible target) as early as 6 months of age (Morales et al., 1998). In children with autism, previous research has established joint attention ability as an early-emerging and fundamental social-communication impairment, present by 1 year of age and incorporated into the diagnostic criteria for autism (American Psychiatric Association, 1994; Mundy et al., 1986). Some studies have shown that children with autism are better able to use gestures to request objects or events than they are able to use similar gestures to initiate joint attention (Mundy et al., 1986). These findings indicate an apparent dissociation in the early social skill development of children with autism (Mundy, 1995).

Joint attention ability has been found to distinguish preschool age children with autism from those with DD and typical development (Bacon, Fein, Morris, Waterhouse, & Allen, 1998; Charman et al., 1998; Dawson, Meltzoff, Osterling, & Rinaldi, 1998). In young infants, however, some evidence suggests that social orienting impairment might be a better discriminator of autism.

In a home videotape study of 1st birthday parties of infants later diagnosed with autism, mental retardation, or typical development (Osterling et al., 2002), 1-year-olds with autism looked at people and oriented to their own names less frequently than did infants later diagnosed with mental retardation and infants with typical development. Both infants with autism and infants with mental retardation, however, displayed fewer joint attention and other gestural behaviors compared with typically developing infants.

Joint attention has become increasingly important in autism research because it is one of the earliest emerging social behaviors and deficits in joint attention are apparent prior to language acquisition. Because autism is often not diagnosed until a child is three or four years of age (Sigman & Capps, 1997), it is critical that researchers look for indicators prior to language emergence such as joint attention so that appropriate treatment may be provided at a younger age.

Bruner (1995, p.11) states that "without a ready ability for joint attention, human beings fall into a grievous state of pathology". Research findings suggest that a disturbance in the development of joint attention skills is an important characteristic of social deficit in young autistic children (Bruner, 1995; Mundy et al, 1986; Mundy, Sigman and Kasari, 1994). Recently, deficits in joint attention have been cited as a potential component deficit that accounts for the abnormal development of communication, speech and social behaviors and is now considered one of the earliest emerging signs of the disorder. Children with Autism are not impaired in 'manding', such as pointing to request or in the ability to appropriately respond to joint attention bids but display profound impairment in 'tacting', such as pointing or commenting to share attention and initiating joint attention bids (Whalen & Schreibman, 2003).

In other words, they can use the behaviors of gaze shifting and pointing for instrumental purposes, ('manding'), but not for the social purpose of sharing attention with another person,('tacting') (Naoi et al., 2008).

Intervention Studies

Whalen and Schreibman (2003) examined the effects of a naturalistic behavior modification procedure on the acquisition of responding and initiating joint attention. The study had eleven participants, five with an Autism diagnosis and 6 typically developing children all between the ages of two and five. In the study, they used pivotal response training and discrete trial training. Pivotal response training (PRT) is derived from applied behavior analysis and focuses on core deficits and excesses of Autism which are considered pivotal areas (Burris 2009). PRT emphasises the child's motivation by providing choices of reinforcement, reinforcing attempts at responding and interspersing maintenance tasks. The reinforcers which are used are initially directly related to the task so the child can establish a link between the target behavior and the reinforcer which leads to generalisation. Discrete trial training (DTT) has also been used. It involves the process of breaking a skill down into discrete components and using repeated trials until the skill is mastered. A discrete trial is a three term contingency, the delivery of a discriminative stimulus followed by a prompt if necessary which is faded over time and finally, a response. If the response is correct, there is a consequence which is planned to function as a reinforcer. If the response is incorrect a variety of procedures such as error correction to elicit the correct response are used (Burris 2009).

The training in Whalen and Schriebman's (2003) study included the use of pivotal response training techniques, turn taking and the use of high preference natural consequences as reinforcement. There were two main phases, responding to joint attention training and initiating joint attention training. The training procedure successfully taught all participants the skills to initiate and respond to joint attention and this successfully generalized for all participants except one whose initiation skills did not generalize. It was found at follow up testing that there was a marked decrement in the initiation of joint attention skills. Whalen and Schreibman (2003) suggest that the decrease in the initiation skills could be due to parents having not known how to maintain the skills. The study provides evidence that joint attention skills can be taught by behavioral interventions to children with impaired joint attention.

Holth and Isaksen (2009) conducted a study on four children diagnosed with Autism aged between 3 and 6 years to investigate if joint attention can be successfully taught by a training protocol based on a combination of procedures. The study addressed the flaws in Whalen and Schriebman's (2003) study by including parents in the training procedure and training them to implement the procedures. Additionally, Holth and Isaksen's (2009) study used generalized reinforcers, such as social interaction, which motivate typically developing children to engage in joint attention. According to Holth and Isaksen (2009) the main treatment goal must be to teach the child with Autism Spectrum Disorder to respond to the same types of social cues as typically developing children do. The study used a modified version of the Early Social Communication Scale (ESCS) (Mundy, Delgado, Block, Venezia, Hogan & Seibert, 2003) to obtain baseline scores and establish adult social responses as conditioned reinforcers for the child's behavior.

The assessment was divided into two main parts. The first part targeted responding to joint attention and involved following a proximal point and a distal point. The second part targeted initiating joint attention and consisted of two subtests that assessed alternated gaze, pointing and vocal responses in two toy activation tasks and a book presentation. The intervention involved three phases, responding to joint attention, establishing social conditioned reinforcers such as smiling and nodding, and the finally switching between initiating and responding to joint attention behaviors using tasks involving turn taking. The results from the study indicate that there was progress in both responding to and initiating joint attention skills when baseline and post training scores were compared. There were no changes during baseline scores suggesting that the improvements had to be from the explicit

training. The skills that were taught during the training were maintained and in some cases improved immediately after the training until the follow up test, a month after the training was complete. Results suggest that the effects of smiling and nodding as generalized social reinforcers were maintained in daily life. Parents reported that their children used the skills that they learnt in different settings. After completing the study, all children were reported to engage in joint attention behaviors and showed enjoyment when doing so. This study further suggests that behavioral interventions can successfully teach children with Autism Spectrum Disorder joint attention skills these can be maintained once parents have been trained to reinforce them at home.

Sharonia's pilot study(2011) examined the general question; To what extent can joint attention be developed and generalized by children with Autism Spectrum Disorder? Children's joint attention level was assessed and a behavioral intervention program based on the research of Holth (2005, 2006, 2009), was used to target deficits in responding and initiating joint attention. Four children diagnosed with Autism Spectrum Disorder (ASD) aged between 4 and 7 years were assessed prior to an intervention phase which targeted the joint attention behaviors of gaze following, monitoring, social referencing, verbal tacting and manding. Post assessments were conducted after the intervention. Intervention results showed that training of specific joint attention skills were successful. In particular, high level behaviors increased at post assessment whereas the low level behaviors decreased. The results show that behavioral intervention programs can successfully teach joint attention skills and those skills can be generalized and maintained after the intervention.

Accordingly, as joint attention has been linked to language and social cognitive processes which have been found to be deficient in children diagnosed with Autism, early intervention programs which successfully target joint attention have the potential to provide significant breakthroughs for the area of autism. This study seeks to explore the effectiveness of an autism intervention program; joint attention training program, that aims to improve joint attention as well as communication skills of children with autism spectrum disorder.

This study seeks to give answers to the following questions

1- Are there differences in post – test scores ranks between control and experimental groups on Joint Attention?
2- Are there differences in re-post test scores ranks for the experimental groups on Joint Attention?
3- Are there differences in post – test scores ranks between control and experimental groups on Communication Skills?
4--Are there differences in re-post test scores ranks for the experimental groups on Communication Skills?

Methods

Participants

Participants were ten children between the ages of five and seven who attended a school for children with developmental disabilities (Tarbya Fekrya).All children attended the same classroom within the school. Parental informed consent forms were sent home by the school director and school psychologist to parents of potential participants telling them about the study and requesting them to give permission for their children to participate. Through a previous comprehensive psychological evaluation each targeted child had received a primary diagnosis of Autistic Disorder. All children were also capable of communication using speech

assessed through a combination of teacher report and observation. They were so-called high functioning.

Criteria for participation in the present study included: (1) A diagnosis of ASD from child psychologist based on The Scale for Screening Autism Disorder (Mohammed, 2003); (2) Deficits in Joint attention, as the aim of this study was to improve these deficits through the training program. Deficits in Joint attention were defined as an inability to intentionally communicate to direct another's attention to an object or event through gaze shifts, gestures or verbal communication.

Instruments

Teacher's rating of child's Joint Attention Scale. The test was developed to assess joint attention in children with autism disorder. The scale is a 3 point rating scale – Always (2), Sometimes (1) and Never (0). There are four domains in the *Teacher's rating of child's Joint Attention* Scale they are Eye Contact (5 Items) , Gesturing (5 Items) , Follow the instructions (5 Items) , Initiating caressing/singing (5 items). Reliability and Validity of the scale was established and the final checklist consisted of 20 items.

Functional communication questionnaire. a 20-item teacher-report questionnaire. It is based on the Autism Diagnostic Scale (Adel Abdulla Mohammed, 2003). Respondents are asked to rate their level of agreement using a five point Likert response scale(3 = Always, 2 = Sometimes , 1 = Never). The Cronbach alpha value was high (0.89) indicating excellent internal consistency.

Procedures

Screening Participants were ten children between the ages of five and seven who attended a school for children with developmental disabilities (Tarbya Fekrya). Each child also had the following characteristics: : (1) A diagnosis of ASD from child psychologist based on The Scale for Screening Autism Disorder(Mohammed, 2003); (2) Deficits in Joint attention, as the aim of this study was to improve these deficits through the training program. (3) ability to read and comprehend words, and (4) ability to follow directions.

Pre-intervention testing : Teachers were asked to rate child's Joint attention on Teacher's rating of child's Joint Attention Scale and their communication skills on Functional communication questionnaire.

General Instructional Procedures: The program used in the current research in order to improve communication skills in children with autism disorder depends on training in: visual communication, self-awareness, visual discrimination, assertiveness, discrimination forms, distinguish colors, and means of transportation. Children were seated at a table facing the experimenter on the other side of the table in a room with pictures on the wall and toys on a bookshelf behind the experimenter. Each toy was presented one at a time to the child to determine if and how the child requested items and to assess joint attention and turn taking.

Results

Joint Attention intervention and development of joint attention

The first objective of the study was to determine if use of joint attention intervention would be more effective for the treatment group compared to the control group .For this purpose, the post intervention scores of both treatment and control groups were analyzed. Table 1. shows Z Value results for the differences in post- test mean rank scores between

experimental and control groups in Social Skills Rating Scale. The table shows that (Z) values were (-2.435) for Eye Contact, (-2.631) for Gesturing, (-2.711) for Follow the instructions, (2.701) for Initiating caressing/singing and (-2.688) for the composite score. These values are significant at the level (0.01) in the favor of experimental group.

Table 1. *Z Values results for the differences in post- test mean rank scores between experimental and control groups in Teacher's rating of child's Joint Attention Scale*

Variables	**Groups**	**N**	**Mean Ranks**	**Sum Ranks**	**Mann-whiteny**	**Z Value**	**Sig.**
Eye Contact	Ex	5	8	40	Zero	-2.435	0.01
	Cont.	5	3	15			
Gesturing	Ex	5	8	40	Zero	-2.631	0.01
	Cont.	5	3	15			
Follow the instructions	Ex	5	8	40	Zero	-2.711	0.01
	Cont.	5	3	15			
Initiating caressing/singing	Ex	5	8	40	Zero	-2.701	0.01
	Cont.	5	3	15			
Composite	Ex	5	8	40	Zero	-2.688	0.01
	Cont.	5	3	15			

The second objective of the study was to determine the effect of joint attention intervention on improving joint attention in children with autism disorder. The children's performance on joint attention was measured pre and post intervention. Table 2. shows Z Value results for the differences in pre and post test mean rank scores for the experimental group in *Teacher's rating of child's Joint Attention Scale*. The table shows that (Z) values were (-2.612) for Eye Contact, (-2.523) for Gesturing, (-2.632) for Follow the instructions, (-2.604) for Initiating caressing/singing and (-2.655) for the composite score. These values are significant at the level (0.01). This indicates that use of Joint Attention intervention had a positive effect on improving Joint Attention in children with autism disorder.

Table 2. *Z Values results for the comparison of mean rank scores of experimental group at pre- and post intervention in Teacher's rating of child's Joint Attention Scale*

Variables	**Negative Ranks**	**Sum**	**Positive Ranks**	**Sum**	**Z Value**	**Sig.**
	Mean		**Mean**			
Eye Contact	3	15	Zero	Zero	-2.612	0.01
Gesturing	3	15	Zero	Zero	-2.523	0.01
Follow the instructions	3	15	Zero	Zero	-2.632	0.01
Initiating caressing/singing	3	15	Zero	Zero	-2.604	0.01
Composite	3	15	Zero	Zero	-2.655	0.01

Joint Attention intervention and improvement of communication skills

The third objective of the study was to determine if use of joint attention intervention would be more effective for the treatment group compared to the control group .For this purpose, the post intervention scores of both treatment and control groups were analyzed. Table 3. shows Z Value result for the differences in post- test mean rank scores between experimental and control groups in communication skills. The table shows that (Z) value was (-2.660).This value is significant at the level (0.01) in the favor of experimental group.

Table 3. *Z Values results for the differences in post-test mean rank scores between experimental and control groups in Functional communication questionnaire*

Variables	Groups	N	Mean Ranks	Sum Ranks	Mann-Whitney	Z Value	Sig
Communication skills	Ex	5	8	40	Zero	-2.660	0.01
	Cont.	5	3	15			

The fourth objective of the study was to determine the effect of joint attention intervention on communication skills in children with autism. The children's performance on communication skills was measured pre and post intervention. Table 4. shows Z Value result for the differences in pre and post test mean rank scores for the experimental group in functional communication questionnaire. The table shows that (Z) value was(-2.032). This value is significant at the level (0.01) .This indicates that use of Joint Attention intervention had a positive effect on communication skills in children with autism.

Table 4. *Z Values results for the comparison of mean rank scores of experimental group at pre- and post intervention in Functional communication questionnaire*

Variables	Negative Ranks	Sum	Positive Ranks	Sum	Z Value	Sig.
	Mean		Mean			
Communication skills	3	15	Zero	Zero	-2.032	0.01

Discussion

The present study evaluated the effects of joint attention intervention on improving Joint Attention and communication skills in children with autism disorder. The study results showed that the joint attention intervention was effective in improving eye contact, gesturing, follow the instructions, initiating caressing/singing (Joint attention subscales) and communication skills of all children participated in this study.

Children in this study did not receive any type of reinforcement or behavior modification strategies while participating in the sessions. Removing strategies such as prompting techniques, token systems, and other reinforcement systems reduced the potential for confounds within the study. Therefore, one can conclude that Joint Attention Intervention was primarily responsible for the change in the Joint Attention and communication skills of children participated in the study .

In summary, joint attention intervention effectively improved the joint attention and communication skills of the children who participated in this study. Overall, results from this study contribute to the joint attention intervention literature for improving the joint attention and communication skills of children with autism disorder. The present study lends empirical support to the notion that children with autism disorder, can be taught so that their joint attention and communication skills can be improved.

Recommendations

Further research is still required to explore the potential benefits of Joint Attention Intervention for children with autism disorder. Such research may include large scale studies, and a further exploration of the exact influence of student attendance, teacher training, classroom conditions and treatment duration and intensity.

The effects of joint attention intervention on other behaviors such as play, and positive affect should also be examined. In addition, future studies should begin to look at

why children with autism are so impaired in joint attention skills and how existing interventions might be modified to remediate joint attention deficits in children with autism. Finally, it will be important for researchers to assess the developmental progression of joint attention and other behaviors and to study how joint attention training might impact a child's future development.

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