

The Influence of the Dance Creativity on Executive Functions of Early Childhood

Elindra Yetti, Erie Siti Syarah, Muktia Pramitasari, S. Syarfina, Debie Susanti

Universitas Negeri Jakarta

Jakarta, Indonesia

elindrayetti@unj.ac.id, eriesitis_s2@mahasiswa.unj.ac.id, muktiapramitasari_s2@mahasiswa.unj.ac.id, syarfina_s2@mahasiswa.unj.ac.id, drdebiesusanti@yahoo.com

Abstract—The purpose of this study is to find out the influence of dance creativity on executive functions of early childhood. The research method used is a quasi-experimental design with paired data t-test analysis. This study was conducted on 50 respondents aged 5-6 years. The results showed that $t_{hit} > t_{table}$, $sig < 0.01$ there was a significant difference between before and after the dance creativity activities implemented. Based on the result of this study, it can be concluded that dance creativity can significantly influence the executive function of early childhood. Further research can be carried out by involving other variables that affect executive functions along with other dance creativity activities.

Keywords—*dance creativity; executive functions; early childhood*

I. INTRODUCTION

It has become common knowledge that adult behavior is determined by the period of human development when they are in early childhood. Felver stated that executive functions (EFs) variable is the most important thing among all psychological variables that influence the development of healthy children and adolescents [1]. EFs deals with family care processes that are needed to intentionally change behavior, pay attention, and act in ways that have become habit. EFs skill which is developed comprehensively allows children to manage their behavior, take care of themselves and others through decision making and non-impulsive actions. Other important skills that depend on EFs such as concentrating on tasks, following rules, and achieving long-term goals and objectives. EFs is very important for healthy development in recent studies, Diamond in his research concluded that EFs skill is one of the most important aspects of ability for someone success in the twenty-first century [2]. His findings also highlighted the importance of understanding and increasing EF on childhood and adolescence.

Benavides-Nieto, Romero-López, Quesada-Conde, & Corredor stated that in several studies there is relationship among EFs deficits, psychopathological and difference behavioral disorders [3]. Research on EFs development in children has increased in the past decade. The increasing of social competence and academic achievement are also related to EFs. The study tried to understand the relationship between executive functions and social competence in 5-year-old

children. It's involved 119 students (60 boys and 59 girls) from the age of 5 years who were enrolled in the last year of kindergarten in Granada. The result showed that there was a positive relationship between social skills and EFs. This fact showed that it was very important to increase EFs in children and learn the factors influenced.

One of the most important focuses on research about EFs is the relationship between EFs development and school readiness and academic achievement. Studies that included in the Abreu Research Topics provide further evidence of the value of EFs predictions in academic learning, and especially reading [4]. Critically, they also clarify the importance of the EFs process for children's mathematics learning, and show how the role of EFs can increase when children in playgroup to kindergarten [5] and then decrease in adolescence [6]. Some findings are mapping the effect of EFs on academic learning are very important for designing effective interventions that target strategic time points in their development. Existing research indicated that the training program can effectively improve academic achievement [7], although socio-environmental factors, such as housing conditions, can impact the effects of cognitive intervention in children [8].

Cognitive development that related to executive function in each child is sometimes not as expected by parents because of several influencing factors such as heredity, environmental factors, maturity factors and the like. Therefore, the best and most enjoyable stimulation for early childhood is needed to improve executive functions from an early age, such as through dance creativity activities and developing self-confidence.

Giguere, in his research from two schools in the United States found that twenty-seven sub-categories found good improvement results in dance creativity, such as making dance movements or organizing dance movements [9]. It was proven that cognition processes work well during the creative process in the dance, and there is a detailed description of the characteristics of the cognitive activity. The next finding is, regarding some cognitive strategies involved in the creative process in dance, as seen in this study, it requires a group to carry out dance creativity activities, and cannot be done only by an individual. The last finding is that children involved in dance creativity are involved in communication, not only verbal and nonverbal communication, but also forms of verbal and non-verbal communication which is termed as "active

discussion" research. These appear as subcategories in several research categories

Recent experimental research indicates that both acute and chronic aerobic exercise promote children's executive function. Overall, engagement in physical activity (or more specific aerobic exercise) is also a cognitive activity that recruits higher-order brain regions and requires adaptive thinking. Aerobic exercise, including motion and song, then, may be an invaluable part of children's development, and these findings should persuade parents and educators to reconsider the importance of these exercise [10].

Based on various problems regarding the executive function of early childhood that have been explained, it is important to conduct a research on the influence of dance creativity activities on executive functions of early childhood. The purpose of this study is to find out the influence of dance creativity on executive functions of early childhood.

II. LITERATURE REVIEW

A. Executive Functions (EFs)

EFs the cognitive ability needed to control and regulate thoughts, emotions and actions. Separation is often made between cool components from EFs which explicitly involve cognitive abilities such as arithmetic mental abilities (mathematical numeracy skills) and hot components that reflect the ability to regulate emotions such as being able to control anger [11]. The executive function is basically located in the prefrontal frontal lobe area with many connections between neurons to the cortical, sub cortical, and brainstem areas. The executive system is mediated by various tissues in the frontal, parietal and occipital cortex, thalamus, and cerebellum. It is related through a series of circuits that connect each region of the central nervous system. Each circuit regulates special functions. Circuits that are very responsible for coordinating executive functions are located in the frontal lobe [12].

Scientific evidence of the development and consequences of executive functions in the early years of human life convey three important messages. First, executive function skills are important structures in the brain for early development of both cognitive and social capacity. Second, both normative differences in the nature of individual development and the impact of difficulties will significantly affect the development of EFs for each child. Third, several interventions focused on supporting the development of certain EFs skills have demonstrated at least short-term effectiveness, with evidence also emerging that EFs might have an impact on other aspects of learning as well [13]. Kuhn suggested that EFs involves cognitive activities at a higher level such as reasoning, making decisions, monitoring critical thinking, and monitoring one's cognitive development [14,15].

Based on several expert opinions, it can be concluded that EF is a cognitive control which is a set of cognitive processes (including attention control, inhibitory control, working memory, cognitive flexibility, reasoning, problem solving, and planning) needed for cognitive control of behavior, namely the ability to choose and successfully monitor behavior that facilitates the achievement of certain chosen goals.

B. Dance Creativity

Dance creativity for early childhood is an activity that involves exploration of movement. The dance movement is arranged according to the important and the closest themes to the child's daily life. The emphasis on children's dance creativity is to hone the child's sensitivity and aesthetic experience. Early childhood education institutions can provide a real experience for early childhood to become more aware of the movements they see and learn in the world around them, try it for themselves, and pay attention to how it feels to move or dance [16].

Stinson also said that dance provides an opportunity for early childhood to learn about themselves and show how they feel about people, objects, and phenomena [16]. Purcel explained that dancing benefits early childhood in three main developmental aspects, namely, psychomotor development, affective development, and cognitive development. The benefits of each new movement that learned by children provide a lot of information to children about their body's abilities. In the same way, when children learn to dance, they learn how their body works, they also learn how they feel at work. Body movements are always a way of communicating feelings. Creative movements in dance are a function of the body's biological rhythms through dance. Children develop self-control, especially in reactions to feelings such as anger, fear and joy. Dance can also provide a means to communicate feelings and be successful in sharing those feelings. Children always feel successful with their expressions and begin to appreciate differences. Besides, children learn about personal space versus shared space (in dance formations) so that help children to practice sharing ideas and compromise through invaluable skills in the process of education for each child [17].

The synthesis of dance creativity activities is an exploratory guide to movement concepts that designed to increase children's awareness and understand the experience of physical movements, which children are at the centre of. Creativity involvement and challenges in doing dance are part of every valuable experience for children.

III. METHODOLOGY

This study used quasi-experimental method with data collection techniques through questionnaires on 50 respondents in the Central Jakarta. The respondents were five-to six-year-old-children which are in kindergarten level. The samples were obtained using multistage cluster random sampling technique. The data was analyzed by using statistical analysis of paired t-tests calculated by the SPSS program.

IV. RESULTS AND DISCUSSION

A. Result

The results of data analysis on 50 respondents before and after the experiment of dance creativity activities can be seen in the table below:

TABLE I. PAIRED T-TEST SAMPLES STATISTICS

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	pre	82.5800	50	5.81374	.82219
	post	1.0908E2	50	15.76853	2.23001

The data in the table above shows the normal standard error so that it is said that the data error rate is low and can be used for paired t test.

TABLE II. PAIRED SAMPLES T-VALUE

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	pre - post	-2.65000E1	14.19866	2.00799	-30.53522	-22.46478	-13.197	49	.000

If t hit = -13.197

t table = 2.660, Therefore

-13.197 > 2.660 → t hit > t table, H₀ is rejected means H₁ is accepted. Therefore there are significant differences between before and after doing dance creativity activities.

TABLE III. PAIRED SAMPLES SIG (2-TAILED)

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	pre & post	50	.441	.001

If using Sig (p-value) Sig. (2-tailed) = 00,1 then, 0,00 < 0,01

B. Discussion

The findings in this study note that before dance creativity activities were applied, children's EFs were quite low; this was related to a learning system that was less varied and less attractive to children. Children often have difficulty in short-term memory, lack of self-control, such as not understanding the voice used inside or outside the classroom, difficulty solving problems and lack of attention. This happened because executive self-control at an early age is varied, fragile, and bound to external stimulus situations with increased stability achieved between the ages of 18 and 30 months [18]. In preschoolers, executive functions can be distinguished by using tasks that are appropriate to development, as adapted from cognitive development of neuroscience. For example, working memory, flexibility, and inhibitory skills can be discriminated against in preschool children [19]. The development of research on early childhood executive function shows more and more evidence that different neurological and behavioral disorder in preschoolers produce a unique pattern of executive dysfunction [19-23].

The second finding on the results of the post-test of children after being given dance creativity activities was that the FEs of children increased significantly. Basically every child likes music and moves, this is in accordance with the findings of the study from Ilari that in more spontaneous rhythmic movements found the response of children to music and regular stimuli of metrics rather than speech [24]. Similarly, the results found in the study of Williams et al. investigated the home music activities of parents of 3031 Australian children who participated in Growing Up in Australia: the Longitudinal Study of Australian Children Studies (LSAC). The findings of Williams et al. research show that home music activities between parents and children play a role in supporting children's development [25].

It is also supported by research conducted by Putranto, there is a significant increase in short-term memory function after the implementation of brain exercise 3 times a week for 2 months in children from low economic status families [26]. FEs can be improved through dance creativity activities that involve motion and song. Research Moreno et al., has designed training methods that can be used to improve mental health and to test the efficacy of educational programs [27]. However, several studies have shown a broad transfer of such training to performance in cognitive activities that are not trained. The findings report the effects of two interactive computerized training programs developed for preschoolers: one for music and one for visual arts. After only 20 days of training, only children in the music group showed improved performance on measures of verbal intelligence. Music easily stimulates children to spontaneously move in creative dance. 90% of the sample showed this increase. The findings showed that transfer of high-level cognitive skills in early childhood can be done so that exploration of dance movements produces many variations of creative dance movements.

Research by Janus, Lee, Moreno, and Bialystok has identified an increase in performance on executive control tasks for bilingual in those who have music training [28]. Using an intervention design in 57 children aged 4-6 years (matched for age, maternal education, and cognitive scores) with instruction programs in music or French conversation in 20 days. The results of the discussion in terms of the benefits of executive control arise from language and music training. The research provides evidence that music in dance creativity activities can affect children's EFs.

V. CONCLUSION

Based on the findings and discussion of the results of the study, it can be concluded that dance creativity activities can affect the Executive Functions (FES) of early childhood. Furthermore, research can be conducted involving other variables that affect the Executive Functions together with dance creativity activities.

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