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EFFECTIVENESS OF PIVOTAL RESPONSE TREATMENT (PRT) ON INCREASING THE NUMBER OF WORDS AND COMUNICATION WITH OTHER AND SOCIAL BEHAVIORS OF CHILDEREN WITH AUTISM

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ABSTRACT
This project aims to examine the effectiveness of Pivotal Response Treatment (PRT) on increasing the number of words and the communication with others and social behaviors of children with autism. Intervention group has been treated during 40 one-hour sessions for two month. This clinical project was conducted on 8 children with autism in Sari's rehabilitation and educational center of developmental disorders (Nick-andishan). Children were assigned to the control and experimental groups by a random sampling. Initial diagnosis of these children was done by using GARS Measurement tool. Two fields of "the number of words (speech)" and" the communication with other and social behaviors" were evaluated by ATECmeasurement toolas a pre-test and a post-test. Data was analyzed by SPSS-16 software and covariance analysis test. Comparing the mean and standard deviation of the experimental group after intervention in terms of speech/the number of words (14,10.23) and communication with other and social behaviors (25,6.27) with those of control group (7,5.35, 16.75,7.27,respectively) and with those of experimental group before intervention showed a significant difference (p<0.05). This study shows the effectiveness of pivotal response treatment on increasing the number of words and communication with other and social behaviors of children with autism.

Keywords: Autism, Pivotal Response Treatment, Number of Words, Communication with other and Social Behaviors

INTRODUCTION
The term of autism (ASDS) is referred to those who have a set of developmental disorders related to central nervous system (CNS). These disorders effect on one's ability to make a communication and his manner of communication and one's responses toward the environment. Autistic person is interested in his iterated behaviors or in his mental patterns iteration (Naseh, 2009). Indeed, autism is a spectrum, not a discrete category, and it is usually considered as a continuity in which the children show different degrees of problems in the fields of verbal and non-verbal communication, social interaction, entertainment and play and stereotypical and iterative behaviors (Diggle and Mc.conachie, 2009). Autism is defined as a disorder which is generally appeared before 30 months of age (Azad, 2005). There is a variety of growing information on autism incidence and according to the most recent statistical information from Sweden and Texas state of American, it equals 6 per 1000 persons; that is, one person per 150 to 170 live births; incidence ratio in boys is 3 to 4 times more than in girls (Golabi *et al.,* 2005). As mentioned, autism incidence has been increased (Baird *et al.,* 2003). Recently, some changes had been made in order to increase learning in children with autism; for example, ABA which is one of the most applicable behavior- therapy in autism has changed somewhat in order to be applicable in natural environments such as at home. Such changing tends to focus on communication objectives which have resulted to Pivotal Response Treatment (PRT) proposed by Robert *et al.,* (1989). This method is very new and its innovators believed that one's behavior depends on a pivot of his reactions and it is related to one's motivations and ability to reaction to differentand multiple signs. This method uses natural interventionsfor creating a positive change in the child's critical behaviors. These interventions target child's communicative and social behaviors. This method targets the child's developmental pivots rather than considering one behavior in different times. This method is used for teaching speech skills, reducing destructive and self-initiated behaviors and increasing educational and communicational skills (Samadi and Mac.conachie,

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1390). PRT is based on the trainer's initiatives and the learner's interests and it is especially effective for developing communication, language, play and social behaviors (Vismara and Bogin, 2009). Koegel *et al.,* (1999) believe that the pivotal objective of PRTintervention is increasing motivation. Motivational strategies such as reinforcement, free choice of activity, helping from previous knowledgefor new learning, etc.showed the increasing of responses and developing of social interactions in children with autism. For example, a study showed that their avoidance from avoidance behaviors becomes reduced, these children spend more time in searching the environment and so more opportunities for learning are created for them (Kogel and Mentis, 1985). Also, it has been found that one of the other major objectives of PRT is increasing verbal communication (Koegel *et al.,* 2009; Opendon, 2005; Coolicun *et al.,* 2010). Mohtashami (2011) assigned some autistic children into two 10-person control and experimental groups and taught Pivotal Response Treatment to their mothers. According to the taught items, each mother should have practiced with her child at home atleast 14 to 18 hours per week. The researcher concluded that Pivotal Response Treatment improved the child's communicative and social skills, especially his or her verbal ability, and was very effective on increasing child's motivation andresponsiveness and on his or her cognitive and behavioral awareness. Salemi-Khameneh *et al.,* (2013) proposed an article with the title of "Effectiveness of Pivotal Response Treatment on decreasing communicative and behavioral problems of 8- to 12-year boys with autism". In that, eighteen 8- to 12-year boys with autism were selected by cluster sampling and randomly assigned to two 9-person control andexperimental groups. Intervention group has been treated with 20 PRT sessions for two months. It showed the effectiveness of Pivotal Response Treatment on decreasing communicative and behavioral problems in boys with autism. Recently, in a project with the title of "Neural Mechanisms of Improvements in Social Motivations After Pivotal Response Treatment", Voos *et al.,* (2012) studied on effectiveness of PRT. They were the first who used Functional Magnetic Resonance Imaging for identifying the neural correlations of successful response to PRT in two children with autism. Both children showed significant achievements in behavior assessment and also increasing excitation to social stimuli in those brain areas used by normal growing children. Versschuur *et al.,* (2014) studied on and identified the studies related to Pivotal Response Treatment (PRT). 43 studies were summarized and evaluated in terms of participants' features, dependent variable, interventions, and results of intervention and confidence level of the evidence. Those conducted studied with showing strong evidence (43.6%) found that PRTis effective on increasing self- initiating and synchronous improvement in communication and language, playing skills and reducing maladjusted behaviors for some children. So the results have shown that Pivotal Response Treatment improved the child's communicative and behavioral skills, especially his or her verbal ability, and it was very effective on increasing motivation and responsiveness and his cognitive and behavioral awareness and play (Mohtashshami, 2011; Salemkhameneh *et al.,* 2013; Stahmer, 1995; Pierce and Schreibman, 1995; Stahmer and Gist, 2001; Baker-Ericzn *et al.,* 2007; Masiello, 2000; Minjarez *et al.,,* Coolicun *et al.,* 2010; Voos *et al.,* 2012; Vresschuur *et al.,* 2014). This study aims to examine the effectiveness of Pivotal Response Treatment on increasing the number of words and the communication with other and social behaviors.

MATERIALS AND METHODS
Universe, Sample and Sampling Method
This project's plan is an experimental one under the title of "A pre-and post-test's plan with a control group". Here, two groups of subjects are randomly selected and randomly assigned to two groups(control and experimental groups); both groups are measured by a pre-test before performing the independent variable on the experimental group and they are re-measured by a post-test after performing the independent variable (Hasan, 2012). Pivotal Response Treatment (PRT) program was performed over the experimental group for two months and then this group was compared with the control group. Our statistical universe includes all children with autism under-treated in Sari's rehabilitation and Educational center (Nick-andishan) in 2014. In this project plan, our sampling method is a random sample since our samples should be selected from Sari's Nick- andishan clinic. In doing so, we randomly selected 8

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qualified children from this center and assigned 4 children to control group and 4 children to experimental group.

Instruments

We used Childhood Autism Rating Scale (CARS) and Autism Treatment Evaluation Checklist (ATEC). ChildhoodAutism Rating Scale (CARS) is a behavioral rating scale. This scale was arranged by Schopler *et al.,* (1980). CARS as a quantified evaluating method consider children interms of 15 different criteria. Inner stability of CARS Test is high and its alpha coefficient is 0.94. An Average reliability of 0.71 shows a good correlation between different researcher's results. The credibility of CARS test was obtained through an independent comparison between CARS diagnoses evaluated by Clinical Psychologists and Psychiatrists. These diagnoses were correlated at r= 0.8 which suggesting the high correlation between CARS diagnoses and clinical diagnoses (Schople *et al.,* 1980). This instrument was translated by Rafeii (2006) in Iran.

Autism Treatment Evaluation Checklist (ATEC): Rimland and Edelson (2000) believe that one big problem in researching about autism is resulted from lack of a credible instrument duringtreatment. Scales such as CARS or GARS aren't able to determine treatment's effectiveness, so they designed a scale abling to show effectiveness or in- effectiveness of a treatment on autism. This scale includes 77 items which infront of each speech, there is a 3-option scale (correct, semi-correct and incorrect) with scoring 0, 1 and 2 respectively-sometimes this scoring is change in some items. In a study in Autism Research Center with 1358 answer sheets by Rimland and Edelson (2000), the validity of each sub-scale with the total score was obtained 0.92, 0.84, 0.87, 0.80 and 0.94, respectively. Its reliability was obtained by Chronbach alpha as 0.83. Its validity was reported as an acceptable number of 0.83 by Jarsius (2002). In Iran, the validity and reliability were obtained by pouretemad and Khonshabi (2004) which its validity was 0.83 according to Chronbach alpha and its sub-scales were 0.87, 0.70, 0.60 and 0.85, respectively (Ali *et al.,* 1391).

Performance

At first each sample which selected by random sampling was reevaluated by GARS measurement tool and then autism diagnosis wasdone.

GARS scale was performed for initial diagnosis (presence or non-presence of autism). Then samples were divided into two 4-person control and experimental groups; both groups were tested by ATEC as a pre-test. Next, Pivotal Response Treatment (PRT) was performed during 40 one-hour sessions for two months.

This intervention was done by using instructions of Koegel *et al.,* with the title of "How to teach pivotal behaviors to children with autism?" and by using Vismar and Bogin's step-by-step training program (2009).

The general principles of PRT including four main pivots were performed; these pivots include: a)Motivation which itself includes seven step:1-Attracting the attention of the child(two step),2-using the shared control(two steps),3-selecting activity by the child (six steps),4- variety of task in terms of interest(two steps), 5- identifying the child's ability in different tasks(there steps),6-how touse reinforcers (two steps),7-type of reinforce (two steps);b) Response to numerous signs including two steps:1-using different stimuli and increasing signs (three steps), 2- reinforcement scheduling (three steps);c)management which includes five steps:1-identifying a behaviors (one step), 2- preparing for self-management (two steps), 3-teaching self-management(three steps), 4- autonomy (four steps), 5-generalizing the training (one step); and d)self-initiating including four steps:1- training self-initiated social interaction(two steps),2-training questioning positions (seven steps), 3- training asking question(three steps), 4- training communicative skills by using the natural techniques (Four steps). After conducting a two-month intervention on the experimental group, both control and experimental groups were tested by ATEC as a post-test.

Then, their scores were compared and the effectiveness of intervention was evaluated. In this project, we used descriptive statistic indices and covariance statistical analysis and our data was analyzed by SPSS software.

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RESULTS AND DISCUSSION

Results

Table (1-1) shows the effect of pivotal Response Treatment on increasing the number of words in children with autism.

Table 1-1: Tests of Between-subjects effects

Resource	Squares sum	Degree of freedom(df)	Squares mean	F	Significance(sig.)
Post-test group	32.448	1	32.448	195.638	0.000
Error	0.829	5	0.166		
Total	138.	8			

A Rsquared=0.998(Adjusted R squared=0.998)
Dependent variable: post-test on the number of words

In table (4-9), the obtained F ratio (F_m=195.638) is bigger than the critical table's F ratio (F_b=6.61) at confidence level of 95% and sig. level of 0.05, this suggests the significant effect of Pivotal Response Treatment on increasing the number of words in children with autism in the experimental group; on the other hand, the null hypothesis is rejected and project hypothesis is accepted.

Table (2-1) shows the effect of Pivotal Response Treatment on increasing the communication with others and Social behaviors in children with autism.

Table 1-2: Tests of Between-subjects effects

Resource	Squares sum	Degree of freedom(df)	Squares mean	F	Significance(sig.)
Post-test group	91.391	1	91.391	40.61	0.001
Error	11.252	5	2.25		
Total	3899	8			

A R Squared=0.973(Adjusted R squared=0.962)

In table (4-12), the obtained F ratio (F_m=40.61) is bigger than the critical table F ratio (F_b=6.61) at confidence level of 95% and sig.level of 0.05; this suggests the significant effect of pivotal Response Treatment on increasing the communication with other and social behaviors in children with autism; on the other hand, the null hypothesis is rejected and project hypothesis is accepted

Discussion

The general objective of this project is determining the effectiveness of Pivotal Response Treatment on increasing the number of words and the communication with other and social behaviors in children with autism. Regarding to covariance statistical analysis and a significant differences between the mean and standard deviation of scores related to the scale of the number of words, and communication with other and social behaviors, it could be concluded that Pivotal Response Treatment increases the number of word and the communication with others and social behaviors in children with autism.

So, these results are consistent with other project's results: In a project, as an example, Stahmer and Gist (2001) taught PRT to parents during 12 weakly one-hour sessions. Sample number was 22 who were randomly divided into control and experimental groups.

Regardless parent's skills level, the effectiveness of treatment was observed and results showed some increasing in the number of words and the communication with other in children whose parents were taught PRT. Coolican *et al.,* (2010) conducted a study in which they taught this method to parents waiting for delivering the therapeutic services for their child. Results showed that child's communicative skills, especially his or her speech performance, increased. Also, these results were consistent with the research results of Golabi *et al.,* (2005), Mohtashami (2011), Salami-khameneh *et al.,* (2013), and with those of

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pierce and Schreibman (1995), Stahmer (1995), Minjarez *et al.,* (2010), Baker- Ericzén *et al.,* (2007) and Versschuur *et al.,* (2014). So, the results of this project showing the effectiveness of Pivotal Response Treatment on increasing the number of words and the communication with others and social behaviors in children with autism were consistent with the results of earlier projects.

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