

Original Article

The Association between functional-emotional development and creative thinking in preschool children

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Abstract

Introduction: Considering that creativity is essential to adapt to today's complex world, identification of the affecting factors on the development of this way of thinking is one of the necessities of research area. Hence, the aim of present research is to investigate the relationship between emotional-functional development as a potential effective factor and the formation of creative thinking.

Methods: 80 children and their mothers were selected from preschools of Mashhad City based on cluster sampling method. The level of creativity among children was measured through Torrance Test of Critical Thinking (TTCT: visual B-form). The mothers of children in sample group answered the Greenspan Social- Emotional Growth Chart.

Results: Data analysis showed a significantly positive association between functional-emotional development and aspects of fluidity, expansion and innovation in two groups of male and female preschool children as verified in creativity test. The results of simple linear regression analysis also showed that functional-emotional development can predict 0.05 percent of variance in creativity. Based on the results of t-test for independent groups, there was no significant difference in the level of functional-emotional development and creative thinking among male and female preschool students.

Conclusion: The findings of present study supports the theory of Greenspan (1997) regarding the significance of functional-emotional development in integrated development of human kind and emergence of higher levels of thinking.

Declaration of Interest: None.

Keywords: Functional-emotional development, Creative thinking, Preschool children.

Introduction

One of our wishes is to be more creative, Most of us like to be an innovative novelist and write interesting stories, a physicist or mathematician who provides a new understanding of the universe (1). Creativity is the ability to

introduce novel ideas, conceptions, inventions or subjects by experts which have scientific, aesthetic, social or technological values (2). Up to now the importance of creativity in development of social, psychological and physical development is proved in area of research related to academic

achievement (3, 4). Lots of studies were concerned with influential factors on formation of creative thinking (5). Amabile (1989) believed that creativity is the result of interaction between the individual and the environment (6).

Bronfenbrenner (1979) explained development of children in a wide system including parents, teachers, colleagues, etc. He believed that familial setting provides an important environment for growth of children and determines the interactive characteristics between mother and child, learning language, adaptability, self-control, self-expression and sense of social competence (7).

From development viewpoint, parents have a lot of opportunities to nurture creativity of their children through game and education (1).

Longitudinal studies show that distinctive transformational experiences (i.e. creative parents, order of birth, age interval among children, etc.) is associated with creativity (8, 9). Russ and Schafer (2006) found out that creative children have supporting parents which allow children to explore their environment and interact with their parents (9).

Greenspan (1997) introduced a modern approach in psychology of development of children with a comprehensive and integrated approach to developmental phenomena. This approach is known as developmental-individual differences model based on Developmental, Individual Differences, and Relationship based (DIR). It is consistent with ecological theory and emphasizes the significance of interaction with social environment (10). This model discussed three effective and dynamic factors in steering human development which include development position of the child, personal differences in processing, sensual balance and relationship of children with their care-takers and other individuals (11). So, DIR approach considers development as a result of dynamic interactions of Biological, Psychological and Social dimensions of humankind which form within stages of "Functional - Emotional Development". In these stages, capacities of regulation, attraction to human beings, mutual social relationships, formation of ideas and bridging between ideas as basic abilities of human being are created (12). Since the time of birth, babies involve in emotional interactions with care takers and experience a developmental stage which results in generation of high-level

thinking structures such as creativity. Developmental, Individual – Differences, Relationship based (DIR) calls this developmental ladder as functional-emotional development stages. In this path, not only biological characteristics and experience are associated but also interact differently in different stages of development. In this theory, creativity is a developmental phenomenon just like other human characteristics. As Greenspan (2004) believed, if increase of creativity is targeted from first experiences of learning, there is more opportunities for nurturing a creative child (13).

Stages of Functional-Emotional Development In Greenspan's theory, due to the role of emotions in steering and integrating behaviors, consistent development of human being is discussed in "Stages of Functional-Emotional Development".

These levels include the following:

- 1) Common Attention and Regulation
- 2) Engagement and Intimacy
- 3) Two-way Intentional Affective Signaling and Communication
- 4) Shared Social Problem Solving
- 5) Creation and Usage of Ideas
- 6) Building Bridges between Two or More Ideas (14-17).

If based on DIR approach, creativity is regarded as a developmental phenomenon which emerges from interactions of biological-mental dimensions and improves with functional-emotional development (18-19). One could expect that children of higher functional - emotional development have more creative thinking. In this regard, the present study aims to investigate the association between functional - emotional development and creative thinking.

Methods

The design of present research is developmental in terms of objective, and descriptive-correlation in terms of data collection method. The statistical population includes the mothers of children aged 4-6 years who attended the kindergartens of Mashhad in the 2013-2014 academic year. It should be pointed that this age group were selected regarding the age condition required for the creativity test and also the availability of a bigger sample size. For sample selection, multi-stage cluster sampling was used. Hence, first 3 districts of Mashhad were selected randomly, then 6 kindergartens were chosen from every

district and the questionnaires were distributed among all mothers of the children aged 4-6 years old. In general, 80 mothers were included in the sample having the necessary conditions (minimum education of diploma, their children must not be mentally disabled, and are willing to cooperate); and mothers without these conditions (education lower than diploma, the child was above 6 or below 4 years, and were not cooperative) were removed.

Greenspan Social- Emotional Growth Chart used for measuring Functional-emotional Development. This questionnaire was introduced by Greenspan (2002) to analyze the level of functional-emotional development of child renunder 48 months and it consists of 35 items. Parents or caretakers score questions which have been rated based on Likert scale and formatted into six choices (from 1= does not have this behavior yet, to 5=has this behavior). In a study by Breinbaur et.al (2004), the concurrent validity of this scale with Billy-III scale in subscales of delicate and large movements was 18 percent. It was 23 percent for cognition, 25 percent for accepting interaction, 21 percent for expression of interaction and 25 percent for language. In Billy-II, mental, motion and behavioral rate measurement subscales were reported as 25, 24 and 38 percent. The reliability of this scale, as in Wechsler Intelligence for Children (WISC), in subscales of vocal, operational and total intelligence quotient were 0.53, 0.27 and 0.43. Internal Reliability was reported as 0.90 (7). Internal validity of Persian version by Karimian (2013) was reported favorable. Ferther, the total reliability coefficient was reported 0.94 (20).

Among different tools of measuring creativity, Torrance test of creative thinking is most commonly used in educational studies and measurements (21). These tests have two A and B forms, the present study use form B. This visual

form has three distinctive sections which are designed based on four characteristics of divergent thinking as discussed in structural intelligence model of Guilford which are fluency, flexibility, elaboration and originality. Doing each task takes 10 minutes and the total required time is 30 minutes. Numerous studies by Torrance (1974) showed reliability coefficient of 0.75 to 0.85 in different times of implementation. A review of reliability of this test by PirKhaefi (1994) in a sample of students showed that reliability coefficient for the whole test is 0.80. Torrance tests, especially form B (visual), are regarded as reference tests of creativity (21- 24). The Persian version of TTCT used by the researcher in this study has been translated and modified by Abedi (1993). Using the test-retest method, he gave the test to the students of secondary schools in Tehran and gained the following reliability scores: fluency: $r= 0.85$, flexibility: $r= 0.85$ originality: $r= 0.82$, and elaboration: $r= 0.80$. Further, the total reliability of the test was reported to be between 0.80 to 0.90. Moreover, Abedi (1993) calculated the validity of the test through concurrent validity method. He administered both the Persian and the original Torrance Test of Creative Thinking simultaneously and achieved meaningful and significant reliability correlations of the four subscales between the two versions of creativity test; for example, $r= 0.497$ for originality subscale and $r= 0.468$ for fluency (25-26).

Results

To investigate the association of function-emotional development and creativity, correlation coefficient of each level of creativity and functional -emotional development were calculated.

Table 1. Pearson Correlation Coefficient between Functional-emotional Development and Level of Creativity

Levels of Creativity	N	M	SD	Correlation Coefficient	P
Fluency	80	12.96	5.09	0.25	0.02
Elaboration	80	38.84	26.59	0.23	0.03
Originality	80	20.09	9.71	0.27	0.01
Flexibility	80	10.71	3.94	0.16	0.14

The correlation between functional-emotional development and level of creativity has a

coefficient of 0.16 to 0.27 which shows the positive correlation between functional-emotional

development and creativity. This correlation is significant for level of fluency, elaboration and originality. Due to the fact that primary objective of present study is to predict creativity through functional-emotional intelligence, simple regression analysis is used for proper prediction (modified

regression coefficient square=0.05, $P < 0.05$, $F = 5.33$). The results of simple regression of creativity based on functional - emotional development showed that functional-emotional development predicts 0.05 variance of creativity.

Table 2. Scales of One-way Analysis of Variance (AVOVA) to Verify Total Significance of Regression Model

	SS	DF	SD	F	p
Regression	9165.11	1	9165.11	5.33	0.02
Remaining	134046.27	78	1718.54		
Total	143211.38	79			

Predictor Variable: Functional-emotional Development; Criterion Variable: Creativity

The results of the above table ($P < 0.05$) shows that the whole model is significant.

Table 3. Scales of Simple Linear Regression Analysis

Model	Non-standard Coefficients	Standardized Coefficients	SD		
	B	Standard Error Criterion	β	T	p
Constant Value	28.31	23.95	-	1.18	0.24
Development	0.42	0.18	0.25	2.30	0.02

Dependent Variable: Creativity

The results of simple linear regression analysis showed that standardized Beta coefficient for evaluation of the share of each variable in the model generated some definite values. The values of t and p show the effect of each predictor variable. These values show the significant

association between predictor and criterion variables. In this regard, functional-emotional development is a significant predictor of creativity ($\beta = 0.25$).

Table 4. T Test of Independent Groups for Determination of Difference of Functional-emotional Development between Male and Female Children

Sex	N	M	SD	t	DF	p
Female	36	129.50	21.13	0.12	78	0.19
Male	44	128.81	30.56			

Table 5. T Test of Independent Groups for Determination of Difference of Creativity between Male and Female Children

Sex	N	M	SD	t	DF	p
Female	36	87.17	46.36	-0.86	78	0.44
Male	44	78.84	39.37			

Based on the findings of table 4 and 5, there is no significant differences of functional-emotional development and creativity between male and female students. In other words, female and male subjects had relatively equal level of functional-emotional development and creativity.

Conclusion

The world in which we live is rapidly changing and we don't know what kind of problems our children have to deal with but we know that creativity is one part of for problem solving (27).

The secret of persistence, development and improvement of societies, organizations and

individuals is their method of adaptation with surrounding environment and its requirements so that Einstein believed that “creativity is more important than knowledge” (28). Therefore, planning for Fostering creativity is one of the most psychological issues on which many studies have been devoted to it. Diverse theories have been introduced to define creativity and its way of development. In this regard, developmental theories are the most commonly applied theories of creativity which not only help us understand the origins of creativity but also contribute to design a nurturing and suitable environment of creativity. From development viewpoint, personal differences are based on creativity, ability of thinking development in regard to feelings and it originates from internal inclinations of human as shown in the findings of present study. Pay attention to the child's development stage of the child, individual differences and establishment of emotional relationship are preconditions of creation of creative thinking which should be paid attention to from early period of living (28).

In this regard, the findings of this study demonstrate that a significant positive relationship exists between emotional-functional development and creativity in the levels of fluency, elaboration, and originality. According to Greenspan (2006) emotion as “the leader of mind team” is a power which enables us to learn from our surrounding environment. According to Weiss (2000) language, thinking and social skills are learnt thorough interactions which include meaningful emotional exchanges (30). In the learning process, when concepts are associated with emotions they find an emotional load beside the physical meaning in the mind of children and this “dual decoding” helps them to have a better understanding and be able to generalize these concepts. In the present study, it was found that a significant relationship exists among the mean value of emotional-functional development capabilities of people and the subscale of fluency from Torrance Test. In other words, the children with more emotional-functional development capabilities obtained better scores in establishing meaningful relationships between thought and language. Hence, it can be said that when the child has a wide range of emotional experiences, she can create an extension of symbols and meaningful expressions and think about them. However,

when the child lacks such experiences she does not learn how to create the images and symbols which are emotionally meaningful. This child can see the image of a chair and says “chair”, but she cannot say meaningful sentences like “I love that”. Moreover, she will learn reading and rote repetition of words but she is not able to understand the meaning of a story and to think about the motivations of its characters (13).

Moreover, in this research a significant positive relationship was found among emotional-functional development and the subscale of elaboration, i.e. paying attention to the details while doing a certain activity. For explaining this finding it can be said that among the developmental capabilities is the self-regulation capability. The children who have a more developed form of this capability can pay better attention to the stimulators in their surrounding environment, become interested in them, and communicate with them. This finding is consistent, and Baddeley (2012) (31-32). Every child has a unique regulatory-sensory profile; some children are evoked by voice or gentle touch, on the contrary some children show little reaction to deep touch and/or loud voice, while another child may be too reactive and the voice of mentor, the environmental voices, the light and color of space or images disturb her and make her over-excited so she cannot obtain understandable information from the environment or under reacts and cannot receive the voice of mentor clearly. When the child cannot regulate her senses, she would not become interested in the external voices and stimulus around her and does not pay attention to them (33). For children to be creative, they should be calm, focus, and absorb actively the information from experiencing the environment and communicating with others (34). The children who obtained high scores in the emotional-functional development scale have reached to this ability, thus have had a good performance in the subscale of elaboration. On the other side, many researchers have proved the significant relationship among emotional regulation disorders and behavioral, emotional, and social problems, as well as learning disorders (see 32, 35). Thus, paying attention to the processing differences in the development process among children is an important step for

creativity development during the first years of children's life (36).

Another finding of this study indicates that the children with higher emotional-functional development capability obtained better scores at innovation and creating new ideas subscale. As said before, when the meaningful learning occurs through emotional experiences in the environment, the child moves beyond the meaningless rote learning and can think and act in unusual and uncommon ways. Regarding the flexibility subscale, no significant relationship was found among the scores of this subscale and the emotional-functional development capability of children. In this regard we can say that the flexibility subscale refers to the ability of thinking in different ways for solving new problems. In DIR approach the problem solution ability is in the high levels of emotional-functional development and in order to achieve this level of development, the child should master the more primary levels which require spending time and more experiences. The child becomes capable of discovering patterns of acting in different areas while communicating with her parents. The recognition of such patterns involves realizing how objects are related to each other. To see the world in the form of patterns will increase the understanding of child toward how it works and enables her to predict events which also increases the problem solution ability of the child (37). Hence, the flexibility and problem solving abilities require the child to find more patterns in her mind by having more emotional experiences and to use them in the forthcoming situations (38). Little experiences of these children may be the reason of their low scores in the flexibility attribute. In general, it can be said that the findings of this study confirms the integrated view of DIR approach on human capabilities and the subject of emotion, and demonstrates that we can foster creativity through affection from the very first days of children's life, and the communication which fosters creativity is not a serious, inflexible, and mechanical one. Enjoyable emotional interactions attract the child to relate to her surrounding world. Looking with the child, moving with her, discovering her favorite toy, and following her natural interests forms her

first creative relationships with others. Emotional exchange, challenging the child's ideas, stimulating the initiation and problem solving ability, encouraging the child to do symbolic games, creative meaningful use of language, and posing logical questions in line with child's interests can be good predictors of creative thinking development of children.

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