

# Comparison of the impact of second language acquisition and Parent Management Training on attention control among kindergartners with Attention Deficiency and Hyperactivity Disorder

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## Abstract

**Background:** Studies on bilingualism and cognitive development are specifically invaluable among children with an intention to improve their future performance. Considerable evidence suggests that bilinguals are more capable of controlling their attention compared to monolinguals. Yet, these studies do not focus on specific populations such as children suffering from Attention Deficiency and Hyperactivity Disorder (ADHD). This study intended to evaluate the efficacy of English language teaching, as a means of becoming bilingual, and Parent Management Training (PMT) as alternates for medication to prevent the potential side effects. **Methods:** 30 ADHD preschool children benefited from English language teaching programs while another 30 from PMT programs. The variations of their attention level means were assessed pre and post applying the interventions. **Results:** The initial and ultimate alterations were compared using paired t-test for each group and independent t-test for the two groups. After applying the interventions, attention level increased in both groups ( $p < .001$ ). However, the group with PMT programs improved more. **Conclusion:** as was indicated both SLA and PMT could

increase attention level of ADHD children. However, parent training was more efficient. Such effective interventions could be substituted for medication to prevent the potential side effects.

**Keywords:** Bilingualism, Parent management training, English language, Attention control, Attention deficiency and hyperactivity disorder.

## Introduction

Becoming bilingual is an economic and social asset in today's communication era when expressing one's thoughts smoothly could lead to arising international integration and in turn, political gains. Benefits of bilingualism could also shed light on personal and professional dimensions of an individual's life. Moreover, bilingualism has been closely correlated with cognitive research due to its associated cognitive outcomes. There is a considerable body of evidence suggesting the promoted cognitive abilities due to bilingualism, including enhanced metalinguistic awareness, metacognitive skills, stronger symbolic representation and abstract reasoning skills, better learning strategies, greater problem-solving skills, improved creative and divergent thinking skills, enriched cognitive flexibility and e.t.c. (Adesope et al., 2010).

To have a better understanding of how different aspects of life could be impacted due to learning a foreign language, it would be wise to start with the very concept of bilingualism and bilingual: There is a wide range of definitions for bilingualism as presented by different scholars: Bloomfield (Romaine and Bilingualism, 1995) considers bilingualism as native-like control of two languages with no shortcomings involved. Baker (2011) defines bilingualism as not simply the ability to speak two languages but also the mastery over components of written expression. Haugen expresses that "bilingualism begins when the speaker can produce complete, meaningful sentences in another language (Karosas, 2004). Other intellectuals are less strict. For instance, Titone, as quoted by Merrikhi (2011), claims that a bilingual has the capacity to hold a conversation in a different language without

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being perfectly proficient. Diebold considers anyone who knows a few words in another language as bilingual (Leinyui, 2006). He mentions “incipient bilingualism” which is the initial stages of contact between two languages. Diebold has a very open view on bilingualism and sees anyone who solely knows a few words of a foreign language as bilingual even if he/she is not able to link the words together. Edwards, also cited by Merrikhi (2012), has the same view and declares that anyone who speaks a few words of another language is bilingual. Accordingly, anyone, no matter in early stages of learning a second language or being fluent in both languages, could be regarded as bilingual. Yet, there is a Level of Bilingualism Hypothesis that was proposed by (Diaz et al., 1983) which states that only in the early stages of second language acquisition do bilinguals benefit from the associated cognitive outcomes. In this regard, it would be wise to carry out studies on the individuals who have just started learning a foreign language in order to investigate the potential outcomes.

Since bilingualism and cognitive development are closely linked, it would be worth studying especially among children with the intention to improve their future performance (Piroozan, Fazeli and Rezaei, 2016). According to scholars who have a broader definition of bilingualism, we could consider children who benefit from early second language acquisition and have a little knowledge of a second language as bilinguals whose cognitive abilities could be studied. Bilingual children take advantage of a uniquely advanced skill called “executive functioning” (Bialystok, Martin and Viswanathan, 2005). As it is presented, executive functioning is “an awareness to operate intentionally and an inhibition mechanism to suppress the more automatic responses of the lower levels” (Bialystok, 1999). This skill is vividly detected in bilingual children’s ability to switch from one task to another efficiently.

Correspondingly, there is considerable evidence that bilingual speakers are more capable of controlling their attention compared to monolinguals (Bialystok, 2001; Bialystok et al., 2004). There are several explanations for this cognitive advantage. Some researchers (Adesope et al., 2010) suggest that it is due to the fact that bilinguals must control their attention constantly to select their target language. Others (Bialystok, Luk and Kwan, 2005; Yoshida, 2008) have stated that bilinguals’ “ability to selectively attend to different representations” may be the reason for their greater attention control. In fact, it could be concluded that scholars consider bilingual learners’ ability to hold two languages in mind simultaneously, responsible for enhanced attention control. Recent studies (Bialystok, 2009) have indicated that bilingual children can take their attention control ability into adulthood.

The significance of concentration and the ability to control attention for better school performance is crystal clear. Yet, some children suffer from such disorders as attention deficiency and are incapable of focusing on a given task. Attention Deficiency Hyper Activity Disorder (ADHD) or as sometimes referred to, Attention Deficit Disorder (ADD), is one of the psychiatric disorders of this type. ADHD is a condition affecting children and adults that is characterized by problems with attention control,

impulsivity, and over activity. As different studies have detected, ADHD negatively affects many aspects of individuals’ lives (Attention-Deficit, 2011). Most of the attention is toward the children with only a passing mention of the adult version. Since this disorder is affected by different factors such as neurologic and genetic ones (Spencer, Biederman and Mick, 2007), there are different estimations of the affected people in different populations. Some scholars claim that it affects between 5-8 percent of school age children, and between 2-4 percent of adults (Attention-Deficit, 2011). Recent studies even go beyond these estimations and approximate the prevalence of childhood ADHD to range from less than 5% to 12% (Arias et al., 2008). This condition disables children to focus and pay attention as they are fidgety, impulsive and easily distracted. Such children have less activity in areas of brain that control attention. Children’s distractibility and inattention are most commonly displayed in poor school performance.

There are no lab tests for the diagnosis of the disorder and doctors have to rely on patient’s and family’s description of behavior problems. According to current guidelines from the American academy of Pediatrics, ADHD should be diagnosed and treated in children as young as age 4 (Goodman et al., 2011). The academy maintains that previous guidelines had limited the diagnosis and treatment of ADHD to 6-12 years of age. However, recent guidelines have expanded the range and included preschoolers and teenagers as well. The new recommendations say treatment for preschoolers should start with behavioral therapies and if the condition does not improve, medication must follow (Pierce, 2011). Another recent study stated that medication can increase the attention span of only 70%-80% of patients and that it may have troubling side effects (Brus et al., 2014). Therefore, it is recommended to follow a combination of drug and behavioral therapy for the improvement of the condition to avoid the hazardous side effects as much as possible.

Considering all the facts about the cognitive benefits of bilingualism, this study chose to investigate the potential impact of becoming bilingual through Second Language Acquisition (SLA) on attention control ability among Iranian ADHD kindergarteners in an attempt to prevent the side effects of medication during the early stages after diagnosis. Since English is the most commonly preferred foreign language among Iranians (Sayadian and Lashkarian, 2010), it was taught as the foreign language to help the participants become bilingual. Meanwhile, the potential impact of Parent Management Training (PMT) on attention control span among monolingual ADHD kids was examined. The ultimate results obtained from bilingual and monolingual ADHD kids concerning their attention control ability were compared to confirm the efficacy of each variable.

## Methods

Children can benefit from their ability to control their attention and concentration especially during school years through learning a foreign language and becoming bilingual. This can increase their awareness, memory, problem solving abilities and reasoning skills as well. Besides investigating the potential positive impact

of learning a foreign language on the cognitive ability of attention control, this study intended to suggest that side effects of medication be avoided during the early stages after diagnosis by substituting other variables such as learning a foreign language and becoming bilingual.

### *Participants*

Since attention control plays a major role for the accomplishment of everyday tasks, especially for school education and due to the fact that children with ADHD lack the ability to control their attention more than their non-ADHD peers, this study focused on the potential improvement of attention control among ADHD kids aged 4-6 in Bandar Abbas, a city in Iran where the researchers lived.

In this regard, two groups of children who were diagnosed with ADHD were selected to be under research. In order to do so, the two bilingual kindergartens in Bandar Abbas were selected through census sampling with the total population of 300 individuals aged 4-6 from which 30 ADHD participants were selected randomly for X<sub>1</sub> with the intervention of teaching English language and becoming bilingual. Three monolingual kindergartens with the total population of 370 individuals aged 4-6 were selected randomly from the list of all the kindergartens in Bandar Abbas, from which 30 ADHD subjects were selected to form X<sub>2</sub> with the intervention of PMT. The justification for the age of the participants was that children are diagnosed with ADHD as early as 4 years of age and also the intention of this study was to improve attention problems of such children before their school education starts.

The participants were selected in a way that they were selected randomly from the list of all children in each kindergarten, and after being diagnosed with ADHD, were selected as the participants of the study. This trend continued until the number of ADHD subjects reached 30.

Their health condition and attention level was assessed using Conner's test. After the diagnosis of ADHD was confirmed by a pediatric psychiatrist, the intention and procedures of the study were discussed with the parents and their consent was obtained for the participation of their children in the study. It was strictly noted that the participants had to be monolingual in the beginning of the study otherwise they would be excluded from the list of the participants. Also, the subjects from the monolingual kindergartens were observed not to start any language learning programs during the follow up period or they would be excluded as well.

The participants at the bilingual kindergarten made the first experimental group and the ones at monolingual kindergartens constructed the second experimental group. The first experimental subjects benefited from English language learning programs as an independent variable the potential impact of which on attention control ability was assessed and compared with the results obtained from those of the second experimental group whose parents attended PMT sessions. These sessions were

held once a month which lasted 3 hours and were presented by professional pediatric psychologists. Behavioral therapy through PMT was considered as the independent variable applied for the second experimental group.

### *Materials*

Conner's Parents and Teachers test was used as the diagnostic test for ADHD. The tests were given to the parents and teachers simultaneously. Then, the results were analyzed and confirmed by a pediatric psychiatrist. Conner's test is also a proper tool for the measurement of children's attention span. Conner's test was repeated after nine months (end of the educational year in Iran) to measure the potential changes. As for teaching English, Tiny Talk 1A, 1B, 2A, 2B, 3A and 3B were used, along with a great deal of exposure to daily conversations in English. In order to control the language learning setting and ensuring the same teaching method, the language teacher was the same for all the 30 bilingual participants. The children were exposed to the second language four hours a day, from 8:00 A.M. - 12:00 P.M. at the kindergarten.

As for the second group who did not gain foreign language learning programs, Parent Management Training programs were provided to their parents so that the children could be handled better by their parents and teachers. These sessions were held once a month which lasted 3 hours and were presented by professional pediatric psychologists. The potential impact of PMT was assessed on attention control with the above mentioned method; a Conner's test in the beginning and one at the end of the educational year. Finally, the potential changes of attention control span were assessed both within the group and between the two groups.

### *Statistical analysis*

After the diagnosis of ADHD, the participants were divided to two groups, one of which benefited from learning a foreign language and another group which were influenced by PMT programs. The attention span of the participants was recorded in the beginning of the course and the assessment was repeated at the end of the educational year (after nine months). The data was analyzed using SPSS program version 19. The changes within the groups were assessed through paired t-test and between the groups via independent t-test.

## **Results**

Thirty participants were selected randomly to take part in the first experimental group, under the label A, that benefited from learning English as a foreign language and becoming bilingual. The mean of the individuals' attention level was obtained and recorded in the beginning of the study. Then, it was compared with the mean of the participants' attention level which was recalculated after nine educational months. The same approach was applied for the second experimental group, under the label B, which benefited from PMT programs. In order to compare the deviations of attention span means, before and after applying the

variables of SLA and PMT, paired t-test was applied for each group. The results are presented in table 1.

Table 1. Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PreA	49.7000	30	11.74778	2.14484
	PostA	40.3333	30	11.73657	2.14280
Pair 2	PreB	52.2333	30	17.34375	3.16652
	PostB	49.1667	30	17.41795	3.18007

As is presented in the table, since Conner's Test is a diagnostic test for ADHD in addition to the assessment of attention level, the

higher the means of grades, the worse the case of ADHD and, in turn, the lower the level of attention. However, lower marks indicate better conditions and higher levels of attention. In this sense, the results of paired t-test for each experimental group detects a rise in the level of attention, as the grades of ADHD level have decreased after applying the variable of SLA for group A and PMT programs for group B. This can be considered as an improvement of attention level. Table1 presents the means and standard deviation between pre-tests and post-tests for each experimental group and table 2 specifies the significance level, df and t value.

Table 2. Paired Samples Testfor Groups A and B

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	PreA - PostA	10.90000	3.71716	.67866	9.51199	12.28801	16.061	29	.000
Pair 2	PreB - PostB	1.75000	2.26712	.29268	1.16434	2.33566	5.979	59	.000

The given significance for both groups A and B is 0.000 which is smaller than 0.05. Therefore, the null hypotheses are rejected at both levels of significance. In other words, the treatments on groups A and B were efficient enough to increase the participants'attention control.

What matters at this point is the comparison of the variables' efficacy to confirm which one works better for attention control enhancement. In this regard, an independent t-test was applied to

compare the means obtained from each experimental group. The results are presented in table 3 and table 4.

Table 3. Group Statistics

	Label	N	Mean	Std. Deviation	Std. Error Mean
AB	A	30	40.33	11.737	2.143
	B	30	49.17	17.418	3.180

Table 4. Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
AB	Equal variances assumed	8.535	.005	-2.304	58	.025	-8.833	3.835	-16.509	-1.157
	Equal variances not assumed			-2.304	50.833	.025	-8.833	3.835	-16.532	-1.134

According to the findings from table 3 and table 4, the difference between the means of attention level obtained from group A and group B are statistically significant and attention level has risen to a higher level (significant level is 0.25,  $p < .001$ ). Also, it is evident that group B outperformed group A after the implementation of PMT programs. Hence, it could be concluded that although both SLA and PMT are capable of improving attention level among ADHD children, PMT is more efficient and helpful compared with Teaching a foreign language and becoming bilingual.

## Discussion and Conclusion

ADHD is one of the most common childhood disorders that can continue through adolescence and adulthood. It is accompanied

by problems with attention control, impulsivity, and over activity. There are different estimates of the prevalence of this disorder. ADHD is generally considered as a predictor of later educational non-achievements among children specifically. The focus of this study was the potential changes of attention control span among children diagnosed with ADHD. The impacts of two different variables were compared: the influence of becoming bilingual through learning a foreign language on one hand and benefiting from parent training programs on the other.

Considering the recommendations for the treatment of preschoolers in a way that behavioral therapies are afforded first and medication is postponed for later severe phases (Pierce, 2011), this study also intended to provide a recommendation to pediatric psychiatrists to delay the start of medication for

preschoolers to prevent the potential side effects. Becoming bilingual and PMT programs presented to parents were considered as alternates of medication for non-severe cases. The findings indicated that both variables were favorable for the betterments of attention control among ADHD children. Yet, PMT was more effective than bilingualism.

The results of this study were quite different from those of previous works in the way that no studies in the fields of TEFL, SLA or psychology had compared the potential impacts of bilingualism and PMT as independent variables. These variables had been under evaluation separately. For instance, in former studies on the significance of PMT, it was stated that parent training is an invaluable intervention for the treatment of preschool ADHD (Hartman, Stage and Webster-Stratton, 2003; Sonuga-Barke, 2001). In another study, it was concluded that parent training not only improves child's behavior along with his/her classroom achievements but also prevents parents' maladaptation and stress (Chronis et al., 2004). These findings were in accordance with the present study regarding the beneficial influence of PMT, but stress level and maladaptation of parents were not considered in this project.

One of the intentions behind carrying out this project was the researchers' concern regarding over-prescription of ADHD medications to young children the cognitive abilities of whom could be controlled through other interventions rather than medication. Although a systematic review in 1998, concluded that there was little evidence of misdiagnosis of ADHD or over prescription of medication by psychiatrists (Goldman et al., 1998), as the results were not current, it was worth it to conduct a research project, such as this one, to highlight the results once again by asserting that efficient alternative treatments such as MPT or TEFL could improve cognitive conditions of ADHD children and prevent over prescription of medication. The results of a study on the analysis of parent training outcomes were exactly consistent with the present findings that emphasize the effectiveness of parent training on the improvement of attentional problems (Hartman, Stage and Webster-Stratton, 2003).

In the field of teaching English as a foreign language, most of the attention is directed towards the opposite direction, i.e. the influence of consciousness and attention on learning a foreign language. The facilitative effects of conscious understanding and attention control on language learning have been constantly stressed (Schmidt et al., 2001; Schmidt, 1995; Schmidt, 1990; Tomlin and Villa, 1994). However, more recent works are demanded with a shift of attention towards the cognitive advantages of learning a foreign language. Recent studies in the field of bilingualism, not TEFL/ TESOL, focus on such facts just like this study did. A systematic review on the cognitive outcomes of bilingualism concluded that learning a foreign language and becoming bilingual increases attention control skills (Adesope et al., 2010). These results are consistent with the findings of this study regarding the variable of teaching a foreign language for the enhancement of attention control. Yet, the controversy between the present study and previous ones encompasses the target population which included ADHD

children. Previous works had evaluated the attention level of non-ADHD kids.

On the whole, based on the abovementioned facts, it is concluded that both foreign language teaching (becoming bilingual) and PMT programs could be considered as efficient alternates of medication for non-severe cases of preschool ADHD. In this way, hazardous side effects of medication are prevented and cognitive correlates are flourished to some extent. It is worth mentioning that PMT is more effective than foreign language teaching for the enhancement of attention control among ADHD kids. It is suggested that future studies in the field of TEFL/TESOL shift their attention towards the outcomes of learning a foreign language not just focusing on its influencing factors. In addition, in order to handle ADHD children better, more studies on parents are essential; for instance, their emotional, educational and socioeconomic status. Another point to be recommended for future studies, would be taking advantage of IVA diagnostic test for ADHD which can properly differentiate the three subtypes of ADHD. This test could facilitate the studies on attention control since the subtype of attention deficiency is specifically identified.

The results of this study are specifically significant for Iranian children since the educational system of Iran has banned primary schools from teaching English as a foreign language. Through presenting such findings concerning the positive impact of becoming bilingual on attention control enhancement, the officials of Iran's ministry of education would change their minds regarding their recent decisions about second language acquisition over primary school years.

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