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## The effect of perceptual-motor training on attention in the children with autism spectrum disorders

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### ABSTRACT

The present study attempted to investigate the effect of perceptual-motor training on attention in children with autism spectrum disorders. The participants (20 girls and 20 boys) were divided into experimental and control groups. They were selected from among 85 subjects after primary tests to be matched. The design of the study was quasi-experimental including an independent variable, a pretest and a posttest. After considering the research hypotheses using descriptive statistics and one-way Analysis of Covariance (ANCOVA), the results suggested a significant difference in posttest scores of experimental and control groups after independent variable being applied. The results also showed that perceptual-motor trainings for children with autism increase their attention because of the impact they have on increasing neurological and cognitive function.

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### 1. Introduction

The field of autism has become a major area of study in the fields of mental health and education worldwide (Adcock & Cuvo, 2009; Bhaumik et al., 2010; Brim, Townsend, DeQuinzio, & Poulson, 2009; Fernel & Gillberg, 2010). Autism spectrum disorder (ASD) is a common, highly heritable neuro-developmental condition characterized by marked genetic heterogeneity (Durand et al., 2006; Sebat et al., 2007). It is well known among parents and clinicians working with children with autism that the attention of these children is atypical and probably affects the triad of core features of autism, i.e., communication deficits, impairments in social relatedness, and restricted and repetitive behaviors and interests. In fact, difficulties in allocating attention in the expected ways are widely indicated as problematic in autism to the extent that some parents have endorsed problems with attention as the main cause of their child's autism (Ornitz, 1988).

People with ASD experience change in attention from one stimulus to another due to the lack of control and dysfunction in the excitation aspects of the regulatory system (Mundy, Stingman, & Kasari, 1994). According to the next studies, from the cortical point of view adapting and processing of new stimulus also decrease in ASD people (Kaplan & Sadock, 1998).

Scientists are trying to determine how the autism responds to their program and how training affects autism. Most of the studies in this regard have been concerned with the underlying conditions and parents and educators' intervention. In this study, the assignment was a new program of which individuals had no prior experience. Therefore, in case the hypotheses of the study are corroborated, it may be construed that children with ASD are capable of enhancement of their attention with a Perceptual-motor training.

Some studies have focused on the role of concrete reinforcements and real awards in the environment to attract and increase the attention in specific age groups of autistic children (Lewy & Dawson, 1992).

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A relatively large number of studies have been conducted in the area of teaching or enhancing attention used in everyday lives of the autistic people. Psychologists, physiotherapists, therapists and teachers also use a variety of teaching methods for the individuals in order for them to develop or enhance attention. They may use different techniques for this purpose. While teaching the individuals with autism, the physiotherapists or the therapists should know how to use assisted technology or any other subsidiary method or strategies. In the present study, a method was developed for enhancing attention in these children. Thus, the impact of perceptual-motor skills training on the brain structures in decreasing or increasing the attention in autistic children is of high significance.

## 2. Background

Attention includes the ability to formulate goals and plans of action and to follow these while facing distraction (Posner & Raichle, 1994). There are many variables which affect attention and seem to be essential. The ways stimuli are proposed also affect attention (Hori et al., 2005). Attention is under neurophysiological support for navigation of eyes and the limb that is the neurophysiological support help increasing the attention by making a close link between attention direction and eyes and limb's movement (Eimer, Forster, Van Velzen, & Prabhu, 2005; Eimer, VanVelzen, Gherri, & Press, 2006; Van der Lubbe et al., 2000; Van der Lubbe, Neggers, Verleger, & Kenemans, 2006). Attention is affected by excitement and anxiety which are influenced by some factors such as individual, environment and the task being done. Also specific amount of excitement and anxiety is required for optimal execution of each task by an individual in a specific environment. Therefore any factor that has influence on the factors affecting attention is indirectly effective in decreasing or increasing attention (Schmidt & Wrisberg, 2008). Perceptual-motor activities are effective in people's accuracy. This depends on the type of activity and people's level of skillfulness (Koedijker et al., 2011). Perceptual-motor capabilities have influence on individual's attention rate and their functional errors during execution of the tasks which need attention. It seems that practicing perceptual-motor activities affects attention rate (Chang et al., 2011).

In order to help the autistic improving their attention, therapists or psychologists usually do not use perceptual or movement practice or perceptual-motor training.

Although there are many studies regarding training and their impacts on attention, the focus of these studies has been mainly on normal populations and in most of them they have eliminated perceptual-motor training. Children with autism have a condition that is stable; therefore, they are in most ways normal children with special needs. Our goal is to help these children to grow and develop their maximum capabilities so that they may succeed as contributing members of the society (Hemayattalab & Rashidi, 2010).

The autism disorder exists in all races and societies. Parents' economical status, education level and living style have no effects on the risk of children getting this disorder (Sadock & Sadock, 2002). Children with autism have deficiencies in perceptual-motor processes (Jepsen & VonThaden, 2002). These results indicate the need for more evaluations which include both the aspects of the perceptual-motor simultaneously and this will be evaluated in relation to attention.

The term "perceptual-motor" refers to the individual's interpretation and response to a stimulus. The motor experiences obtained in the early ages make the major bases of the perceptual-motor evolution. Researchers have shown that the primary perception has positive effect on later acquisitions in life. So it is very important for children to have a rich and strong background of perceptual motor experiences as a base of the motor and nervous systems (Piek, Baynam, & Barrett, 2006).

In a study on impact of training on stereotypical behavior of the autistic children, Levinson and Reid (1993) concluded that the motor trainings had a positive effect on decreasing stereotypical behavior of these children and increasing their acquisition.

Sowa and Meulenbroek (2012) conducted a meta-analysis type study and found out that the motor activities of any type have a significant effect on reducing the symptoms and signs related to these children. In fact, training causes improvement in children with autism to reduce their disabilities.

Lang et al. (2010), in a systematic review, studied different types of physical activities and their influence on autism symptoms in various groups which showed the positive effect of physical activities on reducing negative symptoms in people with autism.

Considering the studies mentioned above we can come to the conclusion that the reviews done in the children with autism about the simultaneous effect of perceptual and motor factors on attention are very limited and these studies are not logical and systematic as well. Lack of researches in this field made us attempt to explore the ways of increasing and modifying level of attention in this group of people. In this study we assumed that execution of an interventional perceptual motor program in this group will be a cause of increasing attention level.

## 3. Method

### 3.1. Participants

First phase: First of all, the method of implementing the test was explained to the parents. After completing 'Parents Satisfaction' and Children's 'Personal Information' Questionnaires, from 22 psycho-therapy clinics which were randomly selected, using convenience sampling method 85 children were put in the children's list to enter screening phase conducted using matching tests.

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