



Effectiveness of Early Educational Interventions on Self-Regulation Skills in Preschool Children

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Abstract

The aim of the current research was to investigate the effectiveness of early educational interventions on the self-regulation skills of preschool children. Statistical population was the Preschool children of Isfahan kindergarten aged 6 to 7 during 2017-2018. The sample consisted of 30 Preschool children that were selected using clustered sampling. The sample consists of 30 Preschool children that were selected using cluster sampling (each group consisted of 15 children). The early educational interventions were conducted in the experimental group. In the semi experimental design, the Preschool Self-regulation Assessment (Smith Donald, 2007) was used to measure research variables. Results showed that early educational interventions were effective in cognitive, emotional and behavioral regulation skills and leading to improved school readiness in children. Early education can have the main role in self-regulation among children. Thus, it is indicated that effective self-regulation provides a foundation for positive classroom behavior and academic achievement.

Keywords: Visual-spatial abilities, Reading performance, Dyslexic students

Introduction

In recent years, the issue of early intervention for children and the impact of early childhood education program, especially on children's cognition and emotions, have attracted many researchers' attention (Abedi, 2007; Arruabarrena & Paúl, 2012; Barnett, 2011; Bartik, 2011; Bruder, 2006; Hillman, 2013; Moore, 2014; Rao, Sun, Chen, & Ip, 2017; Shoshtari, Abedi, & Golshani Ahrami, 2010).

It seems that the early intervention programs are needed to prevent developmental delays in children and to be used in the way of educating them in their critical growth periods. Piaget (1896-1980), the cognitive theorist, has more than anyone else influenced the studies on childhood development. Piaget's theory is the

pioneer of today's revolution in which cognitive processes are emphasized. He believes that children need to learn how to adapt their experiences to cognitive bases, and if they are provided with the opportunities of growth and learning and have the possibility of passing from one stage to another, the cognitive development will occur naturally.

Preschool cognitive abilities include a group of prerequisites needed for children in order to learn their assignments (National Center for Special Education Research, 2009). Given the importance of critical learning periods, initial experiences, and the flexibility of children's brain cells, early intervention programs claim that children in the early stage of their life learn more than all other stages and can be more effective than

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their other life stages (Lasser & Fite, 2011; Moore, 2014).

A review of background studies shows that early interventions have a significant effect on infants' and preschool children's cognitive development (Gartland & Strosnider, 2007; Jadidi 2014; Spittle, Orton, Doyle & Boyd, 2007; Valdes, 2011; Vanderveen, Bassler, Robertson, & Kirpalani, 2009). Moor (2014) investigated the relationship between children's presence in preschool courses and their reading development. The results showed that there is a significant difference between the students who have attended the preschool courses and those who have not attended. Valdes (2011) found that early educational interventions improve these children's educational outcomes.

Researchers believe that if children with problems in their preschool skills are identified during the first years of their lives before facing educational failure, they can be provided with useful early interventions. Early interventions on preschool skills are taught to prepare children for further educational learning, such as reading, writing, and mathematics (Abedi, 2007).

Early childhood researchers and educators have long embraced the idea that getting children off to a good early start in school can have lasting and important effects on their futures. As children's induction into formal school is beginning earlier, the expectations placed on children when they enter the classroom environment are more demanding. Aspects of school readiness, however, encompass beyond the traditional areas of language, literacy, and mathematics to the domain of social and emotional development, including an area that lies at the intersection of behavior and cognition: self-regulation (McClelland & Cameron, 2011).

Recent research suggests that preschoolers' school readiness is supported by a range of skills that fall under the rubric of "self-regulation: (Blair, 2002; Blair & Raver, 2015; Diener & Kim, 2004; Duncan et al., 2007; Duncan, Schmitt, Burke, & McClelland, 2018; Fergusson et al., 2013; McClelland, Cameron Ponitz, Messersmith, & Tominey, 2010; Moffitt et al., 2011). For instance, a child's capacity to manage her emotions in exciting, frustrating, or distressing situations seems to affect the way she is perceived by teachers and peers (Ochsner & Gross, 2008). A child's capacity to process new data and to develop learning strategies has been linked with their regulation of attention (Blair, 2002; Fantuzzo, Perry, & McDermott, 2004; Williford, et al, 2013). In addition, preschoolers' behavior regulation, including their compliance and impulse control, may influence student success as children are normal to follow classroom rules and educators'

directions, share toys, and wait their turn (Suchodoletz et al., 2013; Williford, et al., 2013). Emotion, attention, and behavior regulation seem to represent three important spaces of development; each domain potentially overlapping with and impacting the other two (Blair & Peters, 2003; Smith-Donald, Raver, Hayes & Richardson, 2007).

Growing evidence has established self-regulation as a vital part of being prepared for school. In fact, educators have detailed that issues with self-regulation in the classroom, such as following directions and working independently, are very regular toward the beginning of kindergarten – more common than problems with scholarly skills (Kaufman, Pianta, & Cox, 2000).

Moreover, a developing body of evidence links self-regulation in early childhood with a host of better school- and life-related outcomes, such as school achievement (Duncan et al., 2007), social competence (Blair, 2002), and even college completion (McClelland, Acock, Piccinin, Rhea, & Stallings, 2013). The literature regarding the relationship between children's self-regulation and learning consists of studies that have primarily examined it as a school-entry predictor of children's achievement. These Correlation studies have shown that children who enter school with strong self-regulatory skills have better results (Fantuzzo, Bulotsky-Shearer, McDermott, McWayne, Frye, & Perlman, 2007; Ponitz, McClelland, Jewkes, Connor, Farris, & Morrison, 2008). Further, some limited evidence has proposed that development in these skills corresponds to gains in literacy and math achievement (McClelland et al., 2007). However, little attention has been paid to the prerequisite skills or cognitive capacities that might lay the foundation for children to develop self-regulation.

Early school achievement has appeared to be predictive of ongoing academic achievement and life success. Importantly, research has established that levels of social competence and problem behaviors in kids tend to remain stable over the early school years proposing that the developmental skills which children bring with them to school are less agreeable to change and intervention after children commence school, than they may be in the earlier years of life. It is, therefore, important to consider the ways in which these skills develop from birth, in order to improve children's educational outcomes across their schooling care (Anthony, 2013).

However, there is limited empirical work that develops and measures self-regulation in this wide way. Rather, most research focuses on one or two particular indices of self-regulation. Self-regulation develops rapidly in the early years and as such may need to be measured differently at various age points. Interventions

reported to date rarely focus on children's self-regulation skills as the main target for change. Therefore, assessment and improvement of this skill in children is important. Considering the important role of cognitive abilities in academic learning activities previously mentioned, according to cognitive abilities at this age is very important. Thus, an important contribution within this area of research would be to examine the effectiveness of early educational interventions on improving self-regulation skills of preschool children. Therefore, the following hypothesis was proposed in this study:

Early educational interventions are effective on the self-regulation skills in preschool children.

Method

The research method was semi- experimental design pretest and post-test with control group and random assignment. Independent variables, is early educational interventions and self-regulation skills is dependent variable.

Participants

The statistical population in the present study consisted of boy and girl pre-schoolers in a pre-school in Isfahan's kindergarten in 2017-2018 curricular year, from among them 30 people who received the highest scores on questionnaires were selected via cluster multistage random sampling and randomly assigned into 2 groups of 15 people as the experimental (Early Educational Interventions) and the control groups.

Instruments

Preschool Self-regulation Assessment

In the research, data on children's self-regulation was collected through the Preschool Self-Regulation Assessment. PSRA developed by Smith-Donald et al. (2007) is an assessment tool which allows a performance-based evaluation, and is composed of two main parts; assessor guide for the tasks the child is expected to perform and PSRA Assessor Report Examiner Rating Scale. The first part of the scale is comprised of 10 tasks developed to evaluate self-regulation performance of children. "Toy Wrap," "Snack Delay," "Toy Wait" and "Tongue Task" tasks are used to determine children's delay of gratification levels. "Balance Beam," "Tower Task" and "Pencil Tap" tasks are carried out to assess executive control designating children's ability to follow instructions (Smith-Donald et al., 2007). "Tower Cleanup," "Toy Sorting" and "Toy Return" tasks evaluate children's

socialization skills. During the development of the original scale, two related tasks were combined after validity and reliability studies, and the number of tasks was reduced to nine.

The PSRA Assessor Report Examiner Rating Scale constituting the second part of the scale allows the assessor to evaluate the child's emotion, attention level and behavior based on assessor-child interaction. 15 out of the 28 items in the PSRA Assessor Report Examiner Rating Scale were taken from attention, impulse control, activity level, sociability level, emotion and energy subscales of Leiter-R Social Emotional Rating Scale. Additionally 2 items that do not map on the original items were adapted from Leiter-R Social Emotional Rating Scale. The remaining 9 items were selected from the Disruptive Behavior-Diagnostic Observation Schedule coding system items that allow the evaluation of compliance-noncompliance, intensity and frequency of negative and positive affect, and presence or absence of physical or verbal aggression. Finally two more items were included for assessment of anxiety levels of children during the assessment. The PSRA Assessor Report Examiner Rating Scale is a rubric-type assessment tool consisting of items coded between 0 and 3. The items include behavioral indicators; 0 denoting the lowest score and 3 denoting the highest score. However, some items were reverse-coded to reduce automatic responses and ensure assessor reliability (Items: A4, A5, B1, B5, E1, E2, E5, E6, E8, E9, E10 and E11).

Smith-Donald et al. (2007) conducted the validity and reliability studies of the scale with 64 children aged 41-70 months. Assessors received training on the scale. The test was administered to children in a quiet and suitable location. Immediately after the administration of the test, the assessors filled out the PSRA Assessor Report Examiner Rating Scale according to the child's tasks performance. As a result of the factor analysis of the PSRA Assessor Report Examiner Rating Scale, a two-factor construct was obtained with Impulse/Attention Control and Positive Emotion factors. The final form of the PSRA Assessor Report Examiner Rating Scale explained 53.4% of the variance (Smith-Donald et al., 2007). Cronbach's Alpha coefficients for the two factors were $\alpha=0.89$ for Impulse/Attention Control and $\alpha=0.87$ for Positive Emotion. These coefficients showed that the PSRA Assessor Report Examiner Rating Scale was reliable for the evaluation of self-regulation (Smith-Donald et al., 2007). Smith-Donald et al. (2007) conducted the validity and reliability studies of the scale with 64 children aged 41-70 months. Assessors received training on the scale. The test was administered to children in a quiet and suitable location. Immediately after the administration of the test,

the assessors filled out the PSRA Assessor Report Examiner Rating Scale according to the child's tasks performance.

In the current research, the reliability coefficients of the scales estimated through Cronbach's alpha was high ranging from .78 to .82, and the CFA results showed that the scale had a good data fit.

Procedure

After the pretest, training of early educational interventions was planned and conducted (see Table 1). Treatment included ten 40-min sessions, over 7 weeks.

Educational programs was developed by the researcher in the form of a training package. The training program developed was reviewed and edited by experts in the field twice. In the end, based on a survey form designed to measure the agreement of experts, final expert comments were received. The internal agreement coefficient between the five experts was 0.87. This package has an educational approach based on enhancing the self-regulation skills of pre-school children, which includes a set of techniques, exercises and educational strategies. In fact, the sessions aimed to direct pre-school education to early intervention.

Table 1.

Early educational package based on self-regulation contained 10 forty – minute sessions

session	content
1	Pretest ; Story Reading: The story of rain and books, Swing and fall
2	field trip; Different animals; Red light, purple light
3	Coordinated with color; Game Sleep, sleep
4	Run Orchestra; Look and go up; Birthday Party Games
5	Emotions and Games; Emotional Techniques
6	Relaxation and excitement; good friends game
7	Learning friendly behaviors; Golden techniques
8	all the kids are asleep; Freezing game
9	Theater the opposite; Waves joy
10	Chain reaction; Atal Matal an ant; post-test

Findings

In this study, the parameters for data analysis, descriptive statistics (mean and standard deviation) and

hypothesis testing to analysis of covariance was used. In this section the mean and standard deviation pre, post-assessment scores for the two groups are presented.

Table 2.

Mean and standard deviation scores for pre and post assessment outcome variables

Source	Pre-test		Post-test	
	M	SD	M	SD
Intervention group	6.8	1.37	14.1	1.31
Control groups	6.9	1.56	8.5	1.25

In Table 2, Mean and standard deviation scores of Experimental and control groups at pretest and post-test are shown. According to this data, means of the

experimental group after training of early educational interventions has increased.

Table 3.*Normality tests of Kolmogorov-Smirnov*

Groups	Statistics	df	sig
Intervention group	0.18	15	0.174
Control group	0.154	15	0.200

The results of the Kolmogorov-Smirnov tests in Table 3 show that the condition of the normality of the data is established.

Table 4.*Analysis of ANCOVA on intervention effects of self-regulation*

Source	Sum of Squares	df	Mean Square	F	Sig	Partial Eta Squared	Observed power
Pre-test	0.122	1	0.122	0.8	0.779	0.003	0.059
Group	305.54	1	305.54	200.18	0.001	0.88	100

Table 4 presents the analysis of variance findings. As Table 4 shows, there were significant differences between the two groups on PSRA in both pre and post-test. In addition, the effect size is 0.88. That means 88% Post-test variance is related to early educational interventions, also observed power is one that indicated sufficient for sample size. The results show that early educational interventions have affected self-regulation of the pre-schooler children.

Discussion and Conclusion

Development of self-regulation is considered as one of the most important systems by which children develop competence and are able to succeed in school. Of the key socioemotional competencies in early childhood that lay the foundation for future development and the potentials for adult psychosocial growth, well-being and accomplishment, self-regulation is core. The purpose of this study was to investigate the effect of early intervention on self-regulation skills of preschool children. The results of this study showed that training of early intervention improve the self-regulation skills. In this regard, research studies are consistent with the study (Blair & Raver, 2015; Duncan, 2018; Huffman, 2013; Rao et al., 2017; Sariñana, 2016; Tominey & McClelland, 2011).

A strong body of various studies suggests that importance of early interactions in the development and learning of self-regulation skills (Colman et al., 2006, Kopystynska, Seay & Eisenberg, 2016; Lengua et al., 2013, McCoy & Raver, 2011, Miller & Smith, 2015), which, in turn, have been linked to children's educational outcomes (Kim & Hodges, 2012; Schmitt, McClelland, Tominey & Acock, 2015) and success in social relations (Blair & Raver, 2015). In learning activities, skilled self-regulators can control cognition, behavior and emotions to overcome motivational, cognitive and behavioral challenges related to learning

(Hadwin & Oshige, 2011). However, research shows that, even students with higher education lack the skills or will to regulate their learning when facing related challenges (Jarvenoja et al., 2012).

The results are noteworthy in that there is strong evidence of an intervention effect. First, across all of the statistical analyses performed, a consistent pattern of significant differences in growth on the development constructs is evident for the children receiving the early intervention relative to those in the control group who did not. The magnitude of development observed for the intervention group children is particularly striking.

In sum, the strong, consistent pattern of positive results observed across all analyses is compelling evidence of the efficacy of the program in significantly facilitating development growth in preschool children both overall, and also on Social Emotional Development, Cognitive Development and Language Development.

It is both striking and remarkable that children as young as seven can learn, retain and practice the self-regulation skills they were taught in the program and actually facilitate an increase in their rate of psychosocial development. Given that the age range from three to seven years is a period of accelerated neurological growth and psychosocial development, it is likely that the learning and sustained use of socio emotional self-regulation skills during this period could instantiate a new set-point in the young child's nervous system for an optimal pattern of psycho physiological function, and thereby significantly boost the development trajectory of future psychosocial growth.

Establishing this key set-point early in the child's life, when neural connectivity is still highly malleable, and then sustaining it throughout the educational process with programs building on these fundamental skills, can set the child on a life course of health, well-being, achievement and social responsibility. Correspondingly, the integration of programs designed to foster self-

regulation competence into educational curricula beginning at preschool should help prevent manifestation of much of the psychosocial dysfunction and pathology that not only robs individuals of a fulfilling life but also result in an enormous cost to society.

Practitioner including teachers, school psychologists, and parents must have increased access to information about how to assess and support children's self-regulation in early learning contexts. This will assist the growing number of educational interventions that seek to improve self-regulation and ensure that empirically supported programs are widely disseminated (Connor et al., 2010; Diamond, Barnett, Thomas, & Munro, 2007; Domitrovich, Cortes, & Greenberg, 2007; Tominey & McClelland, 2011).

Self-regulation represents behaviors that are essential for succeeding in social and learning situations. Creating environments in which children have many opportunities to practice these skills may be a critical next step in optimizing their development. Although this study contributes to existing literature on self-regulation interventions, limitations must be noted. One key limitation is that research assistants, rather than teachers, implemented the intervention games, and also, that parents were not involved in implementation. In addition to these findings, we found evidence of spillover effects within playgroup sessions. Findings from this study can be used to refine future applications of this or similar behavioral regulation interventions. These results also have the potential to inform preschool curricula that emphasize promoting the development of self-regulation to ultimately improve academic achievement. The development of self-regulation interventions that can be easily implemented by teachers in classroom settings is critical to ensure that all children enter school with the skills they need to benefit from classroom learning activities.

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