A Comparative Study of Creativity and intelligence of Students in Wechsler Intelligence Scale and Children's Apperception Test

Leila hamivand

MSC. in Exceptional Children Psychology,
leylahamivand@yahoo.com

Abstract: The aim of this study is to comparatively study these problem: whether there is a relationship between creativity and intelligence.The method of the research is descriptive. The statistical society of the research includes all students of primary schools in Tehran city in 2010-11 years. 60 students contributed in the study to be selected for available sampling. The Instrumentations of data collection was Wechsler Intelligence Scale for Children-Revised (WISC-R) and Children's Apperception Test(C.A.T). The data was analyzed by Pearson Product-Moment Correlation Coefficient(Pearson's *r*).Results indicated a statistically significant correlation between creativity and intelligence of students . This study support threshold theory.
[Leila hamivand, Janet HashemiAzar, GholamrezaSarami. **Comparative Study of the Stories of Gifted and Creative Children in C.A.T Test .** *J Am Sci* 2012;8(8):184-188]. (ISSN: 1545-1003).
http://www.jofamericanscience.org. 28

Keywords: Creative Child, Gifted Child, Children's Apperception Test(C.A.T)

1. Introduction

Aducators and psychologists have been interested in the relationships among creativity and intelligence for many years.Some of the confusion may be found in the definitions and understanding of creativity and IQ. Existing literature illustrates disagreement in the true meaning of giftedness. Research on the relationship between intelligence and creativity is contradictory and inconclusive (Brown, 1989; Kim, 2005; Michael& Wright, 1989; Sternberg, 1999). A sample of research revealed that creativity is an independent construct from intelligence (Guilford, 1950; Sternberg, 2003; Torrance, 1975; Wallach & Kogan, 1965), while other research showed a weak to moderate relationship (Getzels & Jackson, 1962; Guilford, 1967; Torrance, 1962; Wallach & Kogan, 1965; Yamamoto, 1964; Runco & Albert, 1986). Still, other research supported the Threshold theory (Barron, 1961; Child & Croucher, 1977; Getzels & Jackson, 1962; Plucker & Renzulli, 1999; Shaw & DeMers; 1986; Torrance, 1962). Threshold theory holds that a positive relationship exists between creativity and intelligence, but only up to an intelligence quotient (IQ) of 120; above the 120 threshold, there is no relationship. The Threshold theory is a curvilinear rather than linear relationship. In other words, higher intelligence does produce higher creativity, but only up to an IQ of 120. Above an IQ of 120, creativity is a distinct mental ability, separate from intelligence. Thus, Threshold theory speculated that intelligence is sufficient but not necessary for creativity. (*Hlasny, 2008).* Torrance (1964) concluded that highly creative students with lower IQ scored equally well on standardized tests of academic achievement as low creative students with higher IQ scores.

According to National Association for Gifted Children (2008), current federal definition of the giftedness is that "gifted students are those who "give evidence of high achievement capability in areas such as intellectual, creative, artistic, or leadership capacity, or in specific academic fields, and who need services or activities not ordinarily provided by the school in order to fully develop those capabilities". Rezulli (2002) believes that giftedness is defined as the relationship between higher than average capabilities, high levels of task commitment, and high levels of creativity.

One characteristic, other than IQ, that society has come to value over the past 50 years is creativity. The definition of "giftedness" is being updated to include individuals with high creative potential rather than just high IQ (e.g., Georgia Department of Education; Renzulli, 1986). Thus, measures of creativity are becoming increasingly important. Creativity can be defined as the capacity to produce novel, original work that fits within contextual constraints (Lubart, 2004).

According to Lubert, et al (2010), creative talent is usually measured by divergent thinking tasks like Torrance Creative Thinking Test that includes 4 elements: a) fluidity (number of the ideas); b) originality (generating unusual ideas); c) extension (extending the ideas); d) flexibility (generating ideas in different ways).Traditional tests of identifying gifted students fail to identify creativity (Mann, 2009).

Guilford (1950, 1962, 1966, 1968) hypothesized that creative individuals possess

divergent thinking abilities including idea production, fluency, flexibility, and originality. Guilford also argued that traditional intelligence tests (such as the Binet IQ test) do not measure some or all of these creative abilities. Guilford's theories spawned an array of divergent thinking (DT) tests such as the Torrance Tests of Creative Thinking (TTCT), Wallach & Kogan Divergent Thinking Tasks, and Guilford Divergent Thinking Tasks. It also spawned research that attempts to correlate scores on these DT tests with creative potential. a recent meta-analysis indicated that the relationship between creativity test scores and IQ scores may be negligible which undermines the threshold theory (Kim, 2005).

However, there is no direct relationship between intellectual ability and creative productivity beyond average ability. Children usually demonstrate "unevenness" in their giftedness profile- with their strengths in one of the both creativity and intelligence far outweighing their abilities in the other. Sternberg (2001) suggests that creativity is a trait that is naturally hard to define, but can be linked by the common idea that things that are creative are both novel and high in quality. He uses this basis to suggest that while intelligence plays an important part in the role of creativity, it is not the end all of what makes a person creative. According to the study of the differences in brain activities (Jausovec, 2000), creativity and intelligence are different abilities that involve different areas of the cerebral cortex while solving problems .In the meta–analyses of the relationship of creative achievement to both IQ and divergent thinking test scores (Kim, 2008), findings show notably lower relationship between IQ test scores and creative achievement than between divergent thinking test scores and creative achievement.

Therefore, the relationship between creativity test scores and IQ scores is negligible, and high levels of intelligence do not necessarily predict creative behavior. Even though robust evidence of a relationship between high intelligence and creativity is lacking, developing creative–thinking skills in intellectually talented children remains a valued goal among some teachers of gifted programs (Bain, Pappas, & Bourgeois, 2003).

Longitudinal studies on the development of creativity tend to focus on assessing the creative abilities of elementary school students.(Claxton,2005)

Virgolim (2005) studied the relationship between intelligence and creativity in Brazilian students identified as gifted and talented. The researcher used the Raven's Progressive Matrices (RPM) to measure intelligence and used the Test for Creative Thinking–Drawing Production (TCT-DP) to measure creativity. Results indicated a positive significant correlation (r = .21, p < 05) between intelligence and creativity for the total sample (N = 100).

Yoon (2005) compared the intelligence and creativity of Asian American (n = 71) and Caucasian (n = 75) gifted students, grades 4-6, in the Philadelphia School District, as well as examined the two groups for gender differences. Participants completed the Standard Progressive Matrices to assess intelligence and the Torrance Tests of Creative Thinking to assess creativity.Overall, results indicated no statistically significant differences in intelligence and creativity for race or gender. Specifically, to investigate whether differences existed in creativity between Asian and Caucasian gifted students, the researcher used a two by two Analysis of Covariance (ANCOVA), with age as the covariate.

Accordingly, Creative-productive giftedness results in the production of original material and tangible products that are intended to be shared with and to impact others (Renzulli, 2002). Cropley (2003) suggested that the development of creativity and intelligence reached a peak during adolescence and early adulthood.

There is usually an interaction between the two types. Also, other research indicates that creative-productive giftedness is not all that closely tied to intelligence and traditional tests of IQ (Getzels & Jackson, 1962; Mackinnon, 1962; Stein, 1968; Wallach, 1971). Sternberg (1999) found that the definition of creative goes beyond of the realm of cognitive intelligence and that individual. Also, developmental differences have a large effect upon the results of creativity, much more than the effect they have upon the results of cognitive thinking.

Regarding the reports about gifted and creative students, the researchers intend to study these problem: whether there is a relationship between creativity and intelligence.

2.Methodology, statistical society, sample, and selection method

The method of this research is descriptive. The statistical society includes all primary students of Tehran city in 2010-2011.

Sample of the research includes 60 female and male primary students of Tehran (this amount was selected as the sample due to the difficulty in administering the tests and researcher's limitations). Sampling method was available sampling.

2.1. Data collecting instruments

2.1.1. Wechsler Intelligence Scale for Children (summarized form)

Revised intelligence scale for children includes a set of intelligence composite tests that is administered individually. The scale provides 3 different scores for IQ. In order to saving the time in measuring the IQ, some different short forms have been written. In these short forms, some selected subsets are conducted or some easy items are deleted in order to shorten the time of the test. One current short forms of the test is to conduct subtests of vocabularies and designing cubes. Average time of the test is 20 minutes. Correlation between the test and complete scale of IQ is usually %90. In two-thirds cases, calculated IQs will be different around 7 scores with the real IQs, and in one-thirds of the cases, the calculated error will be 8 score or more. Vocabularies and cube-designing are conceptually good and suitable tests because both are good indexes of g factor and they are largely reliable and include subtests of both verbal and scientific scales (Marnat, 2003).

2.1.2. Children's Apperception Test (C.A.T)

Children's Apperception Test (C.A.T)is an individually administered projective personality test appropriate for children aged three to 10 years.A series of pictures are presented and children are asked to describe the situations and make up stories about the people or animals in the pictures. The test includes just 10 cards. The reason of using 10 cards is that the children have shorter attention span and so lesser cards have to be administered on them. Moreover, it is believed that the children replicate the pictures of animals easier than the pictures of human. The responses of the subjects to C.A.T include meaningful and complex verbal themes. The quantitative analysis of these themes is difficult due to the complexity of the themes. Thus the interpretations usually depend on the qualitative analysis of the contents of the stories. This issue causes the most methods of determining the validity of the test encounter serious problems. But adopting some quantitative solutions of scoring and grading scales can help determining the validity of the scoring by different administrators with a relatively successful manner. The validity of scorers in different scoring systems has been generally good (between 37-90 percent) where in most cases, a high coefficient change rate has been reported. In studies on determining the criterion validity of the test, there has been a parallel between positive and negative results. In interpreting the test, some characteristics like main subject or theme of the story, main hero, and main needs and drives of the hero are measured (Groth-Marnat, 2003).

2.2. Data collection method

To collect the data, with permission form Tehran Education Office, the researchers administered Wechsler Intelligent Tests. In this regard, we referred to 3 girls and 3 boys' primary schools in zone 3 of Tehran city. The tests were administered on 60 girl and boy primary students. Then. administered (C.A.T) test according to following instruction:

"This is storytelling test. I have some pictures to show you. I ask you to tell a story about each of them. Say what has happened before, and what is happening now in it. Say what the persons of the picture think about, and how they feel and what will happen in the end of the story. Tell any story you want. Do you get it? Ok. This is the first picture. You will have as much time as you need to create your story. I wait your good stories".

all responses of the subjects were recorded. Then the told stories were analyzed and discussed according to following instruction:

score 0 for being stereotyped (not creativity)and score 1 for originality and innovation of the stories(creativity).creativity score was from 0-10. stereotyped descriptions elicited from Belack(1993)scoring.

3.Statistical analysis method

Statistical analysis method included Pearson Product Moment

Correlation to investigate the relationship between intelligence and creativity scors.

4. Research Findings

According Table 1, linearity relation is between creativity and intelligence

Table 1.camparison of linearity relations of creativity and intelligence

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
intelligence Creativity	Between Groups	(Combined)	1476.022	8	184.503	.908	.517
		Linearity	816.664	1	816.664	4.019	.050
		Deviation from Linearity	659.358	7	94.194	.464	.856
	Within Groups		10362.661	51	203.189		
	Total		11838.683	59			

Table 2. Measures of Association

	R	R Squared	Eta	Eta Squared
intelligence* Creativity	.263	.069	.353	.125

The correlation coefficient between intelligence and creativity is
($r = .26$, $p < .05$)
Therefore Correlation coefficient is low .

Table 3. Correlations

		intelligence	Creativity
intelligenc	Pearson Correlation	1	.263*
	Sig. (2-tailed)		.043
	N	60	60
Creativity	Pearson Correlation	.263*	1
	Sig. (2-tailed)	.043	
	N	60	60

*. Correlation is significant at the 0.05 level (2-tailed).

5. Discussion and conclusion

Most longitudinal studies of creativity have focused on the divergent thinking skills of students rather than the affective changes that impact the development of creativity. The majority of recent studies have focused on elementary school-age children and have not extended into adolescence. This study attempted to address connection creativity and intelligence in primary Students.researchers evaluate creativity by Children's Apperception Test. A correlational analysis using a Pearson Product-Moment Correlation Coefficient (Pearson's r) answered the research question, "What is the relationship between intelligence and creativity in students?" This finding provide further evidence supporting the literature that documents the dependence between intelligence and creativity However, it is consistent with the Threshold theory The result of this study showed that creativity and intelligence scores are connected. Analysis of the ANOVA reflected linear connection in creativity and intelligence scors . however, Correlation coefficient was low .The interesting finding of this study was the increase in intelligence scores result the increase in creativity scors. Research has shown that the relationship between creativity test scores and IQ scores is insignificant.Davis and Rimm (1998) found that, a base level of intelligence is essential for creative productivity, but above a threshold (about IQ = 120), there is virtually no relationship between measured intelligence and creativity. This finding is not consistent with Davis and Rimm study(1998). Additionally, many researchers agree with the threshold theory, which assumes that below a critical IQ level which is usually thought to be about 120, and which indicates that there is some correlation between IQ and creative potential,and above the threshold there is no correlation (Barron, 1961; Getzels & Jackson,1961, 1962; Guilford, 1967; Guilford & Christensen, 1973; Hall, 1972; MacKinnon,1961, 1962, 1967; Simonton, 1994; Walberg, 1988; Walberg & Herbig, 1991;Yamamoto, 1964). However, a recent meta-analysis indicated that the relationship between creativity test scores and IQ scores may be negligible which undermines the threshold theory (Kim, 2005).This study confirms threshold theory. In answering to this question that" Are children who are highly intelligent very likely to be highly creative?"This study responds positively.

There are several possible explanations for these results. First, results seem consistent with Guilford's (1950) Structure-of-the-Intellect Model, when he stated, "Creativity and creative productivity extend well beyond the domain of intelligence" . Runco (2004) brilliantly declared, "everyone is creative". , Torrance (1974) indicated that intelligence does not solely predict future achievement. Creativity has moderately strong predictive validity. The independence between intelligence and creativity provide further evidence for this argument. An individual can be creatively gifted and/or intellectually gifted. This research has been limited to the students of primary schools of Tehran city. The research has been limited to Wechsler Intelligence Scale for Children (summarized form) to determine IQs of the students and it has been limited to Children's Apperception Test (C.A.T) to determine the creativity scores of the students. the researchers suggest that the educational system uses creativity score to identify gifted students and providing them with special services. Since many teachers are not familiar with the traits of creative students and at the most occasions, creative students not only are not identified as gifted, but they are labeled asabnormal students, we suggest that the teachers need training courses to increase their knowledge about the creativity, creative students, and the way of nurturing their creativity, especially their verbal creativity in primary schools.

Corresponding Author:
Leila hamivand, MSc. in Exceptional Children Psychology, leylahamivand@yahoo.com

References

1. Bain, S. K., Bliss, S. L., Choate, S. M., & Brown, K. S. (2007). Serving children who are gifted: Perceptions of undergraduates planning to become teachers. Journal for the Education of the Gifted, 30(4), 450–478.
2. Bellak,L.(1993).The T.A.T,C.A.T and S.A.T in clinlcal use(5thed).NewYork:Grune&Stratton.
3. Brown, R. T. (1989). Creativity: What are we to measure? In J. A. Glover, R. R. Ronning, & C.R. Reynolds (Eds.), Handbook of creativity (pp. 3-32). New York: Plenum Press.
4. Claxton, Amy F. , Pannells, Tammy C. and Rhoads, Paul A.(2005). 'Developmental Trends in the Creativity of School-Age Children', Creativity Research Journal, 17: 4, 327 — 335.
5. Cropley, A. (2000). Defining and measuring creativity: Are creativity tests worth using? Roeper Review, 23(2), 72-87.
6. Georgia Department of Education. (2005). Education program for gifted students. 160-4-2-.38.
7. Guilford, J. P. (1968). Intelligence, creativity, and their educational implications. San Diego,CA: Robert R. Knapp.
8. Hlasny ،Jason G.(2008). CREATIVITY: A COMPARISON OF GIFTED STUDENTS. Capella University.
9. Kim, Kyung Hee and VanTassel-Baska, Joyce.(2010). 'The Relationship Between Creativity and Behavior Problems Among Underachieving Elementary and High School Students', Creativity Rese.
10. Kim, K. H. (2005). Can only intelligent people be creative? A meta-analysis. Journal of Secondary Gifted Education, 16, 57–66.
1. Kim, K. H., Cramond, B., & Bandalos, D. L. (2006).The latent structure and measurement invariance of scores on the Torrance Tests of CreativeThinking– Figural. Educational and Psychological Measurement, 66, 459–477.
11. Kim, Kyung Hee.(2008) .'Underachievement and Creativity: Are Gifted Underachievers Highly Creative?', Creativity Research Journal, 20: 2, 234— 242.
2. Lubart Todd .Pacteau, Chantal. Jacquet، Anne-Yvonne . Caroff، Xavier (2010). Children's creative potential: An empirical study of measurement issues. Learning and Individual Differences.
12. Marnat, Gary-Groth (2003), Handbook of Psychological Assessment, Wiley, Fourth Edition.
13. Mann, Eric L.(2009) .The Search for Mathematical Creativity: Identifying Creative Potential in Middle School Students.Creativity Research Journal. 21: 4.338 — 348.
14. Michael, W. B., & Wright, C. R. (1989). Psychometric issues in the assessment of creativity. In J. A. Glover, R. R. Ronning, & C. R. Reynolds (Eds.), Handbook of creativity (pp. 33-52). New York: Plenum Press.
15. Plucker, J. A., & Renzulli, J. S. (1999). Psychometric approaches to the study of human creativity. In R. J. Sternberg (Ed.), Handbook of creativity (pp. 35-61). Cambridge,United Kingdom: Cambridge University Press.
16. Runco, M. A. (2004). Everyone has creative potential. In R. J. Sternberg, E. L. Grigorenko, & J. L. Singer (Eds.), Creativity: From potential to realization (pp. 21-30). Washington, DC: American Psychological Association.
17. Renzulli, J. S. (2002). Emerging conceptions of giftedness: Building a bridge to the new century.Exceptionality, 10(2), 67-75.
3. Runco, M. A. (2007). Creativity: Theories and themes:Research, development, and practice. Amsterdam.
18. Runco, M. A., & Albert, R. S. (1986). The threshold theory regarding creativity and intelligence:An empirical test with gifted and nongifted children. Creative Child and Adult Quarterly,11, 212-218.
19. Sternberg, R. J., & O'Hara, L. A. (1999). Creativity and intelligence. In R. J. Sternberg (Ed.),Handbook of creativity (pp. 251-272). Cambridge, United Kingdom: Cambridge University Press.
20. Sternberg، Robert J.(2006). Creating a Vision of Creativity: The First 25 Years Psychology of Aesthetics, Creativity, and the Arts. Vol. S, No. 1, 2–12.
21. Torrance, E. P. (1962). Guiding creative talent. Englewood Cliffs, NJ: Prentice-Hall.
22. Torrance, E. P. (2007). The Torrance tests of creative thinking norms-technical manual figural forms A & B. Bensenville, IL: Scholastic Testing Service.
23. Virgolim,angela M.(2005). creativity and intelligence:A study of Brazilian gifted and talented students.University of Connecticut.
24. Wallach, M., & Kogan, N. (1965). Modes of thinking in young children. New York: Holt,Rinehart, & Winston.
25. Yoon,song.(2005). Comparing the intelligence and creativity scores of Asian American gifted students with Caucasian gifted students.Purdue university.

6/16/2012