



A Study of Verbal and Nonverbal Creativity (Divergent Thinking) and Intelligence of 10th Class Boys of Different School Boards

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ABSTRACT

We constantly need creativity and intelligence for new and better ideas to solve our problems. The main aim of this research paper is to find out the verbal and non verbal creativity of 10th class students to recognize, develop and act upon the divergent thinking and intelligence they already possess. They recognize and cultivate the inherent creativity in their own and with others classmates, they may identify characteristics of a creative person, develop creative thinking, problem solving and using creative skills using their basic elements of the creative process, examine qualities of a creative environment in real world settings.

Keywords: Divergent thinking, fluency, flexibility, originality, creativity, intelligence

Relationship of divergent thinking and intelligence has a controversial matter. In the lay literature, one often hears about the testing of divergent thinking rather than intelligence. Here we study about the process whereby individuals acquire knowledge from the environment. Thus the term divergent thinking and intelligence refers to the highest level of various mental processes such as perception, memory, abstract thinking, critical thinking, logical thinking, creativity, reasoning, problem solving as well as the more interactive and control processes related to brain executive functions. The components within the domain of divergent thinking represent the relationships among sub system of the cognitive domain. To know the comprehensive cognitive functioning, we may comprehend the performance of the students in the creative functions. Psychologist has considered various domains of divergent thinking and intelligence and attempted to measure them. In contrast to divergent thinking and intelligence that is distinguishes between verbal and non-verbal perceptual organization of cognitive process

or creativity. The development of the various components underlying divergent thinking and intelligence does not occur at the same pace. During infancy and early childhood attention and perception are the most rapid developmental components, while in later childhood and adolescent, high order linguistic abilities are acquired, in creative function divergent thinking and intelligence are the important components and they are special and executive elements due to the pattern evolving in differentially emerging abilities. Such outcomes may have adaptive or maladaptive significance for student functional adjustment. These creative talent need definitely to be honored and cultivated in India.

REVIEW OF RELATED STUDIES

Carl Rogers (1969) commented; "not only individual adjustment and group tension, but international annihilation will be the price we pay for a lack of creativity and intelligence." This seems to be somewhat general acceptance of the idea that what offer is called "divergent thinking" is one of the

key elements in creativity. This process is more accurately divergent production, since it is a matter of generating alternative items of information to meet a given revising information, a flexibility that provides the basis for originality. Divergent thinking, or what Guilford (1950, 1968) called divergent production, is more than a metaphor. In fact, one reason the concept is so attractive is that it leads directly to testable hypotheses and allows reliable assessment of the potential for creative thoughts. Bruner, (1962) argues that man's creative faculties restore his dignity in computer dominated age. Jackson (1962) regards it as one of the highly valued qualities. Considering creativity as one's most valuable resource. Toynbee, (1964) prove creativity and intelligence into the educational climate in which creative talents are appreciated, nourished and nurtured in the nation. Guilford, (1967) People with intelligence below average intelligence have little chance of being very creative; those with intelligence above the threshold may have the potential of high creativity but it is not related to their IQ level. Torrance, (1969) recognize development of creativity is all important for the development of a fully functioning, mentally healthy, well educated and vocationally successful individual. It is because of growing recognition of the importance of creative functioning and there is sufficient evidence of the universality of creativity. Taylor, (1969) "In fact historical record provides evidence that cultures have collapse because of the failure to utilize intelligent imaginative method for solving problems."

In this context Taylor (1972) discussing the work of Arnold Toynbee, the historian, describes the need of the society to utilize its potential creativity and intelligence a matter of survival for any society, majority of mankind's are struggled upward to a better life, America's destiny is the example to help indigent in favor. Guilford and Christensen (1973) assumed a break in the correlation data between intelligence quotient (IQ) and creativity at an IQ level of approximately 120. Below an IQ level of 120, a correlation between IQ and creativity is observed, whereas no correlation is observed at IQ levels above 120. The basic idea of the threshold hypothesis means that high creativity requires high intelligence or above-average intelligence. Above-average intelligence is considered to form

a necessary but insufficient condition for high creativity. Getzels and Jackson, (1962); Guilford, (1967); Fuchs-Beauchamp *et al.* (1993) considered divergent thinking and intelligence as a classical and notable hypothesis. According to this theory, the relationship between creativity and intelligence may vary at different levels of intelligence. . Jaeggi *et al.* (2008) found creativity as a critical for an extensive variety of cognitive activities and is considered to be one of the most important aspects in the learning process. It is closely related to success of career and life, especially in the contemporary complex social environments. Batey *et al.* (2010). Creativity enables people to think about things in a novel manner and facilitate the development of civilization, whereas intelligence helps people solve problems in a logical manner.

Over the last six decades, intelligence has received substantially more academic attention than creativity, However, the relationship between creativity and intelligence remains unclear. Ivcevic and Brackett (2015) investigated the role of openness to experience in the intelligence and creativity relationship. This study was based on questionnaire for high school students, identified a significant interaction between emotional regulation ability and openness to experience and it is revealed that openness can moderate the relationship between emotional intelligence and creativity. Welter *et al.* (2016) suggested that the association between intelligence and creativity was not straightforward and was dependent on a combination of factors, including grade level and gender. Another limitation of our study is the lack of gender balance in the sample; future research can explore the threshold hypothesis with more balanced samples. Furnham, (2016) in Britain and found Cognitive ability was positively but not significantly correlated with divergent thinking (creativity) but significantly negatively with both facet and domain emotional intelligence scores. Shi *et al.* (2017) examined the moderating effect of openness to experience between intelligence and DT with 831 children; the results indicated a significant moderate effect. Intelligence was closely associated with creativity when an individual had a medium openness or high openness to experience.

Divergent thinking

J.P. Guilford first coined the terms of divergent

thinking in 1956 in his words divergent thinking is a thought, process or method used to generate creative ideas by exploring many possible solutions. It is often used in conjunction with its cognitive colleague, convergent thinking, which follows a particular set of logical steps to arrive at one solution, which in some cases is a 'correct' solution. By contrast, divergent thinking typically occurs in a spontaneous, free-flowing, 'non-linear' manner, such that many ideas are generated in an emergent cognitive fashion. Many possible solutions are explored in a short amount of time, and unexpected connections are drawn. After the process of divergent thinking has been completed, ideas and information are organized and structured using convergent thinking or creative process.

Four components of divergent thinking

Divergent thinking is a useful concept for identifying, supporting and measuring creativity and creativity is a process in which man to actualize himself, manipulates internal and external symbols, as creation of illustrative ideas based on his or her knowledge senses regarding people and objects to produce on. The four major components of divergent thinking are fluency, flexibility, originality and elaboration are very useful for an operational concept. It is operational because it can be objectively identified and quantified. This is accomplished through these four major components of divergent thinking. Fluency refers to the total number of ideas, options and solutions generated for an open-ended problem.

This is a very important strength for creativity process because higher fluency implies having more options to choose from. Flexibility is about the number of conceptual categories. The responses generated for any open ended question could be grouped under certain categories or clusters, based on their conceptual similarities are called flexibility and numbers of responses are your flexibility score. Originality is the aspect of created or invented works or ideas and is about statistical infrequency of responses related to the task and these responses are comparing with original ideas, this is called the extended effort to define principles, explanations and these are occurs in brainstorming. Brainstorming is also related to the influence of fluency, flexibility and originality. As you generate

more ideas, you will be more likely to generate more categories of ideas and more original ideas will be considered, but the question arises that, how we understand and support our divergent thinking abilities, namely, fluency, flexibility, originality, and elaboration.

Association of divergent thinking with personality traits

Many psychologists have found that a person high in intelligence quotient alone does not guarantee of creativeness instead of personality traits that promote divergent thinking are more important and is found among people with personality traits such as nonconformity, curiosity, willingness to take risks, and persistence.

Divergent thinking and Intelligence

Intelligence itself is a term with many meanings and referents. While divergent thinking distinction between creativity in achievement, creativity in ability, creativity in disposition or attitude or invent new ideas. the researchers of creativity have used the term "intelligence" variously to refer IQ tests measure, cognitive abilities (including such creativity-related components as divergent thinking abilities, problem-finding abilities, special talents such as musical and artistic abilities, and the ability to access primary process modes of thought by regressing in the service of the ego) and observations (peers, teachers, etc) describe as "intelligence" on the basis of repeated observations of behavior in many situations.

Creative Functioning & Creative Process

Attempts to define and analyze the creative process have been disappointing. The multiplicity of meanings and interpretation have proposes result in a vague and elusive conception of what creativeness entails. Fowler (1956) offered to define creativity and creative process as a term of praise much affectedly by critics. It is presumably intended to mean original or something like that. The following definitions were selected as typical for the diverse mean and interpretations assigned to creativity and creative process.

1. Creativity and creative process is the synthesizing theories of leadership,

empowerment, and new ideas; it is empowering leadership with several intervening variables. (Zhang, 2010).

2. The process of forming new ideas of hypotheses testing and these ideas or hypotheses communicating the result. (Yamamoto, 1961)
3. Creativity is novel work which must be accepted by a group at some point at a time. (Stein, 1960)
4. Creativity is a dimension of personality pertinent to the learning process in general and transcends different subject matter, (Levinger, 1959)
5. An action of mind that produces a new idea or insight. (Gerard, 1946)

Creativity is a process in which man to actualize, manipulates internal and external symbols, as illustrative of ideas, people and objects to produce on. Rhodes (1961) examined forty definitions of creativity and sixteen of imagination, attempted to clarify the meaning and range of behavior which creativeness encompasses, he observed and isolated four stand of creativity as behavior 1. Person 2. Product (ideas) 3. Process 4. Press (the interaction of the environment upon the individual). Each stand has indentified academically, but only in unity to the four stands operates functionally.

In an address in 1962, J.P. Guilford observed that creativity like love, is a many splendored thing, small wonder that few have ventured to define it, a great deal of mist surrounds the words, since a person can behave creativity in many different ways, it is not strange that we have many definitions.

METHODOLOGY

The sample for final investigation consisted of 150 male students from 10th standard in different Convent, Government and Private schools of Bareilly UP India. The psychometric instruments administered to the participants include:

1. Torrance Test of Creative Thinking (verbal and non-verbal)

(A) Verbal Form Test and sub-test: This test consists wholly of verbal tasks and can be used with the subjects of all ages. This test divided into two sub-subjects namely,

(i) Product Improvement Test: The material required for product improvement task includes a small toy dog; a time of ten minutes is placed on writing tests. The subjects are asked to try to think the cleverest, most interesting and most unusual uses they can for changing this toy dog so that subjects will have more fun playing with it. They are asked not to worry about how much it mould cast.

(i) Unusual Uses Tests: The materials are required same as that of product improvement. The test was administered individually and orally and by written in group and give direction to prepare a list in clear form based on based on your idea under these categories most interesting and most unusual uses you can think of this toy dog.

(B) Non Verbal Form

(i) Picture Completion: Picture completion of figural form set up for individual in respect to complete it into the simplest and easiest way possible. Thus to produce on original responses, the subjects are usually has to control his tension and delay gratification of this impulse to closure. Each figure is scored for fluency flexibility and originality.

(ii) Circles: There are 36 circles as the stimulus material. The common element tested is the ability to make multiple associations to a single stimulus. Theoretically the circles elicit the tendency to bring structure and completeness to whatever is incomplete.

2. Jalot's G.G.M. Ability Test: Dr. S.S Jalota's Group General Mantel Ability Test (1/60), 1960, revised edition was used for the purpose of determining the IQ of the sample. The test consists 100 items and these elements Viz.

| | | | |
|---|-------------------------|---|----------------------|
| a | Vocabulary-Similarities | d | Vocabulary-Opposites |
| b | Number series | e | Classification |
| c | Best Answer | | |

Statistical Techniques Used: The subjects were classified into three groups based on different schools, the three groups were: convent boys,

government boys, and private boys. In order to determine difference between convent government, convent-private and government private school's student's means, S.D. and "t" ratio were used.

Objectives of the Study

The central purpose of the present study was to compare quantitatively significant differences among convent, government and private schools students in relation to creative functioning and intelligence.

1. To investigate systematically differences on verbal creativity for convent, government and private school students.
2. To compare differences on non-verbal creativity of convent, government and private school students.
3. To find out the differences on total creativity for convent, government and private school students.
4. To determine the difference in convent, government and private school students on intelligence.

Hypotheses of the Study

To achieve the above mentioned objectives, the following null hypotheses have been formulated:

1. There is no significant difference between convent government, convent private, and government-private schools students in relation to their verbal creative functioning.
2. There is no significant difference between convent government, content private and government private school's student in relation to their non verbal creative functioning.
3. There is no significant difference between convent government, convent-private and government-private school's students in relation to their total creativity.
4. There is no significant difference between convent government convent private and government private school student in relation to intelligence.

Sample of the study

The subjects were randomly selected 150 students

of 10th class boys classified into three groups based on their courses and school background for the final analysis. The three groups were convent boys, government boys and private boys.

RESULTS AND INTERPRETATION

Table: 1(a): Significant Difference between Convent-Government 10th class Boys on Verbal Creativity.

| Variable | Convent Boys | | Government Boys | | "t" ratio | Remarks |
|-------------------|--------------|-------|-----------------|-------|-----------|-------------|
| | Mean | S.D. | Mean | S.D. | | |
| Verbal Creativity | 40.3 | 12.32 | 42.5 | 12.96 | 0.6152 | Significant |

Table: 1(b): Significant Difference between Convent and Private 10th class Boys on Verbal Creativity.

| Variable | Convent Boys | | Government Boys | | "t" ratio | Remarks |
|-------------------|--------------|-------|-----------------|-------|-----------|-------------|
| | Mean | S.D. | Mean | S.D. | | |
| Verbal Creativity | 40.3 | 12.32 | 31.6 | 14.60 | 0.0932 | Significant |

Table: 1(c): Significant Difference between Government Private Schools Boys on Verbal Creativity

| Variable | Government Boys | | Private Boys | | "t" ratio | Remarks |
|-------------------|-----------------|-------|--------------|-------|-----------|-----------------|
| | Mean | S.D. | Mean | S.D. | | |
| Verbal Creativity | 42.5 | 12.96 | 31.6 | 14.60 | 1.6414 | Not-significant |

In order to test the first hypothesis the results explicitly point out that the mean value 42.5 (12.96) of government boys students is higher than convent 40.3 (12.32) and private 36.1 (14.60) students respectively, thus we can say that government boys are superior in verbal creativity at front of convent and private school students and convent school students have bright verbal creativity at front of private school students. The "t" ratios in all the three comparison i.e. convent government, convent-private and government-private are .6152, 1.0932, 1.6414 respectively which are not significant at any level. From the results we can conclude that there is slight variation in verbal creative functioning of three types of aforesaid school students, but the difference in their mean values are not significant.

Conclusion

It was considered that creativity has always naturally been associated with the arts, music, painting, designing literature and drama along with creative thinking, was well understood. It was not clearly recognized that creativity is related to problem solving in general, but before mid century there has been efforts to improve skills in inventing and problem solving, mostly in industries.

Table: 2(a): Significant Difference between Convent-Government 10th class Boys on Non-Verbal Creativity.

| Variable | Convent Boys | | Government Boys | | “t” ratio | Remarks |
|-----------------------|--------------|------|-----------------|------|-----------|-----------------|
| | Mean | S.D. | Mean | S.D. | | |
| Non-verbal Creativity | 52.1 | 7.08 | 51.6 | 7.92 | 0.265 | Not-significant |

Table: 2(b): Significant Difference between Government and Private 10th class Boys on Non-Verbal Creativity.

| Variable | Government Boys | | Private Boys | | “t” ratio | Remarks |
|-----------------------|-----------------|------|--------------|-------|-----------|-----------------|
| | Mean | S.D. | Mean | S.D. | | |
| Non-verbal Creativity | 51.6 | 7.92 | 51.2 | 11.12 | 0.146 | Not-significant |

Table: 2(c): Significant Difference between Convent and Private Schools Boys on Non-Verbal Creativity

| Variable | Convent Boys | | Private Boys | | “t” ratio | Remarks |
|-----------------------|--------------|------|--------------|-------|-----------|-----------------|
| | Mean | S.D. | Mean | S.D. | | |
| Non-verbal Creativity | 52.1 | 7.08 | 51.2 | 11.12 | 0.33 | Not-significant |

In order to test the second hypothesis, mean score, SD and “t” ratios were calculated. The mean values of convent, government, and private students shows that all the three groups have almost identical mean values (7.08) 51.6 (7.92) and 51.2 (11.31) respectively. Though there is a slight variation in standard deviations of convent and government boy’s students in respect to private schools students. But none of the “t” ratio is significant

Conclusion

Thus the second hypothesis has been accepted. The same results were obtained for verbal creative functioning and the results in both cases shows that all the student whether they belong to convent, government or private school, have almost some or slight variation in their creative thinking. There may be so many reasons of these results, first reason may be that all the student belong to the same educational background, same area, having same socioeconomic status and are taught by similar teaching methods and school background.

Table: 3(a): Significant Difference between Convent-Government 10th class Boys on Total Creativity.

| Variable | Convent Boys | | Government Boys | | “t” ratio | Remarks |
|------------------|--------------|-------|-----------------|-------|-----------|-----------------|
| | Mean | S.D. | Mean | S.D. | | |
| Total Creativity | 85.3 | 13.84 | 85.9 | 15.61 | 0.148 | Not-significant |

Table: 3(b): Significant Difference between Convent and Private 10th class Boys on Total Creativity.

| Variable | Convent Boys | | Private Boys | | “t” ratio | Remarks |
|------------------|--------------|-------|--------------|-------|-----------|-----------------|
| | Mean | S.D. | Mean | S.D. | | |
| Total Creativity | 85.3 | 13.84 | 86.5 | 17.88 | 0.265 | Not-significant |

Table: 3(c): Significant Difference between Government Private Schools Boys on Total Creativity

| Variable | Government Boys | | Private Boys | | “t” ratio | Remarks |
|------------------|-----------------|-------|--------------|-------|-----------|-----------------|
| | Mean | S.D. | Mean | S.D. | | |
| Total Creativity | 85.9 | 15.61 | 86.5 | 17.88 | 1.6414 | Not-significant |

In order to test the third hypothesis, means SD and “t” rations were calculated for all the these three types of school’s student on total creativity. In all the cases private school’s boys have more mean value 86.5 (17.88 SD) than their counterparts i.e. convent and government boys school students having mean values 85.3 (13.84 SD) and 58.9 (15.61

SD) respectively. The 't' ratios have been found 0.143, 0.265 and 0.127 in all the three comparisons respectively. It is clear that from the result of these categories that there is a slight difference in mean value of convent, government and private boys school students but the critical ratio are not significant at any level.

Conclusion

From the above results we concluded that the third hypothesis is partially accepted. It has been truly said that creative thinking process has been considered as bipolar in which there is an interaction between a person and the environment in which he exists. As Paige (1962) observed that every act of thinking implies a balance between one's assimilation of the outside world to one's needs and one's accommodation of oneself, to demands of the outside world.

Table: 4(a): Significant Difference between Convent-Government 10th class Boys on Intelligence.

| Variable | Convent Boys | | Government Boys | | "t" ratio | Remarks |
|--------------|--------------|-------|-----------------|-------|-----------|-----------------|
| | Mean | S.D. | Mean | S.D. | | |
| Intelligence | 54.1 | 11.83 | 54.5 | 12.32 | 0.117 | Not-significant |

Table: 4(b): Significant Difference between Convent and Private 10th class Boys on Intelligence.

| Variable | Convent Boys | | Private Boys | | "t" ratio | Remarks |
|--------------|--------------|-------|--------------|-------|-----------|-----------------|
| | Mean | S.D. | Mean | S.D. | | |
| Intelligence | 54.1 | 11.83 | 57.7 | 14.61 | 0.957 | Not-significant |

Table: 4(c): Significant Difference between Government Private Schools Boys on Intelligence.

| Variable | Government Boys | | Private Boys | | "t" ratio | Remarks |
|--------------|-----------------|-------|--------------|-------|-----------|-----------------|
| | Mean | S.D. | Mean | S.D. | | |
| Intelligence | 54.5 | 12.32 | 57.7 | 14.61 | 0.837 | Not-significant |

To test of the forth hypothesis the mean values of convent, government and private schools boys

students are 51.1 (1.83SD), 54.4 (12.32SD) and 57.7 (14.61SD) respectively.

Conclusion

It is clearly point out that the mean value of private schools boys students is higher than convent and government boys school students. The mean value of private boys shows that the boys of private school performed better intelligence in comparison to convent and government schools boys students. But't' ratio in all the three comparison are insignificant. This shows that there is no significance difference between these school's boys students in relation to intelligence. Thus the hypothesis is partially accepted.

MAJOR FINDINGS AND CONCLUSION

With the result of the study it is found that verbal and non-verbal creativity has a positive relationship with intelligence and it is mostly not related to the type of school or medium of instruction.

1. Medium of instruction, types of school and sex is partially make an impact on divergent thinking and intelligence.
2. Intelligence was positively and significantly related to divergent thinking's all four dimensions i.e. fluency, flexibility, originality, elaboration.
3. Fluency, flexibility, originality and elaboration dimension of divergent thinking was positively and significantly related to verbal creativity.
4. Fluency, flexibility, originality and elaboration dimension of divergent thinking was positively and significantly related to non-verbal creativity.
5. Fluency, flexibility, originality dimension of divergent thinking was positively and significantly related to and total creativity.

So that the aforesaid results shows that some hypotheses are accepted and some are rejected as some previous studies have found over creativity and intelligence related to the concerned.

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