

## Effectiveness of Quinn's Early Educational Program on Attention and Memory of Preschool Children in Isfahan

Sayehnaz Saniei Abadeh <sup>a</sup>, Ahmad Abedi <sup>b\*</sup>

<sup>a</sup> School of Psychology and Educational Sciences, Isfahan (Khorasgan) Branch, Islamic Azad University, Isfahan, Iran.

<sup>b</sup> School of Educational Sciences and Psychology, Isfahan University, Isfahan, Iran.

### ARTICLE INFO

### ABSTRACT

#### ORIGINAL ARTICLE

#### Article History:

Received: 26 Oct 2018

Revised: 20 Nov 2018

Accepted: 27 Nov 2018

#### \*Corresponding Author:

Ahmad Abedi

#### Email:

a.abedi@edu.ui.ac.ir

Tel: +98 9133162301

#### Citation:

Saniei Abadeh S, Abedi A. Effectiveness of Quinn's Early Educational Program on Attention and Memory of Preschool Children in Isfahan. *Social Behavior Research & Health (SBRH)*. 2018; 2(2): 254-264.

**Background:** Early intervention at preschool age can resolve many cognitive and metacognitive problems of children. Accordingly the present study aimed to investigate the effectiveness of Quinn's early educational program, on attention and memory of pre-school children in Isfahan city.

**Methods:** The study design was Randomized controlled trial. The study population included parents of all pre-school children in Isfahan city during school year 2016 - 2017. Thirty persons were selected through convenience sampling and then randomly divided into experimental and control groups (15 in each group). The research tool that was used in this study is Conner's Neuropsychological Testing 2004. First, the pretest was conducted for both groups; then the experimental group was exposed to eight 90-minute sessions of Quinn's early educational program; but there was no interference for the control group. At the end of the intervention, the posttest was conducted for both groups. The data of the study was analyzed through covariance analysis test.

**Results:** The findings showed that Quinn's early educational program has impacts on the attention and memory of pre-school children (P-value < 0.0005). The average of children's memory and attention were 18.7 (7.12) and 11.73 (5.68) in order to 11.45 (11.4) and 4.93 (2.45), respectively.

**Conclusion:** Given the impact of Quinn's program on the memory and attention of pre-school children, this training can be used to improve the attention and memory of preschool children.

**Keywords:** Quinn's Early Educational Program, Attention, Memory, Preschool



## Introduction

The early growth of children is the most important determinant of their health over the course of life and the preschool years are a very important opportunity to improve their growth and prevent from developmental disorders. The early developmental opportunities provide a basis for the overall academic success as well as overall health and wellbeing of children.<sup>1</sup> Children should be provided with the learning experiences and environmental stimuli during the preschool time, since this period is considered as the critical primary learning age, in which the brain is very flexible and growth happens in all dimensions.<sup>2</sup> Attention Deficit Hyperactivity Disorder (ADHD) is the most common problem among children of the present era.<sup>3</sup> Attention is the most important task of the mind and the main aspect of the cognitive structure that plays an important role in the structure of intelligence, memory, and perception.<sup>4</sup>

Attention is one of the most critical and complex factors in teaching and learning. It is referred to a series of complex mental functions, which includes focusing on or engaging in a purpose, keeping or tolerating, and staying alert during a long time, encoding the stimuli, and shifting the focus from one target to another.<sup>5</sup> Attention control refers to the ability of children to adjust or control the mental activity level, the amount of information and stimuli entering the mind, and adjustment or control of the activities. Children with ADHD are often hyperactive and have short attention periods.<sup>6,7</sup>

Considering the fact that attention is associated with components such as cognitive processing, storing, retrieving the information, and executive functions of the brain, it is closely related to memory. Memory skills also evolve during the preschool period.<sup>8-10</sup> Disorders in the memory functions such as short term memory and working memory defects, mild encoding impairment, as well as cognitive and metacognitive strategies lead to various problems in the learning process of children.<sup>11, 12</sup> Memory is defined as the ability to remember what has been learned or experienced and the ability to recall and retrieve. In other words,

memory is a reservoir, in which the learning processes are memorized, remembered, and learned.<sup>13</sup>

Piaget et al. reported that memory loss did not correlate with the pass of time; rather it developed as a result of improvement in some intelligence-related skills. According to Piaget, children do not record and then reload a copy of the reality in their memory passively. They use the mechanisms of internalization and externalization to interpret the reality as it conforms to their cognitive development. Therefore, this process is considered as a part of the child's rational (intelligence) action. According to Piaget, memory promotes with the child's cognitive development and this development encompasses the progress from the initial appearance level of a true reminiscence to the last level of accuracy and precision in memorization. So, memory does not rely on experience and repetition, but it comes from intelligence.<sup>14</sup> Greenbaum and Graph studied the implicit memory of three-, four-, and five- year-old children. Their results showed that the explicit memory was not constant and improved by age in comparison with the implicit memory.<sup>15</sup> Memory involves the basis of human learning, thinking, creativity, planning, and everyday behavior. Furthermore, all social behaviors require memory because a person without memory is unable to communicate with others using symbols and language.<sup>16, 17</sup> Therefore; it is necessary to identify these problems in the early stages and try to prevent their adverse effects applying early interventional methods.<sup>5</sup>

Many studies showed that early educational and psychological interventions were efficient in improving the basic skills or essential indicators of growth, including the executive functions and attention in children with neuropsychological learning disabilities and children with other learning problems.<sup>18</sup> Early interventions were designed to prevent from the impairments or development of the present disabilities by providing health care or child care services. Therefore, early intervention programs involve application of all educational and

rehabilitative activities that instruct children and their parents to implement these activities as soon as the child problem is identified.<sup>18, 19</sup> Kirk, Glaager, Anastasiou, and Kelman reported that early intervention in relation with the children, their parents, the family, and the network was broader than the community.<sup>20</sup> Generally, the early intervention and pre-school education are family-oriented activities.<sup>21</sup>

In this regard, we used the Quinn curriculum in this research. In this curriculum, learning and playing are combined professionally. These plays and educations enter to child's life gradually and mothers become familiar with the children's growth indicators, games, and intelligence boosting toys. The curriculum includes seven basic skills that children must learn before starting the preschool. These skills consist of language skills, knowledge / comprehension, memory, mathematical abilities, visual/spatial reasoning, cognitive skills, elegant motor skills. Moreover, two other abilities exist in this curriculum including processing speed and attention control. In addition to the above mentioned skills, five personality characteristics of young children are also improved: curiosity, self-commitment to the interests, perseverance, failure tolerance, and self-control.<sup>7</sup> Ebrahimi et al. showed that Quinn's curriculum was effective on the mental health of children with neuropsychological learning and developmental disorders.<sup>22</sup> In addition, other studies indicated that timely interventions can significantly reduce the incidence of learning disorders, such as learning disability as well as psychological disorders.<sup>23-29</sup>

Considering the importance of preschool period in determining the physical, mental, and social health, academic and occupational success, generally the individual's efficiency in adulthood and throughout the life, the effect of early intervention on reducing and preventing the academic and psychological harms, and finally, due to the lack of studies on educational and interventional programs for preschool children in Iran, the current study was conducted. The aim was to deal with this research question: Is the early

intervention of Quinn's curriculum efficient on the attention and memory of preschool children?

### Methods

This trial was a random case-control research. The statistical population included all the parents of preschool children in Isfahan city in the academic year of 2016-2017. In this study, the independent variable was the early Quinn curriculum, while the dependent variables included attention and memory of preschool children. We used the simple random sampling method to collect the samples. In this regard and by using the available sampling, 30 individuals were selected by referring to a preschool center. The samples were randomly assigned into two groups of intervention and control. The size of sample for each group was calculated by referring to scientific resources, which reported 15 individuals for each group. As Delaware mentioned, in studies with experimental research method, 15 individuals were sufficient for each group to generalize the data.<sup>30</sup> The inclusion criteria consisted of the consents of parents as well as the management, and trainer of the educational center. Furthermore, the parental cooperation and signed consent forms were necessary for the children's presence in the intervention.

Exclusion criteria included the children with behavioral and health problems, children younger than four years and older than six years, and having more than two absents during the course.

### Conners' Neuropsychological Test

The neuropsychological test was developed by Connors in 2004 to evaluate the psychiatric problems of children in the age range of 5 - 12. This test evaluates the attention problems, motor-sensory function, language, executive, memory, learning, and cognition functions throughout four scales, ranging from not observed to severe. Questions of this tool are designed according to the two components of attention and memory. The numbers of items on attention and memory are 14 and 10, respectively, which are scored using a Likert scale ranging from severe (3 scores) to not observed (zero). Higher scores indicate lower level of



attention and memory. Abedi et al. (2008) translated and standardized this questionnaire to be applied in Iran. The internal reliability coefficients were in the range of 0.75 - 0.90. Their test re-test reliability coefficient were 0.60 to 0.9 after eight weeks. In addition, the validity of Conner's constructs was confirmed using factor analysis. The discriminant validity of the questionnaire was also strongly confirmed by statistical evaluation of the questionnaire's ability to differentiate the people with ADHD from the normal individuals, and other clinical groups. Jadidi and Abedi (2011) also evaluated the validity of this questionnaire as appropriate. They reported that the construct validity of this tool was appropriate and calculated the reliability as 0.79 using the Cronbach's alpha.<sup>31</sup>

In order to conduct this research, after conducting the pre-test, we provided the parents with a general description of the research design and the confidentiality of the information. Furthermore, we asked the parents to sign the informed consent forms. Then, the Quinn curriculum intervention (8 sessions) was conducted. The curriculum was performed in two 90-minute sessions a week and the total course lasted one month. The home activities and assignments of Quinn curriculum were also explained to parents to play with their children. Curriculum sessions were conducted in groups of five members. In this research, one parent (father or mother) participated in the program and shared the training contents with his/her spouse. In other words, parents should reach a common ground in interacting with their child (in the same line with the Quinn's curriculum). Since these interventions were conducted at home by parents, the researcher needed to control the conditions and ensure about full implementation of intervention by parents. So, the researcher asked the parents to record all the assignments carried out at home and present them to the researcher at the following session in order to resolve the problems.

During the study, the participants could quit the intervention at any time and those who had more than two absents were excluded from the research. Eventually, 15 people received the Quinn

curriculum in the intervention group. After eight sessions, the of intervention group were re-evaluated with the checklist. Regarding the ethical considerations, parents and students were asked to complete written consent forms and they were also provided with some explanations about the intervention procedure. In addition, both groups were ensured about confidentiality of the information; they were not required to mention their names on the questionnaire. Finally, the intervention was conducted on the case group using the Quinn curriculum according to Table 1; whereas, the control group was trained as usual.

In this research, we used the descriptive and inferential statistics to analyze the data. We also used the mean and standard deviation in descriptive statistics and the Shapiro-Wilk test to evaluate the normal distribution of variables in inferential statistics. Levin test was applied to investigate the quality of variances and the covariance analysis to distinguish the efficiency of the pre-test variable. Statistical analysis was analyzed using SPSS<sub>23</sub>.

## Results

The findings of demographic data are presented in Table 2.

The mean and standard deviation of attention and memory components in the intervention and control groups achieved from the pre- and post-test stages are presented in Table 3.

Before presenting the results of covariance test analysis, we evaluated the assumption of parametric tests. Therefore, Shapiro-Wilk test results confirmed the assumption of normal distribution of sample data (P-value < 0.05). Likewise, the homogeneity of variance assumption was evaluated by Levin's test. The results were not significant, which showed the homogeneity of variances (P-value < 0.05). In addition, t-test results indicated that the pre-test of intervention group and control group didn't have significant correlation with variables (attention and memory) (P-value < 0.05). Regarding the homogeneity assumption of the regression slope, the results showed that the pre-test results did not have

significant correlation with the grouping variables in the post-test stages regarding the attention and memory variables.

Table 4 showed the univariable covariance analysis results (ANCOVA). According to the results, Quinn's early curriculum was effective on attention, since the significance level was less than 0.05 (P-value < 0.0005). In other words, the difference between the control and experimental groups was significant considering the effect of early Quinn's curriculum on the dependent variable (attention of pre-school children in Isfahan). In addition, the difference between the scores of the control and experimental groups indicated that the attention rates of the participants were significantly different between the scores achieved from pre-test and those achieved after the implementation of before the early Quinn curriculum.

According to the results of Table 5 and considering the pre-test scores of the auxiliary variables, the difference between the control and case groups was significant regarding the pre-school children's performance in all components of attention including selective attention, sustained attention, attention shift, divided attention, scope of attention (P-value < 0.005, P-value = 0.003, P-value = 0.005, P-value = 0.004, P-value < 0.0005, respectively). In other words, the difference between the scores of the two studied groups of pre-school children indicated that the early Quinn's

curriculum had a significant effect on their attention components (selective attention, sustained attention, attention shift, divided attention, scope of attention).

The findings of Table 5 show the results of univariable covariance analysis test (ANCOVA). According to the Table 5, early Quinn's curriculum was effective on memory since the level of significance was less than 0.05 (P-value = 0.004). In other words, the difference between the control and experimental groups was significant considering the effect of early Quinn's curriculum on the dependent variables (pre-school children memory in Isfahan). In addition, the difference between the scores of the control and experimental groups indicated that the memory scores of preschool children were significantly different after participating in the early Quinn curriculum.

According to Table 6, considering the pre-test scores as auxiliary variables, the difference between the intervention and control groups was significant regarding their performance scores in all memory types including short-term memory, active memory and long-term memory (P-value = 0.002, P-value < 0.0005, P-value > 0.0005, respectively). In other words, the difference between the scores of the two groups of children indicated that the early Quinn curriculum had a significant effect on all types of memory (short-term, active, and long-term).

**Table 1.** An overview of Early Quinn Education<sup>7</sup>

Session Number	Title	Session Content
The first session	-Introducing the Quinn program, introducing the required characteristics and skills for preschools period and providing the explanation about teaching these skills to the child regarding the Quinn's program.	-Introducing the seven abilities of highly successful children in preschool period. -Introducing the five vital skills that all children require to be successful in their future life. -Education on how to train children subconsciously using plays.
The second session	-Reading, an activity to promote the seven abilities -Instruments for promoting the seven abilities	-A review of the previous session and get a report about the home assignments -Teaching the dialogue reading technique, teaching techniques to promote the story telling skills, teaching the rhythmic games, teaching games using music and homemade tools to promote seven skills such as



		homemade music tools, and rattles.
The third session	Speaking; a way to promote the six abilities	<p>a ---Review of the previous session and getting a report of previous home assignment</p> <p>-Teaching the participants to perform the techniques in everyday life Teach parents how to use ping pong conversations, games to promote the children's vocabulary reservoir, comprehension, knowledge, similarities and differences. Games such as: What is the thing that . . . , Microphone and recorder. . . .</p>
The fourth session	Activities to teach listening skills to children	<p>-A review the previous session and a report of their home assignments</p> <p>-Teach games and techniques in everyday life to promote the listening and responding skills. Games such as May I...? Freeze/ Melt, Marco Polo, The boss says and etc.</p>
The fifth session	Promoting the knowledge / reception (comprehension) skill Promoting the skill of memorization	<p>A review of the previous session and get a report of their home assignments</p> <p>-Teach how to play games and techniques needed to teach children every day concepts such as colors, letters, numbers, and body organs. Teach the child the games and techniques needed to promote the memory in everyday life. Games such as whispers, the pattern of numbers, everything about me, What is lacked?</p>
The sixth session	-Promoting the skill of mathematics -Promote the spatial/visual reasoning	<p>-A review of the previous session and get a report of their home assignments</p> <p>-Introduction of the mathematical concepts that the children should know and teaching them to play games and implement techniques in everyday life according to these concepts. Games such as cooking together, the magical container, Finding the patterns, etc.</p> <p>Teaching them to play games and implement techniques in everyday life to promote the visual-spatial reasoning such as copy my pattern, find the hidden images, plastic blocks, and etc.</p>
The seventh session	-Promoting the cognitive skills -Promoting the elegant motor skills	<p>-A review of the previous session and get a report of the conducted home assignments</p> <p>-Teaching games and techniques of everyday life to promote the cognitive skills such as dialogue pictures, true / false questions, telling jokes and riddles, etc.</p> <p>Teaching games and techniques of everyday life to promote elegant motor skills such as letter writing practices, working with tweezers without tips, cutting, pouring in dishes and etc.</p>
The eighth session	-Promoting the five vital skills that every child will require to succeed in his/her future life	<p>-A review of the previous session and get a report of home assignments</p> <p>-Introduction of curiosity skills, commitment to self-interests, perseverance, tolerance of failures and defects, self-control, and performing techniques in everyday life to create and promote these skills. Games such as taking care of animals and plants, martial sports, reading chapter-books and etc.</p>

**Table 2.** Descriptive Data for Demographic Variables

Groups	Children age	Fathers' age	Mothers' age	The highest level of fathers' education	The highest level of mothers' education
Experimental group	5.25 (1.12)	37.40 (3.12)	33.17 (4.64)	40% MA	41% MA
Control group	5.48 (1.24)	36.58 (3.26)	34.31 (4.33)	39% MA	43% MA

**Table 3.** Mean and standard deviation of attention and memory components in intervention and control groups achieved from the pre- and post-tests

Component	Intervention Group				Control Group			
	Pre-test		Post-test		Pre-test		Post-test	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Attention	18.07	7.12	11	5.47	13.53	8.05	14.13	8.24
Memory	11.73	5.68	4.93	2.45	9.87	4.09	10.47	5.03

**Table 4.** The results of the covariance analysis regarding the effect of early Quinn curriculum on the attention of pre-school children in Isfahan

Source of changes	Sum of squares	Df	Mean squares	F	Significance	Eta squares	Test power
Improved model	1260.296	2	630.148	74.928	<0.0005	0.847	1.000
pre-test	1186.663	1	1186.663	141.101	<0.0005	0.839	1.000
Group	336.974	1	336.974	40.068	<0.0005	0.597	1.000
Error	227.071	27	8.410				

**Table 5.** The results of MANCOVA analysis regarding the scores of the intervention and control groups in components of attention (selective attention, sustained attention, attention shift, divided attention, scope of attention)

Source of changes	Sum of squares	Df	Mean squares	F	Significance	Eta squares	Test power	Source of changes
Pre-test	selective attention	18.687	1	18.687	39.832	<0.0005	0.634	1.000
	sustained attention	23.394	1	23.394	40.575	<0.0005	0.638	1.000
	Attention shift	35.714	1	35.714	50.359	<0.0005	0.686	1.000
	Divided attention	2.488	1	2.488	2.515	0.126	0.099	0.330
	Scope of attention	19.667	1	19.667	22.439	<0.0005	0.494	0.995
group	Selective attention	10.259	1	10.259	21.868	<0.0005	0.487	0.994
	sustained attention	6.127	1	6.127	10.628	0.003	0.316	0.877
	Attention shift	6.822	1	6.822	9.619	0.005	0.259	0.844
	Divided attention	10.303	1	10.303	10.416	0.004	0.312	0.871
	Scope of attention	15.899	1	15.899	18.139	<0.0005	0.441	0.983

**Table 6.** The results of the covariance analysis on the effect of early Quinn's curriculum on the memory of pre-school children

Source of changes	Sum of squares	Df	Mean squares	F	Significance	Eta squares	Test power
Improved model	968.195	2	484.098	15.938	<0.0005	0.541	0.999
pre-test	738.562	1	738.562	24.315	<0.0005	0.474	0.997
group	305.075	1	305.075	10.044	0.004	0.271	0.863
error	820.105	27	30.374				



**Table 7.** The results of MANCOVA analysis regarding the scores achieved by the intervention and control groups according to different memory types

Source of changes	Sum of squares	Df	Mean squares	F	Significance	Eta squares	Test power	Source of changes
Pre-test	Short term memory	51.820	1	51.820	40.387	<0.0005	0.634	1.000
	Active memory	20.721	1	20.721	22.677	<0.0005	0.476	0.966
	Long term memory	55.359	1	55.359	58.960	<0.0005	0.702	1.000
Group	Short term memory	15.826	1	15.826	12.334	0.002	0.330	0.921
	Active memory	24.406	1	24.406	26.709	<0.0005	0.517	0.999
	Long term memory	17.755	1	17.755	18.910	<0.0005	0.431	0.987

### Discussion

The current study was conducted to determine the efficiency of early Quinn's curriculum on the memory and attention of pre-school children in Isfahan city. The results showed that Quinn's curriculum was effective on the attention and memory of pre-school children. Considering the Eta squares, these changes or improvements were due to the effect of the early Quinn curriculum. The results of the current study are in the same line with the findings of Ebrahimi et al. (2016) on the effect of Quinn's curriculum on the mental health of children with neuropsychological and developmental learning disorders.<sup>22</sup>

Based on the Quinn's findings, the Quinn's curriculum, as an intervention program, provides parents the opportunity to get information about their children and know the ways to train and play with them.<sup>27</sup> Moreover; they can play the best role in determining and satisfying the cognitive and emotional requirements of children. Parents should help their children to develop the required interpersonal skills to preserve their indisputable rights, such as ignoring the false demands of others, expressing their opinions and desires, showing their lack of happiness, and not socializing with inappropriate people. Parents are also required to help their children to develop skills in order to compensate their lack of social skills, to end disturbing thoughts and excitement reactions, and to stabilize their personalities. On the other hand, initial relationships affect the individual's social efficiency by providing a basis for one's

expectations about other relationships, which determines the child's entry into other relationships.

The results of this study showed that Quinn's curriculum affected the performance of children's attention. The results are in the same line with the results of Schulz (2015) and Bingham et al. (2017).<sup>24, 29</sup> As the researchers showed; early education could promote the children's perceptions of the subject, increase the positive experiences of children, promote physical experiences, and stimulate their individual interest and attention. The Quinn's curriculum is as an educational and interactive program between parents and children to increase intelligence and school success for preschool children. Moreover, modeling, responding, coaching, and other behavioral techniques are used to promote the cognitive and emotional development. This model emphasizes on the pre-school period as the most important and vital stage of development. In this curriculum, it is believed that the child's cognitive and emotional developmental demands should be established in the early childhood. Since the stability of attention is shaped in childhood and attention affects the person's subjective representations and future learning, we need to control various variables in order to improve attention. Quinn's curriculum makes preschool children to enjoy their emotional environment, since their parents are engaged in the curriculum. It also makes the children to pay more attention to what is going on around them. Therefore, this model helps the participants to achieve the desired goals and provides positive feedbacks to them after performing the homework

and assignments in the subsequent sessions. In this regard, this model has a significant effect on the education's effectiveness and the participants gradually learn to reduce their self-restraint using their experiences in group activities and the received positive feedbacks. Finally, we found that the early Quinn's curriculum had a significant effect on increasing the attention and reducing the inhibition.

On the other hand, the cognitive ability of memory is one of its executive functions, which was evaluated in many researches and the preschool children were not excluded from such studies. For example, Ozonoff and Jensen evaluated and compared three groups of sick children (Autism, ADHD, and Tourette syndrome) with a normal control group in terms of executive functions. Their results showed differences in the performance of three groups in executive functions, which suggested that the effects of these consequences were influenced by early intervention methods.<sup>32</sup> Talebpour et al. (2002), evaluated the effect of cognitive education on the control source, progress of motivation, and memory performance. They concluded that cognitive education program had a significant effect on memory performance. Patients with autism were more involved in their assignments in comparison with the control group and those with ADHD. The performance of preschool children was explained in various homework and skills.<sup>33</sup> In addition, according to the current study, the effect of the early Quinn's curriculum intervention on the memory of preschool children was studied by Ban et al. They evaluated the efficiency of early home-based and family-based interventions in the development of cognitive functions in children aged 12 to 36 months. Their findings showed that cognitive functions such as the memory of children who went under these early intervention was significantly different from the control group.<sup>34</sup>

From the cognitive perspective, the efficiency of various assignments in preschool children depends on their memory, because it requires them to maintain and use the categorized information, while processing the new data. According to the role of

curriculums in children's memory, poor function in some of the preschool children is not unexpected. Studies have shown that the posterior side of the prefrontal cortex, as well as the cerebellum and the posterior regions of the brain play a role in the process of completing homework. Functions of these parts increase when a rule transfers into another. On the other hand, according to the studies conducted on pre-school children, they were normal in their developmental stages of prefrontal cortex and normal sub-cortical areas. Therefore, Quinn-based early intervention training can be explained from this perspective. In general, the findings indicated that Quinn's curriculum could improve the performance of children's attention and memory by understanding and changing the attitudes of parents about the ways of communicating and interacting with their children, and the strategies to identify and promote the required skills for children.

Moreover, the early Quinn's curriculum can play an important role in improving one of the important dimensions in cognitive and learning processes by influencing the attention and memory of pre-school children. One of the most important requirements of learning among the pre-school and elementary school children is to have a wide attention span and sufficient concentration to increase their self-confident and self-efficacy perception. This educational program can sustainably promote the child's performance in memory and attention; so, it can be expected that academic performance and learning would also change positively.

The current study had some limitation such as the facts that the results were limited to Isfahan city and some uncontrolled variables existed such as the financial status of families, the number of children, parents' education level and their social status, and the lack of using random sampling methods, which could affect the results. Therefore, in order to increase the power of generalizability, this study should be carried out in other cities, regions, and societies with different cultures, within families with different socioeconomic status, and among children with disorders using follow ups and applying a random sampling method.



## Conclusion

Regarding the effect of Quinn's curriculum on the attention and memory of preschool children, we suggest the authorities to teach parents the exercises and activities of the Quinn's curriculum. In addition, this curriculum should be presented in kindergartens and preschool centers, especially in health centers to improve the skills and performance of children. This process can be conducted by introducing early Quinn's curriculum to official of the Well-being organization, as custodians of kindergartens and preschools, so that they can execute the program in the relevant centers.

## Conflicts of Interest

In this study, did not report any potential conflicts of interest with the authors.

## Acknowledgments

This manuscript was extracted from the master's thesis with the code of 238207055951062. We appreciate all the staffs, participants and their parents, the preschool centers' authorities, and others who contributed in this research.

## Authors' Contribution

Conceptualization, S.S.A. and A.A.; Methodology, A.A.; Formal Analysis, A.A., Investigation, A.A.; Data Curation, A.A., Writing – Original Draft, S.S.A. and A.A.; Writing – Review and Editing, S.S.A. Resources, S.S.A.; Supervision, S.S.A.

All authors read and approved the final manuscript and are responsible about any question related to article.

## References

1. Anderson PJ, Reidy N. Assessing executive function in preschoolers. *Neuropsychology Review*. 2012;22(4):345-360.
2. Malekpur M. Early Intervention Programs for Young Children with Special Needs, Theory and Practice - A Model for Iran. *Research on Exceptional Children*. 2003;7(1):39-54. [Persian]
3. Klingberg T, Fernell E, Olesen PJ, et al. Computerized training of working memory in children with ADHD-a randomized, controlled trial. *Journal of the American Academy of Child & Adolescent Psychiatry*. 2005;44(2):177-186.
4. Hartman J, Hunfalvay T. Effect of attentional focus of learning the basic cast for fly fishing. at: 2002 AAHPERD National Convention and Exposition; 2002 Apr 9-13; San Diego, CA.
5. Seidman LJ. Neuropsychological functioning in people with ADHD across the lifespan. *Clinical Psychology Review*. 2006;26(4):466-485.
6. Pezzica S, Vezzani C, Pinto G. Metacognitive knowledge of attention in children with and without ADHD symptoms. *Research in Developmental Disabilities*. 2018;83:142-152.
7. Quinn K. *Testing for Kindergarten*. Simon and Schuster: New York; 2010.
8. Nelson K, Fivush R. The emergence of autobiographical memory: A social cultural developmental theory. *Psychological Review*. 2004;111(2):486-511.
9. Ganji H. *Mental Health*. Tehran: Roshd Publication; 2011. [Persian]
10. Masoura EV, MacGinitie WH, Kamons J, Kowalski RL, MacGinitie RK, MacKay T. Establishing the link between working memory function and learning disabilities. *Learning Disabilities: A Contemporary Journal*. 2006;4(2): 29-41.
11. Lerner JW, Lowenthal B, Egan RW. *Preschool children with special needs*. Boston: Allyn and Bacon; 2003.
12. Taroyan NA, Nicolson RI, Fawcett AJ. Behavioural and neurophysiological correlates of dyslexia in the continuous performance task. *Clinical Neurophysiology*. 2007;118(4):845-855.
13. Lee K, Ng SF, Ng EL, Lim ZY. Working memory and literacy as predictors of performance on algebraic work problems. *Journal of Experimental Child Psychology*. 2004;89(2):140-158.
14. Ribaupierre A. *Piaget's Theory of Cognitive Development*. 2<sup>nd</sup> ed. Oxford: Elsevier; 2015. P:120-124.
15. Cowan N, Aulme C. *The development of memory in childhood*. UK: Psychology Press; 1997.



16. Adolphs R, Tranel D, Denburg N. Impaired emotional declarative memory following unilateral amygdala damage. *Learning & Memory*. 2000;7(3):180-186.
17. St Clair-Thompson HL. Executive functions and working memory behaviors in children with a poor working memory. *Learning and Individual Differences*. 2011;21(4):409-414.
18. Abedi A, Malakpoor M. Investigation of efficacy of educational – psychological early interventions for improving executive functions and attention of children with neuropsychological learning disabilities. *Journal of New Educational Approaches*. 2010;5(1):65-86. [Persian]
19. Meisels SJ, Shonkoff JP. *Handbook of early Childhood intervention*. New York: Cambridge University Press;1990.
20. Kirk S, Gallagher J, Coleman MR, Anastasiow N. *Educating exceptional children*. Boston: Cengage Learning; 2006.
21. Schertz HH, Odom SL, Baggett KM, Sideris JH. Effects of joint attention mediated learning for toddlers with autism spectrum disorders: An initial randomized controlled study. *Early Childhood Research Quarterly*. 2013;28(2):249-258.
22. Ebrahimi AA, Abedi A, Yarmohammadian A, Faramarzi S. Effectiveness of Quinn's parenting program on psychological well-being of pre-school children with neuropsychological/developmental learning disabilities. *Modern Applied Science*. 2016;10(4): 179-188.
23. Kavianpour F, Malekpour M, Abedi A. Efficacy of executive functions training (response inhibition) on the rate of impulsivity in preschool children with developmental coordination disorder: A single-subject research. *Journal of Rehabilitation*. 2013;14(1):70-80. [Persian]
24. Schulz RA. Joint attention intervention with assisting parent mediated techniques to increase a toddler with autism spectrum disorder use of joint attention: A single case study. [MA Thesis]. Mankato, United States: Minnesota University; 2015.
25. Maloney EA, Converse BA, Gibbs CR, Levine SC, Beilock SL. Jump-starting early childhood education at home: Early learning, parent motivation, and public policy. *Perspectives on Psychological Science*. 2015;10(6):727-732.
26. Ruocco S, Gordon J, McLean LA. Effectiveness of a school-based early intervention CBT group program for children with anxiety aged 5–7 years. *Advances in School Mental Health Promotion*. 2016;9(1):29-49.
27. Quinn A. Illuminating the complex: Seeing developmentally appropriate practice in Beloglovsky and Daly's early learning theories made visible. *Delta Kappa Gamma Bulletin*. 2016;82(3):53.
28. Skjæveland Y. Learning history in early childhood: Teaching methods and children's understanding. *Contemporary Issues in Early Childhood*. 2017;18(1):8-22.
29. Bingham GE, Quinn MF, Gerde HK. Examining early childhood teachers' writing practices: Associations between pedagogical supports and children's writing skills. *Early Childhood Research Quarterly*. 2017;39:35-46.
30. Delavari A. *Research methods in psychology and educational sciences*. Tehran: Virayesh Publishing; 2000. [Persian]
31. Jadidi M, Abedi A. Adaptation and standardization of Connor neuroscience inventory on children aged 1 to 57 years old in Isfahan. *New Educational Approaches*. 2011;3(1):19-30.
32. Armitage S. Birth order: College students' perceptions of their ordinal position compared to Alfred Adler's categories. [MSc Thesis]. United States. Wisconsin-Stout University, The Graduate School; 2007.
33. Talebpour A, Nouri A, Moulavi H. The effects of cognitive training on locus of control, achievement motivation and academic performance of high school students. *Journal of Psychology*. 2002;6(1):18-29. [Persian]
34. Bann CM, Wallander JL, Do B, et al. Home-based early intervention and the influence of family resources on cognitive development. *Pediatrics*. 2016;137(4):1-11.