



Components of Creativity in relation to Locus of Control: A Study of Students from Mysore University, India

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ABSTRACT: *The aim of the present study was to analyse and compare components of creativity of students with respect to their locus of control, age, gender and family type. The study was conducted on students of undergraduate and post graduate programmes of university of Mysore. The data was collected from a sample of 244 students, of which 112 were males and 132 were females. It was also found that 146 students had external locus of control and 98 students were found to have internal locus of control. The students were divided into three age groups, the first group consisted of students from 18 to 20 years, second group comprised of students from 21 to 23 years and the last group was formed of students from 24 to 26 years. When the family type was considered it was found that 81 students came from joint family and 163 students were from nuclear family. Abbreviated Torrance Test for Adults and Levenson & Miller's Locus of Control tests were administered on students and their socio – demographic details were taken. The results show that the respondents with external and internal locus of control significantly differ on components of creativity. The students with internal locus of control were found to be higher on Fluency, Elaboration, Flexibility, Figural Response, Norm Referenced Creativity, Criterion Referenced Creativity and Total Creativity. Females were found to be significantly better than males on Originality, Elaboration, Flexibility, Norm Referenced and Criterion Referenced creativity. Within the different age groups it was found that the students from the age groups of 21-23 and 18-20 years were better than the students in age group of 24-26 on Elaboration, Verbal creativity, Norm Referenced and Criterion Referenced Creativity. The interaction of locus of control and age groups revealed that the students with internal locus of control in the age group of 18-23 were significantly higher on Fluency, Verbal Responses, Norm Referenced Creativity, and Criterion Referenced creativity as compared to students having external locus of control in this age group, while in the age group of 24-26 years, the externals are higher on these creativity factors as compared to internals. The results of students living in Nuclear and Joint families show that the students belonging to Nuclear families are significantly higher on Fluency, Norm Referenced Creativity and Overall Creativity as compared to the students living in Joint families. Interestingly the results also revealed that the students with internal locus of control living in nuclear families are significantly higher on norm referenced creativity and total creativity as compared to the one's living in joint families while the results are vice versa for students with external locus of control.*

Keywords: Creativity, Elaboration, Flexibility, Fluency, Locus of Control

I. INTRODUCTION

Man has been involved in the process of creative imagination since time immemorial. The world in which he has been has always made demands for something new – ideas, process or products. Guilford (1965) observes that creativity, like love, is a many splendored thing. "Whether it is considered from the viewpoint of its effects on society, or as one of the expressions of the human spirit, creativity stands out as an activity to be studied, cherished and cultivated (Arieti, 1976). Toynbee (1964) has rightly remarked that, "a few creative minds can make enormous differences to civilisation." Highly creative people are a national resource and such people should be identified at the school stage only and permitted to pursue the field of activity in which they

show talent. It is essential that the nation should become concerned about all its potential human resources, especially aware of the waste and loss of such resources in each person (Taylor, 1978).

A large body of knowledge exists in the psychology literature on the definition of and traits that constitute creativity. Zaidi (1966) writing on the nature of creativity says:

“Creativity is the mystic smile on Mona Lisa’s face; it is the creation of universal characters like Prince Hamlet and Prince Mishkin (Idiot) and Oblomov; it is the invention of the wheels, and the numbers, it is Newton’s law of gravitation, Galileo’s foresight; it is Shakespeare’s, Ghalib’s and Eliot’s spontaneous flow of words, and symbols combined into new meanings and harmonious patterns, it is Beethoven’s and Mozart’s melodeous combination of sounds. And at the same time, it is the crude lines of a child’s drawings, the unique pattern in the flower decoration of a housewife; it is imagining the consequences of events and trends and thinking of the solutions of hypothetical problems.”

Torrance defined creativity as “the process of sensing problems or gaps in information, forming ideas of hypotheses, testing, and modifying these hypotheses, and communicating the results. This process may lead to any one of many kinds of products—verbal and nonverbal, concrete and abstract” (Torrance 1963).

Examining the relationship between age and creativity has been of great interest to researchers (Amabile, 1996). Published in 1953, Harry Lehman’s *Age and Achievement* remains the most ambitious empirical study of the relationship between age and creativity ever undertaken by a psychologist. Nonetheless, there is agreement in the research literature (e.g., Cole 1979; Dennis 1966; Horner, Rushton & Vernon 1986) that, allowing for differences in definitions and methodology, somewhere around 40 is the most productive age. Despite this, it should be borne in mind that many famous creative individuals continued to produce until well into later life: Darwin, Freud and Einstein became famous in their twenties and remained active into their seventies - those who start youngest seem to continue longest. According to Simonton (Simonton, 1988, 1997) the peak performance of creativity varies among the different domains. For example, in the domains of poetry and mathematics the peak performance is rather early in life while the decline after the peak is rather large. In domains like history and geology the peak is much later and the post-peak decline-rate is rather small (Simonton, 1988, 1997). In 1993, Howard Gardner of Harvard observed that “while other kinds of writing seem relatively resistant to the processes of aging, lyric poetry is a domain where talent is discovered early, burns brightly and then peters out at an early age.”

Bhargava (1979) conducted his study on 300 adults, and found no relation between age and creativity. Alpaugh et al. (1982), in their study on 61 Caucasian women, found that one of the most important divergent thinking abilities involved in creative writing, fluency, declines with age. McCrae (1987) et. al., administered six measures of divergent thinking on 825 men ranging in age from 17 to 101 over the period from 1959 to 1972; repeat administrations were given to a subset of 278 men after a 6-year interval. Cross-sectional analyses showed curvilinear trends, with an increase in scores for men under 40 and a decline thereafter. Davis (1993) and Pariser and van den Berg (1995) reported a U-shaped developmental trend of artwork production by comparing creativity among children, adolescent artists and non artists, and adult artists and non artists. Both studies revealed that, unlike adolescent artists and adult artists, adolescent non artists and adult non artists did not show advancement out of the conventional phase of mid childhood.

Lee (1994) conducted his study on 200 adults across four age cohorts of young (17-22), middle-aged (40-50), old (60-70) and old-old (75+). Standard methods of scoring were used to obtain measures of fluency, flexibility and originality. The results showed that middle-aged subjects scored highest on all 3 measures. Wu et al. (2005) conducted study exploring performances on 3 types of creativity tasks (real-world problem, figural, and verbal; Torrance, 1974) in 22 6th-grade students and 22 university students from Hong Kong. As compared to 6th-grade students’ scores, university students’ scores (both quality and quantity) were significantly higher on the real-world problem and significantly lower on the figural task. On the verbal task, the groups did not differ. Binnewies et al. (2008), conducted a study on 117 nurses (in the age group of 24 to 45 years), the findings showed that age was unrelated to idea creativity.

From the above studies, it is clear that there exist no consensus on the relationship of creativity and age. Some researchers report a positive relationship whereas others reported a negative relationship.

Researchers have held the view that there are differences in the creative ideation of individuals with internal and external locus of control. Golann (1963) has stated that one of the variables related to the ability to be creative is the presence of an internal source of direction. Torrance (1971) found that creative individuals tended to function more effectively when external reinforcement was not prevalent an indication of locus of control. Erwin and Steinke (1973) conducted a study on ninety 7th, 8th, and 9th grade students, to study the relationship between scores on the Rolter’s Internal-External scale, Guilford’s Unusual Uses Test and a sorting task which examined their level of abstractness. No trends were seen between locus of control scores, measures of uncommonness and levels of abstractness. Glover and Sautter (1976) found that individuals with internal

locus of control scored higher on flexibility and originality subscales of creativity tests. On the other hand, they also found that individuals possessing external locus of control excelled in verbal feedback and scored higher on elaboration subscales of creativity tests. Richmond and De La Serna (1980) and Chadha (1989) found a significant relationship between creativity and internal locus of control.

The majority of the research in the field of creativity has been concentrated on gender and birth order. Considering the various studies of creativity with sex as a variable the findings show diversified results. Razik (1964) studied samples from four colleges including agriculture, education, engineering and applied arts, and found that girls outranked boys in their creative ability. On a college sample of 191 females and 123 males Middents (1968) found boys scores significantly higher than those of girls on non-verbal elaboration. Simpkins and Eisenmen (1968), worked on a sample of 116 subjects, of which 65 were females and 51, males, results revealed that there was a trend for females to score higher than males, although the difference was not significant. Raina (1970) conducted studies on 50 teachers to find out the sex difference on creativity. He could not observe any difference on ideational fluency drawn from above tests. Bowers (1971) studied thirty six male and thirty five female undergraduates, and found that women showed higher scores on creativity than men. Raina (1971) studied sex differences in creative functioning of 30 male and 25 female teachers. The findings revealed no significant difference in verbal creativity of male and female teachers, but they differed significantly in originality aspect of non-verbal creativity which favoured males. Olive (1972) compared 197 males and 237 females and found the latter to be superior on five of the seven creativity tasks administered on them. Victor and Anne (1974) investigated the relationship between creative functioning and gender. Subjects included 30 males and females who all were undergraduates. In the final analysis, females were found to be more creative than males. A very significant study was conducted by Alpaugh and Birren (1975) on young, middle aged and older people (20-83 years old) and concluded that the degree of sex role identification was not related to creativity. In a series of studies of creativity in art using a collage-making task with adults, Amabile (1983) found "there was a nearly significant sex difference. Females made collages that were rated higher in creativity than those made by males. Tripathi (1983) in his study on 354 B.Ed. teacher- trainees concluded that females were higher on creativity than the males. Singh (1986) conducted a study to find sex difference in science teachers on a sample of 100 teachers. Results showed that male and female teachers did not differ significantly in their creativity. Habibollah et al. (2009) in his study on 152 subjects revealed that females' mean score was greater than the males' mean for Creativity, but the standard deviations between females and males were not higher. Naderi et al. (2009), in his study on 153 undergraduate Iranian students (48 females, 105 males; aged 19 to 27 years) of Malaysia Universities. The results revealed no significant difference between female and male students' overall creative perception. The studies of sex difference on creativity presents a confusing pattern of results. These confusing results need further research and clarification. It is clear that some of these discrepancies must arise from differences between the studies in terms of sampling, nature of test, conditions of administration and so on. The present study is also one further step in the direction of understanding sex differences in creativity.

Not many researchers have tried to explore the role of nuclear family and joint family on creativity level of an individual. Sharma (1982) conducted a study was to explore the relationship of creativity with certain background, psychological and organizational factors of students of higher secondary schools of Delhi. The sample consisted of 481 students (230 boys and 251 girls), the findings revealed that creativity was higher in nuclear families as compared to joint families. Raina (1986) in his study on 1000 students attempted to find out the effect of type of family on scientific creativity of students of different schools. The findings of the study were that the type of family, single or Joint did not have any relationship with the scientific creativity of the boys. Whereas girls of single families were most creative in science, and girls of joint families were least creative. From these few studies, it seems that subjects belonging to nuclear family are considered to be more creative in comparison to those belonging to joint families. Since the studies are limited, it will be quite early to reach a conclusion. Further research is needed to establish a definite relation between creativity and type of family.

II. OBJECTIVES OF THE STUDY

- To find out the difference in components of creativity of male and female students.
- To compare the students belonging to different age groups (18-20 yrs, 21-23 yrs and 24-26 yrs) on components of creativity.
- To compare the components of creativity of students coming from nuclear family and joint family.
- To compare the students on components of creativity having internal or external locus of control.

III. HYPOTHESIS

- H1. Female students would score high on creativity in comparison to males.
H2. There will be no significant difference in creativity of students belonging to different age groups (18-20 yrs, 21-23 yrs and 24-26 yrs).

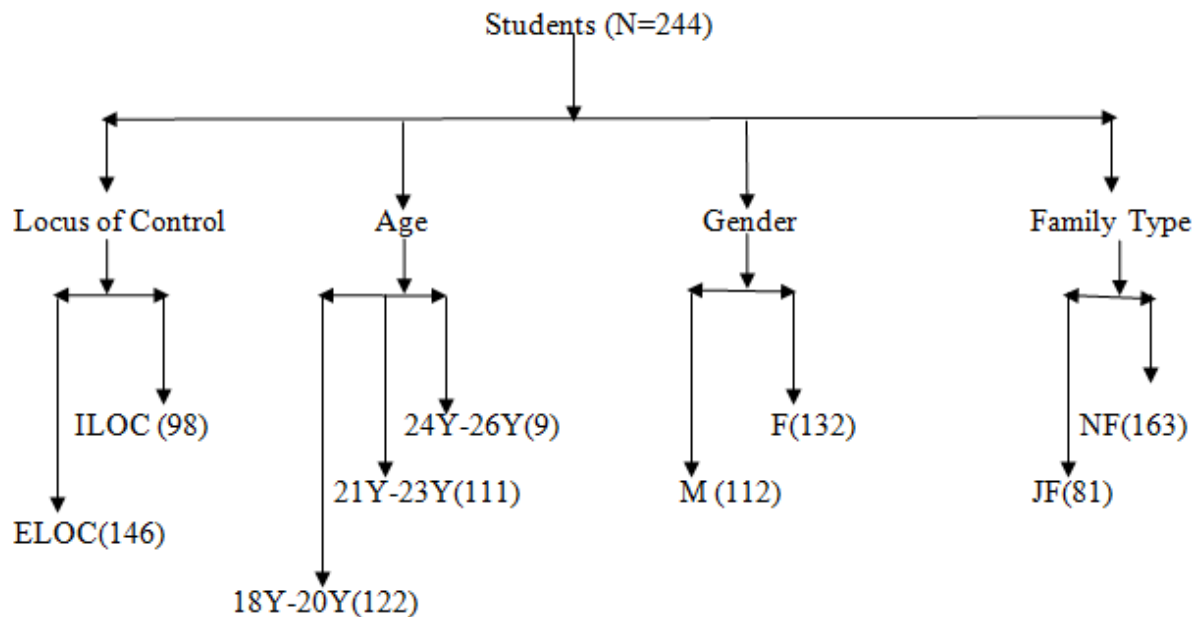
- H3. Students coming from nuclear family would score higher on creativity in comparison to students from joint family.
- H4. Students with the internal locus of control would be higher on components of creativity.

IV. RESEARCH METHODOLOGY

The sample has been selected on the basis of purposive sampling. The total sample selected consisted of 450 students studying in University of Mysore. Out of 450, a total of 244 usable responses were obtained with return rate of 53.3%.

The research design is given below:

Students (N=244)



Here,

ILOC=Internal Locus of Control

ELOC= External Locus of Control

18Y-20Y= between the age group of 18 to 20 years

21Y-23Y= between the age group of 21 to 23 years

24Y-26Y= between the age group of 24 to 26 years

F = Females

M = Males

NF= Nuclear Family

JF = Joint Family

V. TOOLS USED

A three – part questionnaire was used for data collection.

5.1 Socio- Demographic

This part of the questionnaire was concerned with collecting socio-demographic details such as name, gender, age, educational level and department.

5.2 Abbreviated Torrance Test for Adults (ATTAs)

The Torrance Tests of Creative Thinking (TTCT) “is the most widely used and most researched creativity test” (Goff & Torrance, 2002, p. 36).The ATTA was developed from the TTCT and both content and face validity have been established by the Scholastic Testing Service (Goff & Torrance).

The ATTA assessment consists of “four norm-referenced abilities and fifteen criterion referenced creativity indicators” (Goff & Torrance, 2002, p. 1).

The four norm-referenced measures are identified as the following:

- Fluency- the ability to produce quantities of ideas which are relevant to the task instruction.
- Originality – the ability to produce uncommon ideas that are totally new or unique.
- Elaboration – the ability to embellish ideas with details.
- Flexibility – the ability to process information or objects in different ways, given the same stimulus.

The fifteen criterion-referenced creativity indicators included the following (Goff & Torrance, p. 2):

- verbal responses- which included richness and colourfulness of imagery, emotions and feelings, future orientation and humour, conceptual incongruity and provocative questions; and
- figural responses- which included openness and resistance to premature closure, unusual visualization and different perspectives, movement and/or sound, richness and/or colourfulness of imagery, abstractness of titles, context or the environment for object and articulateness in telling story, combination and synthesis of two or more figures, internal visual perspective, expressions of feelings and emotions, and fantasy.

Raw scores from the four norm-referenced measures were converted to normalize scaled score, and were added to fifteen criterion-referenced indicators which received a score ranging from 0 to 2, to create the creativity index (CI).

A seven- point scaled score was developed to interpret the resulting creativity index and Table 1 provides this essential information.

5.3 Locus of Control (LOC)

Levenson and Miller (1976) multidimensional scale of I-E control was used to measure LOC. It has 24 items related to two sub areas namely internal control and external control. External control has two sub scales i.e. powerful others and chance. The subjects are required to respond to each item on a 5-point scale. The score on the 8 item of each sub-area was used as a score. The higher the score, the greater the subject's degree of expectancy for the particular aspect of locus of control.

VI. DATA COLLECTION AND ANALYSIS

After seeking permission from the instructors, the researcher visited the classes in order to administer the questionnaires. The students were made certain that the results remain confidential and their instructors would not see the results of the questionnaires. The questionnaires were administered in one session under standard conditions. The directions of the questionnaires were in English; however, the researcher explained them once more so that participants would have a clear understanding of what they were supposed to do. The data collected were put into Statistical Package for Social Sciences (SPSS) to be analyzed.

VII. RESULTS

7.1 Components of Creativity and Locus of Control

Table 1.1 shows the results of Two Way MANOVA with gender and locus of control as independent variables and factors of creativity as dependent variable. The two way MANOVA (Table 1.1) revealed that Locus of Control impacted significantly on the dependent variable of creativity with Wilks' Lambda = .68, F value = 11.78 and significance value = .00. Further scrutiny of Analysis of Variance for all factors of creativity according to locus of control (Table 1.2) revealed that Fluency, Elaboration, Flexibility, Figural Response, NR Creativity, CR Creativity and Total Creativity are significantly different according to Locus of Control of the students. Analysis of the mean table (Table 1.4) shows that students with Internal LOC score significantly higher than students with External LOC on Fluency, Elaboration, Flexibility, Figural Response, NR Creativity, CR Creativity and Total Creativity. Also, students with Internal LOC have scored higher than students with External LOC on Originality and Verbal Responses as well but the score is not significant.

Table 2.1 shows the results of Two Way MANOVA with age group of students and Locus of Control as independent variables and factors of creativity as dependent variable. The two ways MANOVA (Table 2.1) revealed that locus of control did not impacted significantly on the dependent variable of creativity. Further scrutiny of Analysis of Variance for all factors of creativity according to locus of control (Table 2.2) revealed that none of the factors of creativity are significantly different according to locus of control of the students. Analysis of the mean table (Table 2.3) shows students of Internal LOC scoring more than students with External LOC on Originality, Elaboration, Flexibility, NR Creativity and Total Creativity, but the difference is not significant.

Table 3.1 shows the results of Two Way MANOVA with Locus of control and Family Type as independent variables and factors of Creativity as dependent variable. The two way MANOVA revealed that Locus of Control impacted significantly on the combined dependent Creativity variables with Wilks' Lambda = .85, F value = 4.42 and significance value = .00. The further scrutiny of the ANOVA table (Table 3.2) for all factors of creativity according to Locus of Control shows that fluency, elaboration, flexibility, Figural Responses, NR Creativity, CR Creativity and Total Creativity are significantly different according to Locus of Control. Analysis of mean table (Table 3.3) shows that Internally Controlled students are significantly high on Fluency, Elaboration, Flexibility, Figural Responses, NR Creativity, CR Creativity and Total Creativity in comparison to externally controlled students. Internally controlled students are also high on Originality and Verbal Response in comparison to externally controlled students but the difference is not significant.

From the above result it becomes very clear that creative students (scoring high on Fluency, Elaboration, Flexibility, Originality, Figural Response, Verbal Response, NR Creativity, CR Creativity and

Total Creativity) have an Internal Locus of Control. This means that students who believe that their personal efforts, behaviors or skills will influence and determine outcomes in their life have the capability of producing large number of ideas which are unique. They have the ability to embellish those ideas with details. They are also capable of processing the same information or objects in different ways. Internally oriented students do not take premature decisions, they try and analyse problem from all perspective before reaching a conclusion. They also have the capability of capturing the essence or deeper meaning of the problems and they are able to communicate their views clearly and powerfully.

7.2 Components of Creativity and Gender

Table 1.1 shows the results of Two Way MANOVA with gender and locus of control as independent variables and factors of creativity as dependent variable. The two way MANOVA (Table 1.1) revealed that gender impacted significantly on the dependent variable of creativity with Wilks' Lambda = .92, F value =2.00 and significance value = .03. Further scrutiny of Analysis of Variance for all factors of creativity according to gender (Table 1.2) revealed that Originality, Elaboration, Flexibility, Norm referenced Creativity and Total Creativity are significantly different according to gender of the students. Analysis of the mean table (Table 1.3) shows that female students score significantly higher than male students on Originality, Elaboration , Flexibility, NR Creativity and Total Creativity. Also, females have scored higher than males on Fluency, Verbal Responses, Figural Responses and CR Creativity as well, but the score is not significant.

The two ways MANOVA (Table 1.1) revealed that interaction between Gender and Locus of Control which did not impacted significantly on the combined dependent variable Creativity.

The result clearly shows that female students in comparison to their male counterparts have scored high on various variables of creativity like Originality, Elaboration, Flexibility, NR Creativity, Total Creativity, Fluency, Verbal Responses, Figural Responses and CR Creativity. It become clear that female students are able to produce uncommon ideas inculcating great details into it, moreover they are not rigid in their approach leaving scope for viewing things from all perspective.

7.3 Components of Creativity and Age Group

Analysis of Variance for all factors of creativity according to age-group of students (Table 2.1) revealed that Elaboration, Verbal Responses, NR Creativity and Total Creativity are significantly different according to Age-group of the students. If we analyse the mean table (Table 2.2), we will notice a trend appearing that score of students on various factors of creativity (Elaboration, Verbal Responses, NR Creativity and Total Creativity) increases from 18-20 yrs to 21-23 yrs and then decreases at 24-26 yrs. The other factors such as Fluency, Originality, Figural Responses and CR Creativity also show the same trend but the difference is not significant.

From the results it becomes clear that creativity tends to increase from 18 years to 23 years thereby taking a dip at 24-26 years. By this result we can say that creativity increases from 18 years until 23 years and there after decreases. Meaning thereby that students in the younger age group tend to be more creative in comparison to older students. Younger students have the ability to embellish ideas with details rather than being restricted to the core idea. Younger students are also able to give more number of original and unique responses or solutions for a give problem. They also have the ability to process information or objects in different ways given the same stimulus and this quality of theirs is very helpful when logical approaches fail to produce satisfactory results.

Analysis of Variance for all factors of creativity (Table 2.1) revealed that Fluency, Verbal Responses, NR Creativity, CR Creativity and Total Creativity are significantly different when Age-group and Locus of control of the students interact.

If we analyse the mean table (Table 2.5), we notice that Internally controlled students in the age group of 18-20 yrs and 21-23 yrs are high on Fluency scale in comparison to Externally controlled students in the same age group. Whereas externally controlled students in the age group of 24-26 yrs have scored high on Fluency in comparison to internally controlled students of same age group. Looking at Verbal Responses, we find that internally controlled students in the age group of 18-20 yrs and 21-23 yrs score higher in comparison to externally controlled students in the same age group. Whereas, Externally controlled students in the age group of 24-26 yrs scored higher in comparison to Internally controlled students in the same age group . As far as Norm Referenced (NR) Creativity is concerned, we again observe the same thing that Internally controlled students in the age group of 18-20 yrs and 21-23 yrs are high on NR Creativity in comparison to Externally controlled students in the same age group. Whereas externally controlled students in the age group of 24-26 yrs have scored high on NR Creativity in comparison to internally controlled students of same age group. Coming to Criterion Referenced (CR) Creativity, the same pattern persist, which shows that Internally controlled

students in the age group of 18-20 yrs and 21-23 yrs are high on CR Creativity in comparison to Externally controlled students in the same age group. Whereas Externally controlled students in the age group of 24-26 yrs have scored high on CR Creativity in comparison to Internally controlled students of same age group. Next is Total Creativity and this also shows that internally controlled students in the age group of 18-20 yrs and 21-23 yrs are high on Total Creativity in comparison to externally controlled students in the same age group. Whereas externally controlled students in the age group of 24-26 yrs have scored high on Total Creativity in comparison to internally controlled students of same age group.

If we analyse the result we can draw a conclusion that there exist a pattern which shows that internally controlled students in the age group of 18-20 yrs and 21-23 yrs are high on various factors of creativity like Fluency, Verbal Response, NR Creativity, CR Creativity and Total Creativity in comparison to externally controlled students in the same age group. Also, we see that Externally Controlled students in the age group of 24-26 yrs are high on Fluency, Verbal Response, NR Creativity, CR Creativity and Total Creativity in comparison to Internally controlled students in the same age group. This makes it clear that students who believe that outcomes in their life depends on their own actions and choices show high level of creativity in comparison to students who have a belief that whatever happens in their life is controlled by powerful others or is dependent on chance factor. Also we see that students in higher age group are externally oriented and have a high level of creativity.

7.4 Components of Creativity and Family Type

The ANOVA table (Table 3.1) for all factors of creativity according to family type shows that fluency, NR Creativity and Total Creativity are significantly different according to Creativity. Analysis of mean table (Table 3.4) shows that students belonging to Nuclear family are high on Fluency, NR Creativity and Total Creativity in comparison to students belonging to Joint family. Students belonging to Nuclear family also score high on Originality, Elaboration, flexibility, Verbal Responses, Figural Responses and CR Creativity in comparison to students of Joint family, but the score is not significant. Results clearly shows that students of nuclear family score higher on all variables of creativity in comparison to students of joint family.

The two way MANOVA revealed that interaction between Locus of Control and Family Type did not impacted significantly on the combined dependent variable Creativity.

The further scrutiny of the ANOVA table (Table 3.2) for all factors of creativity shows that only NR creativity and Total Creativity is significantly different when Locus of Control and Family type interacts. Analysis of mean table (Table 3.5) shows that internally controlled students of Nuclear family are high on NR Creativity in comparison to Externally Controlled students of Nuclear family. Again, internally controlled students of Joint family are high on NR Creativity in comparison to Externally Controlled students of Joint Family. Further, internally controlled students of Nuclear family are high on Total Creativity in comparison to Externally Controlled students of Nuclear family. Again, internally controlled students of Joint family are high on Total Creativity in comparison to Externally Controlled students of Joint Family.

VIII. DISCUSSION AND CONCLUSION

8.1 Components of Creativity and Gender

A number of comparisons have been made between the scores of girls and boys on various measures of creativity. Torrance (1972) has reported that beginning in 1958 and continuing into the early 1960's, it was found that boys consistently excelled girls in most measures of originality and that girls excelled boys in ability to elaborate ideas and in most verbal measures of creative thinking. He also observed that in the 1960's and into the 1970's, sex differences in measured creative thinking abilities began to fade out (Torrance, 1972, p.597). Similarly, Kogan concludes that sex differences in various cognitive functions have diminished in recent years (Kogan, 1974, p.12). Torrance (1983) found that gender differences in divergent thinking ability have changed over time. Meaning thereby that in the present context girls score higher than boys on almost all subset of creativity as found in the present study. The results of this study are also consistent with those of others (Flaherty, 1992; Boling & Boling, 1993; Kogan, 1974; Coone, 1969; Warren and Luria, 1972; & Dudek, Stobel & Runco, 1993). The higher score in favour of girls may be attributed to diverse role expectations from them in the modern context, in comparison to earlier times where females were expected to take care to family and indoor activities. Now females along with the males are expected to go out of the house and work and along with it they are supposed to take good care of the children and the family at home. Over time the activities of females have been adding up and becoming more diverse in comparison to male counterpart, resulting in development of divergent thinking ability.

8.2 Components of Creativity and Age

Past research has not reached a consensus on how creativity is related to age. Some researchers have reported a positive relation and found that children become more creative as they get older (Smith and Carlsson, 1983; 1985). Smolucha and Smolucha (1985) reported a J-shaped pattern with a small peak at the age of 6 and higher peaks in the 20s. From the results of present study, we have found that creativity increases from 18 years until 23 years and there after decreases. This result can be explained with the help of the fact that at these ages a student is in the final year of graduation/post graduation and the emphasis is on logical rather than divergent thinking and the focus shifts to conventional behaviour, well defined problem solving, getting good grades to get a stable and reputed job. This peaking of divergent thinking in middle age is consistent with the findings of Jaquish and Ripple (1981) and the decline after middle age is in addition consistent with the findings of Lehman (1953), Guilford (1967), Alpaugh and Birren (1977) McCrae et al. (1987). A lot many explanations are available for such results, one being offered is that fluid intelligence increases until early middle age and then declines suggesting that divergent thinking is a kind of fluid intelligence (Schaie & Labouvie – Vief, 1974). Others believe that operations underlying divergent thinking are the same at all ages but vary with age in how effectively or efficiently they are used. Specifically, effectiveness or efficiency peaks in middle age and declines markedly especially in the later portion of old age. Giving support to the above findings, Lehman stated that ‘it remains clear that the genius does not function equally well throughout the years of adulthood. Superior creativity rises relatively rapidly to a maximum which occurs usually in the thirties and then falls off slowly.’ This happen because of the fact that old seems stereotyped and rigid, when a situation requires a new way of looking at things, the acquisition of new technique or even new vocabularies. According to Simonton (Simonton, 1988, 1997) the relationship between age and creative performance is based on historiometric research. Creative performance rapidly increases until the age of 30 till 40 after which the performance output gradually declines. At the final years of one’s career, the creative output becomes half the rate compared to the career peak around the 30s.

8.3 Components of Creativity and Family

Several authors have proposed that one of the key influences on creative development is the physical and social environment of the child, comprised of family, school, and societal spheres. The family environment may provide cognitive (e.g., intellectual stimulation) and affective (e.g., emotional security) support for creativity as well as providing the physical setting in which a child grows (Harrington, Block & Block, 1987). Parental practices that are associated with the production of original problem solutions, therefore, encourage students to search for alternatives when usual behaviours are ineffective in handling problematic situations. Encouragement or discouragement of such practices is likely to vary with the family structure – whether it is nuclear or joint. The findings of our study shows that children who are brought up in a nuclear family show more creativity in comparison to children of joint family. This is easily explained by the fact that in joint families, parents have to stick to traditional ways and sacrifice the extent of freedom they can give to their children for the sake of adjustment. The likings and disliking of the other members are also to be taken into consideration in joint families. Another possible reason could be the diversion of their mental energies into petty conflicts between different members rather than channelizing their energies into constructive work. In nuclear families, the parents are more permissive and more tolerant of their children’s behaviour whereas in joint families, they may have to curb the activities of their children who would be expected to behave in certain desired ways. Generation gap leading to interference and conflicts in the rearing practices adopted by the parents and the grand parents may also induce conflicts in the children so as to hinder their creativity. In joint families, parents have to stick to the traditional ways and hence may discourage the expression of unconventional behaviour in their children.

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Table 1. The Scaled Score for the Creativity Index, with Added Interpretive Information.

Abbreviated Torrance Test for Adult Scoring		
Scaled Score	Percentage of Adults	Meaning
7	4	Substantial
6	12	High
5	20	Above Average
4	26	Average
3	20	Below Average
2	12	Low
1	4	Minimal

Source: Goff & Torrance, 2002, p. 29.

Table 1.1: Summary of Analysis of Variance for All Factors of Creativity According to Gender and Locus of Control of the students.

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Gender	Fluency	1.356	1	1.356	.369	.544
	Originality	1925.605	1	1925.605	4.887	.028
	Elaboration	24.921	1	24.921	5.010	.026
	Flexibility	88.802	1	88.802	9.569	.002
	Verbal Responses	1.786	1	1.786	1.341	.248
	Figural Responses	13.045	1	13.045	2.214	.138
	NR_creativity	264.093	1	264.093	6.432	.012
	CR_Creativity	22.003	1	22.003	2.861	.092
	total_creativity	457.070	1	457.070	7.018	.009
LOC	Fluency	129.411	1	129.411	35.175	.000
	Originality	791.422	1	791.422	2.009	.158
	Elaboration	202.435	1	202.435	40.700	.000
	Flexibility	158.284	1	158.284	17.056	.000
	Verbal Responses	4.774	1	4.774	3.585	.060
	Figural Responses	98.547	1	98.547	16.724	.000
	NR_creativity	3641.797	1	3641.797	88.699	.000
	CR_Creativity	145.540	1	145.540	18.923	.000
	total_creativity	5108.127	1	5108.127	78.428	.000
Gender * LOC	Fluency	7.903	1	7.903	2.148	.144
	Originality	48.499	1	48.499	.123	.726
	Elaboration	2.845	1	2.845	.572	.450
	Flexibility	.088	1	.088	.010	.922
	Verbal Responses	.060	1	.060	.045	.833
	Figural Responses	.143	1	.143	.024	.876
	NR_creativity	58.689	1	58.689	1.429	.233
	CR_Creativity	.015	1	.015	.002	.965
	total_creativity	47.480	1	47.480	.729	.394

Table 1.2 : Mean Scores of Gender for the Factors of Creativity

Dependent Variable	Male	Female
Fluency	12.92	13.08
Originality	13.70	19.52
Elaboration	12.61	13.27
Flexibility	13.39	14.64
Verbal Responses	1.34	1.52
Figural Responses	2.73	3.21
NR Creativity	53.20	55.35
CR Creativity	4.10	4.72
Total Creativity	57.19	60.03

Table 1.3: Mean Scores of Locus of Control for the Factors of Creativity

Dependent Variable	Internal LOC	External LOC
Fluency	13.75	12.25
Originality	18.47	14.74
Elaboration	13.89	12.00
Flexibility	14.85	13.18
Verbal Responses	1.57	1.28
Figural Responses	3.63	2.31
NR Creativity	58.28	50.27
CR Creativity	5.21	3.61
Total Creativity	63.35	53.87

Table 1.4: Mean Scores of Gender * Locus of Control for All Factors of Creativity

Dependent Variable	Gender	Internal LOC	External LOC
Fluency	Male	13.86	11.98
	Female	13.65	12.51
Originality	Male	15.10	12.29
	Female	21.85	17.19
Elaboration	Male	13.44	11.78
	Female	14.33	12.22
Flexibility	Male	14.21	12.58
	Female	15.50	13.79
Verbal Responses	Male	1.47	1.21
	Female	1.68	1.36
Figural Responses	Male	3.42	2.05
	Female	3.85	2.58
NR Creativity	Male	57.71	48.68
	Female	58.85	51.86
CR Creativity	Male	4.89	3.31
	Female	5.53	3.91
Total Creativity	Male	62.39	52.00
	Female	64.31	55.75

Table 2.1: Summary of Analysis of Variance for All Factors of Locus of control According to the Age group of the students at three creativity levels.

Source	Dependent Variable	Type III Sum of Squares	Df	Mean Square	F	Sig.
LOC	Fluency	.037	1	.037	.010	.920
	Originality	15.007	1	15.007	.037	.848
	Elaboration	2.675	1	2.675	.570	.451
	Flexibility	4.199	1	4.199	.443	.506
	Verbal Responses	1.744	1	1.744	1.370	.243
	Figural Responses	.151	1	.151	.026	.873
	NR creativity	29.439	1	29.439	.758	.385
	CR Creativity	2.948	1	2.948	.393	.531
	Total creativity	12.794	1	12.794	.209	.648
Age Group	Fluency	15.826	3	5.275	1.465	.225
	Originality	213.423	3	71.141	.176	.913
	Elaboration	85.062	3	28.354	6.040	.001
	Flexibility	52.393	3	17.464	1.843	.140
	Verbal Responses	10.300	3	3.433	2.697	.047
	Figural Responses	22.991	3	7.664	1.303	.274

	NR creativity	667.723	3	222.574	5.730	.001
	CR Creativity	56.455	3	18.818	2.510	.059
	Total creativity	1092.965	3	364.322	5.952	.001
LOC* age group	Fluency	30.015	3	10.005	2.779	.042
	Originality	590.767	3	196.922	.486	.692
	Elaboration	32.831	3	10.944	2.331	.075
	Flexibility	41.068	3	13.689	1.445	.230
	Verbal Responses	11.883	3	3.961	3.112	.027
	Figural Responses	31.665	3	10.555	1.794	.149
	NR creativity	569.935	3	189.978	4.891	.003
	CR Creativity	70.127	3	23.376	3.118	.027
	Total creativity	995.951	3	331.984	5.424	.001

Table 2.2 : Mean Scores of Locus of control for the Factors of Creativity

Dependent variable	Internal LOC	External LOC
Fluency	13.38	13.46
Originality	16.64	15.05
Elaboration	14.49	13.81
Flexibility	15.23	14.38
Verbal Responses	1.57	2.11
Figural Responses	2.87	3.03
NR Creativity	57.99	55.75
CR Creativity	4.44	5.15
Total Creativity	62.37	60.90

Table 2.3: Mean Scores of Age- groups for the Factors of Creativity

Dependent Variable	18-20 yrs	21-23 yrs	24-26 yrs
Fluency	12.94	12.98	12.28
Originality	16.34	17.62	12.42
Elaboration	12.84	13.05	11.71
Flexibility	14.09	13.99	12.64
Verbal Responses	1.38	1.49	1.00
Figural Responses	2.97	3.05	1.28
NR Creativity	54.06	54.35	49.07
CR Creativity	4.35	4.55	2.28
Total Creativity	58.34	58.84	51.35

Table 2.4: Mean Scores of Locus of Control * Age –group for All Factors of Creativity

Dependent Variable	Age Group	Internal LOC	External LOC
Fluency	18-20 yrs	13.78	12.10
	21-23 yrs	13.77	12.19
	24-26 yrs	11.00	13.57
Originality	18-20 yrs	20.14	12.55
	21-23 yrs	18.45	16.80
	24-26 yrs	11.00	13.85
Elaboration	18-20 yrs	14.10	11.58
	21-23 yrs	13.85	12.25
	24-26 yrs	11.00	12.42
Flexibility	18-20 yrs	15.34	12.83
	21-23 yrs	14.57	13.42
	24-26 yrs	12.00	13.28

Verbal Responses	18-20 yrs	1.49	1.28
	21-23 yrs	1.80	1.18
	24-26 yrs	-6.00	2.00
Figural Response	18-20 yrs	3.83	2.10
	21-23 yrs	3.65	2.45
	24-26 yrs	-8.00	2.57
NR Creativity	18-20 yrs	59.03	49.09
	21-23 yrs	57.92	50.78
	24-26 yrs	45.00	53.14
CR Creativity	18-20 yrs	5.32	3.37
	21-23 yrs	5.45	3.66
	24-26 yrs	-3.00	4.57
Total Creativity	18-20 yrs	64.21	52.46
	21-23 yrs	63.27	54.42
	24-26 yrs	45.00	57.71

Table 3.1: Summary of Analysis of Variance for All Factors of Creativity According to Gender and Locus of Control of the students.

Source	Dependent Variable	Type III Sum of Squares	Df	Mean Sq.	F	Sig.
Locus of control	Fluency	38.625	1	38.625	10.598	.001
	Originality	207.552	1	207.552	.521	.471
	Elaboration	93.542	1	93.542	18.631	.000
	Flexibility	61.161	1	61.161	6.406	.012
	Verbal Responses	.796	1	.796	.600	.439
	Figural Responses	37.840	1	37.840	6.407	.012
	NR creativity	1304.635	1	1304.635	31.879	.000
	CR Creativity	49.271	1	49.271	6.410	.012
	Total creativity	1829.486	1	1829.486	28.150	.000
	Family Type	Fluency	15.608	1	15.608	4.283
Originality		889.974	1	889.974	2.236	.136
Elaboration		12.010	1	12.010	2.392	.123
Flexibility		10.590	1	10.590	1.109	.293
Verbal Responses		1.102	1	1.102	.830	.363
Figural Responses		8.436	1	8.436	1.428	.233
NR creativity		307.246	1	307.246	7.508	.007
CR Creativity		17.288	1	17.288	2.249	.135
Total creativity		441.659	1	441.659	6.796	.010
LOC* Family Type		Fluency	13.681	1	13.681	3.754
	Originality	69.619	1	69.619	.175	.676
	Elaboration	8.813	1	8.813	1.755	.186
	Flexibility	27.597	1	27.597	2.891	.090
	Verbal Responses	2.779	1	2.779	2.093	.149
	Figural Responses	8.331	1	8.331	1.410	.236
	NR creativity	337.092	1	337.092	8.237	.004
	CR Creativity	18.919	1	18.919	2.461	.118
	Total creativity	507.258	1	507.258	7.805	.006

Table 3.2: Mean Scores of Locus of Control for the Factors of Creativity

Dependent Variable	Internal LOC	External LOC
Fluency	13.28	12.24
Originality	16.96	14.56
Elaboration	13.60	11.99
Flexibility	14.49	13.19
Verbal Responses	1.44	1.29
Figural Responses	3.33	2.31
NR Creativity	56.27	50.25
CR Creativity	4.78	3.61
Total Creativity	60.98	53.86

Table 3.3: Mean Scores of Family Type for the Factors of Creativity

Dependent variable	Nuclear Family	Joint Family
Fluency	13.09	12.43
Originality	18.24	13.28
Elaboration	13.09	12.51
Flexibility	14.11	13.57
Verbal Responses	1.45	1.27
Figural Responses	3.06	2.58
NR Creativity	54.72	51.80
CR Creativity	4.54	3.84
Total Creativity	59.17	55.67

Table 3.4: Mean Scores of Locus of Control X Family Type for the Factors of Creativity

Dependent Variable	Locus of Control	Nuclear Family	Joint family
Fluency	Internal LOC	13.91	12.64
	External LOC	12.26	12.22
Originality	Internal LOC	20.14	13.78
	External LOC	16.35	12.77
Elaboration	Internal LOC	14.14	13.07
	External LOC	12.03	11.95
Flexibility	Internal LOC	15.20	13.78
	External LOC	13.02	13.35
Verbal Responses	Internal LOC	1.66	1.21
	External LOC	1.24	1.34
Figural Responses	Internal LOC	3.82	2.85
	External LOC	2.31	2.31
NR Creativity	Internal LOC	59.26	53.28
	External LOC	50.19	50.32
CR Creativity	Internal LOC	5.48	4.07
	External LOC	3.59	3.62
Total Creativity	Internal LOC	64.60	57.35
	External LOC	53.73	53.98