

## DIVERGENT PRODUCTION ABILITIES AMONG COLLEGE STUDENTS IN RELATION TO THEIR DIFFERENT COGNITIVE STYLES

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### ABSTRACT

*This study examines divergent production abilities in a sample of 290 college students (145 female and 145 male). 't' value indicated no significant gender differences in word, ideational fluency, expressional fluency, elaboration dimensions of divergent production abilities among college students in relation to different styles. But significant gender differences were found among college students in associational and spontaneous flexibility having integrated style. Significant gender differences were found in adaptive flexibility among college students having systematic and undifferentiated style. Significant gender differences were observed in originality among college students having undifferentiated style. In case of both male and female students significant as well insignificant correlation was found between the dimensions of divergent production ability. This study has lot of educational implications.*

**Keywords:** : word fluency ideational fluency, flexibility, adaptive flexibility, originality and elaboration,

### Introduction

A creative person is an important requirement in the global world, and this makes divergent thinking an increasingly important area in education. The first person who defines creative thinking was Torrance, who defined it as "the ability to sense problems, make guesses, generate new ideas, and communicate results" (1965, 1966, 1988, as cited in Wang, 2011). However, individual and group differences can occur for creativity and such differences demand study to permit understanding of their underlying causes. One such class of group differences for creativity is gender differences. Boys and girls may differ in their creativity levels, due to sex differences associated with different biological influences on the two sexes and/or due to gender differences associated with different socio-cultural influences on the two sexes. The present research is an investigation of creativity differences between boys and girls with an emphasis on gender differences on creativity.

Some empirical studies observed that females tend to have higher creativity scores than men (Anwar, Shamim-ur-Rasool, & Haq, 2012; Awamleh, Al Farah, & El-Zraigat, 2012; DeMoss, Milich, & DeMers, 1993; Hong et al., 2013; Kousoulas & Mega, 2009; Stephens et al., 2001). Stephens et al. (2001) indicated that females performed significantly better than males in the subtests of originality and creative index. Kousoulas & Mega (2009) observed that female students scored higher than the male students in the subtests of fluency and flexibility, and for the total score of divergent thinking, except for the originality subtest. Awamleh et al. (2012) found the presence of gender differences in creative thinking abilities and observed that females had an advantage over males on the subtests of fluency and flexibility. Hong et al. (2013) observed that females had a significant advantage over the males in the subtests of fluency, flexibility, and elaboration, but not in originality when domain-specific items were used. The results of the study further indicated that there were no differences between males and females in their domain-general creative thinking scores. Klausmeier & Wiersma (1964) found that the mean divergent thinking test scores for girls were higher than for boys. Khaleefa et al. (1996) reported that small girls in the Sudan were found to be more creative than boys, for as long as they enjoy the same level of freedom. This, however, changes during adolescence, when girls have less freedom and face more pressure in the restricted socio-cultural system. Halpern & LaMay (2000) observed that women tend to have slightly higher verbal abilities than

men. Raina (1980) reported a reversal in sex differences in creativity over a 10-year period in India. In 1969, boys in India had shown a consistent superiority in both the verbal and figural tests. Retesting a decade later, however, revealed that the advantage in both verbal and figural creativity had shifted in favor of the girls. Still other studies indicated that female students were more creative as compared to the male students. So the creativity differs significantly on the bases of gender. Female academically gifted students were found to be more creative and have better personality characteristics than male academically gifted students (Dalal & Rani, 2013; Sethi, 2012; Nadim & Wani, 2013; Deshmukh, 1978). Statistically significant differences were found between the creativity of male and female senior college students with low achievement on total creativity and also on Fluency, Flexibility and Elaboration dimensions where as insignificant difference was found on originality dimension (Wasake, 2014). Baer & Kaufman (2008) reported that there were few studies indicating the advantage of females over males, in terms of divergent thinking (Singh, 1979; Rejskind, Rapagna & Gold, 1992); but, many more studies showed mixed results or no significant differences (e.g., Goldsmith & Matherly, 1988; see Baer & Kaufman, 2008 for a comprehensive review). Overall, the display of regular gender differences has been vague. Males were found better than females on certain aspects of creativity but females were generally good than males on others (Ai, 1999).

Girls recorded superiority over boys in problem finding while boys surpassed them on spontaneous fluency and cognitive flexibility but there was no significant gender difference on overall divergent thinking (Joseph Achieng Rabari; Francis Chisikwa Indoshi & Tony Okwach Omusonga, 2011). Conti, Collins & Picariello (2001) observed that girls were less creative in competitive situations and boys were more creative in competitive situations. Lau & Li (1996) revealed that boys were more creative than girls. Razik (1964) found that girls outranked boys in their creative ability. Women showed higher scores on creativity than men (Bowers 1971; Anne, 1974; & Tripathi, 1983).

The studies presented thus far provide evidence that females have mostly higher creativity scores compared to males. However, opposed to the previous results, some studies revealed that males scored higher than females in creative thinking subtests. He et al. (2013) reported that males had superiority over the females in creativity test performance as demonstrated by both composite creative scores and individual subscale scores. Rathod (2012) revealed that Boys were more open minded, free thinking, bold, hence current affairs knowledge will be more and these all may lead them to have maximum divergent production ability than the girls. Girls are hard workers, prompt, punctual, and honest; they attain maximum divergent production ability as compared to boys. Ruth & Birren (1985) showed that men performed better than the women. Ghosh (2013) revealed that boys were found more creative than girls.

Differing from those studies, some studies indicated that there were no gender differences in creative thinking. These studies were mostly conducted in higher education settings. Ayyildiz-Potur & Barkul (2009) reported that there were no differences between males and females in their use of creative thinking abilities. No significant differences in creativity were found between males and females (Ester Come Brink 2003; Aitken-Harris, 2004). In the domain of cognitive styles Studies consistently find gender differences in its dimensions (Kaur & Oberoi, 2010). Armstrong (2010) revealed that, students whose dominant cognitive styles were Analytic attained higher grades for long-term solitary tasks involving careful planning and analysis of information. However, contrary to expectations, performance on tasks believed to be more suited to the Wholistic/Intuitive style was also higher for Analytic individuals, as was overall ability defined by final degree grades. Despite some studies reported no statistically significant gender differences in the (field-dependent & field independent) cognitive style (Al-Salameh, 2011; Reddy, 2013), systematic

and intuitive cognitive style (Jena, 2013). Others reported that sex difference is not a matter for the creativity. It is the family environment and the socio-economic status is the cause and consequence for the creative components (Kumar, 1995; Trivedi & Bhargava, 2010). Further studies observed that boys do not differ significantly in all the variables of verbal creativity, except the measures of originality from the girls (Siddiqui, 2011). Khan & Gash (2012) reported that male and female collegians showed no significant difference in the elaboration dimension of non-verbal creativity. But in originality dimension of non-verbal creativity findings showed significant difference accordingly. Significant correlation was found between field independent students with higher scientific creativity than field dependent students (Sharma, 2013).

This study was designed to explore gender differences in some variables of divergent production abilities on a sample of the college students population. The questions we seek to address are: what are the differences in eight dimensions of divergent production abilities between male and females having different cognitive styles and second what is the inter-correlation between different dimensions of divergent production abilities for both males and females.

## **Method**

### **Participants**

For the present study the investigator has used descriptive cum survey method of research. The population of the present study consists of all part 1st college students studying in Govt. degree colleges of district Jammu, Samba, Kathua, Reasi and Udhampur in Jammu division. Multi stage random sampling technique was used and a sample of 8 colleges were selected out of these 27 colleges in proportion to the number of colleges in each district by randomization technique. The researcher has selected a sample of 290 students (145 Male and 145 Female) from the selected colleges by randomization technique. While collecting the data the investigator has personally visited and contacted the concerned officials of selected colleges and granted permission for data collection. For collecting the data the researcher has used cognitive style inventory developed by Praveen Kumar Jha and divergent production abilities test battery developed by Dr .K. N Sharma

### **Measures**

Divergent production abilities test (DPA) Designed by Dr .K. N Sharma. It is a battery of tests on divergent production abilities based on the model of Guilford. The battery contains 6 tests as: word production test, uses of things test, similarities test, sentence construction test, titles test, and elaboration test. These six tests are used to measure eight abilities, i.e. Word fluency Ideational fluency, Expressional fluency, Associational fluency, Spontaneous flexibility, Adaptive flexibility, Originality and Elaboration.

Cognitive style inventory (CSI) is a self-report inventory established by Praveen Kumar Jha in 2001. The inventory consists of two broad dimensions i.e. systematic and intuitive. It is self-report questionnaire which contains 40 items.

### **Procedure**

The questionnaires were filled out individually by students; in some cases students were guided in understanding the questions which they find difficult. There were no significant differences across gender in the method of administering the questionnaires.

**Results**

T test were performed to test for gender differences in eight dimensions of divergent production abilities and Pearson correlation was performed to see the relationship between these dimensions of divergent production abilities.

**TABLE 1: Values of Mean, S.D., SE<sub>DM</sub> and ‘t’ for male and female college students in word fluency as a dimension of divergent production abilities having different cognitive styles**

Cognitive Styles	Group	N	Mean	S.D	SE <sub>DM</sub>	T	df	Significance
Systematic	Male	21	49.23	9.39	3.75	<b>0.24</b>	40	NS
	Female	21	48.33	9.31				
Intuitive	Male	11	48.54	10.54	5.30	<b>0.32</b>	14	NS
	Female	5	46.8	5.15				
Integrated	Male	35	52	11.45	2.70	<b>0.74</b>	77	NS
	Female	44	54	12.33				
Undifferentiated	Male	45	50.15	8.77	2.04	<b>0.62</b>	72	NS
	Female	29	51.44	8.47				
Split	Male	33	48.09	6.29	1.60	<b>1.25</b>	77	NS
	Female	46	46.39	7.50				

Review of Table 1 shows that the computation value of *t* for male and female college students in word fluency, having systematic, intuitive, integrated, undifferentiated and split styles is 0.24, 0.32, 0.74, 0.62 and 1.25 which is well below the table value of *t* 2.02, 2.14, 1.99, 1.99 and 1.99 at 0.05 level of significance for 40, 14, 77, 72 and 77 degrees of freedom respectively. The calculated value thus, falls short of the table value. The value of *t* is therefore, not significant. It can therefore, said that there were no significant gender differences in word fluency among college students having systematic, intuitive, integrated, undifferentiated and split cognitive style.

**TABLE 2: Values of Mean, S.D., SE<sub>DM</sub> and ‘t’ for male and female college students in ideational fluency as a dimension of divergent production abilities having different cognitive styles**

Cognitive Styles	Group	N	Mean	S.D	SE <sub>DM</sub>	T	df	Significance
Systematic	Male	21	49.33	10.54	3.03	<b>0.12</b>	40	NS
	Female	21	48.95	8.53				

Intuitive	Male	11	51.81	9.61	4.73	<b>0.67</b>	14	NS
	Female	5	48.6	3.49				
Integrated	Male	35	49.45	12.34	2.48	<b>1.61</b>	77	NS
	Female	44	53.31	9.69				
Undifferentiated	Male	45	50.37	8.07	2.36	<b>0.53</b>	72	NS
	Female	29	49.10	12.31				
Split	Male	33	49.51	8.62	2.00	<b>0.85</b>	77	NS
	Female	46	47.80	8.92				

Review of table 2 shows that the computation value of  $t$  for male and female college students in ideational fluency having systematic, intuitive, integrated, undifferentiated and split styles is 0.12, 0.67, 1.61, 0.53 and 0.85 which is well below the table value of  $t$  2.02, 2.14, 1.99, 1.99 and 1.99 at 0.05 level of significance for 40, 14, 77, 72 and 77 degrees of freedom respectively. The calculated value thus, falls short of the table value. The value of  $t$  is therefore, not significant. It can therefore, said that there were no significant gender differences in ideational fluency among college students having systematic, intuitive, integrated, undifferentiated and split cognitive style.

**TABLE 3: Values of Mean, S.D.,  $SE_{DM}$  and 't' for male and female college students in associational fluency as a dimension of divergent production abilities having different cognitive styles**

Cognitive Styles	Group	N	Mean	S.D	$SE_{DM}$	T	Df	Significance
Systematic	Male	21	52.14	11.74	2.90	<b>1.29</b>	40	NS
	Female	21	48.38	5.54				
Intuitive	Male	11	49.09	10.52	5.41	<b>0.27</b>	14	NS
	Female	5	47.6	6.16				
Integrated	Male	35	49.94	9.10	2.50	<b>*1.99</b>	77	Significant at 0.05 level
	Female	44	54.93	12.41				
Undifferentiated	Male	45	50.86	9.58	2.10	<b>1.26</b>	72	NS
	Female	29	48.20	7.57				
	Male	33	47.57	8.72				

Split	Female	46	47.28	9.01	2.03	<b>0.14</b>	77	NS
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Review of Table 3 shows that the computation value of  $t$  for male and female college students in associational fluency having systematic, intuitive, undifferentiated and split styles is 1.29, 0.27, 1.26 and 0.14 which is well below the table value of  $t$  2.02, 2.14, 1.99 and 1.99 at 0.05 level of significance for 40, 14, 72 and 77 degrees of freedom respectively. The value of  $t$  is therefore, not significant. It can therefore, said that there exists no significant gender differences in associational fluency among college students having systematic, intuitive, integrated, undifferentiated and split cognitive style. But significant differences were found between male and female college students in associational fluency having integrated cognitive style as the value of  $t$  1.99 equals the table value of  $t$  1.99 at 0.05 level of significance for 77 degrees of freedom. It can therefore, said that there were significant gender differences in associational fluency among college students having integrated cognitive style.

**TABLE 4: Values of Mean, S.D.,  $SE_{DM}$  and ' $t$ ' for male and female college students in expressional fluency as a dimension of divergent production abilities having different cognitive styles**

Cognitive Styles	Group	N	Mean	S.D	$SE_{DM}$	T	df	Significance
Systematic	Male	21	47.57	11.49	3.27	<b>0.65</b>	40	NS
	Female	21	49.71	9.06				
Intuitive	Male	11	51.81	13.08	6.77	<b>0.20</b>	14	NS
	Female	5	50.4	8.02				
Integrated	Male	35	52.17	9.76	2.50	<b>0.86</b>	77	NS
	Female	44	50.00	11.98				
Undifferentiated	Male	45	50.22	9.00	2.13	<b>1.62</b>	72	NS
	Female	29	46.75	8.92				
Split	Male	33	48.63	9.28	2.08	<b>1.46</b>	77	NS
	Female	46	51.67	8.82				

Review of table 4 shows that the computation value of  $t$  for male and female college students in expressional fluency having systematic, intuitive, integrated, undifferentiated and split styles is 0.65, 0.20, 0.86, 1.62 and 1.46 which is well below the table value of  $t$  2.02, 2.14, 1.99, 1.99 and 1.99 at 0.05 level of significance for 40, 14, 77, 72 and 77 degrees of freedom respectively. The calculated value thus, falls short of the table value. It can therefore, said that there were no significant gender differences in expressional fluency among college students having systematic, intuitive, integrated, undifferentiated and split cognitive style.

**TABLE 5: Values of Mean, S.D., SE<sub>DM</sub> and 't' for male and female college students in spontaneous flexibility as a dimension of divergent production abilities having different cognitive styles**

Cognitive Styles	Group	N	Mean	S.D	SE <sub>DM</sub>	T	df	Significance
Systematic	Male	21	51.28	10.22	2.76	<b>0.55</b>	40	NS
	Female	21	49.76	6.92				
Intuitive	Male	11	52.09	10.99	5.88	<b>0.25</b>	14	NS
	Female	5	53.6	8.17				
Integrated	Male	35	49.97	11.73	2.48	<b>*2.01</b>	77	Significant at 0.05 level
	Female	44	54.97	10.33				
Undifferentiated	Male	45	53.06	8.71	3.03	<b>1.20</b>	72	NS
	Female	29	50.03	12.91				
Split	Male	33	51.51	9.34	2.01	<b>0.98</b>	77	NS
	Female	46	49.5	8.68				

Review of table 5 shows that the computation value of  $t$  for male and female college students in spontaneous flexibility having systematic, intuitive, undifferentiated and split styles is 0.55, 0.25, 1.20 and 0.98 which is well below the table value of  $t$  2.02, 2.14, 1.99 and 1.99 at 0.05 level of significance for 40, 14, 72 and 77 degrees of freedom respectively. The value of  $t$  is therefore, not significant. It can therefore, said that there exists no significant gender differences in spontaneous flexibility among college students having systematic, intuitive, integrated, undifferentiated and split cognitive style. But significant differences were found between male and female college students in spontaneous flexibility having integrated cognitive style as the value of  $t$  2.01 exceeded the table value of  $t$  1.99 at 0.05 level of significance for 77 degrees of freedom. It can therefore, said that there were significant gender differences in spontaneous flexibility among college students having integrated cognitive style.

**TABLE 6: Values of Mean, S.D., SE<sub>DM</sub> and ‘t’ ratio for male and female college students in adaptive flexibility as a dimension of divergent production abilities having different cognitive styles**

Cognitive Styles	Group	N	Mean	S.D	SE <sub>DM</sub>	T	df	Significance
Systematic	Male	21	52.85	9.99	2.58	<b>*2.25</b>	40	Significant at 0.05 level
	Female	21	47.04	5.80				
Intuitive	Male	11	50.63	6.39	3.95	<b>1.52</b>	14	NS
	Female	5	44.6	7.79				
Integrated	Male	35	50	6.23	2.31	<b>0.39</b>	77	NS
	Female	44	49.09	12.50				
Undifferentiated	Male	45	50.53	4.67	1.89	<b>**3.20</b>	72	Significant at 0.01 level
	Female	29	44.48	11.32				
Split	Male	33	50.60	5.86	1.60	<b>1.83</b>	77	NS
	Female	46	47.67	7.72				

Review of table 6 shows that the computation value of  $t$  for male and female college students in adaptive flexibility having intuitive, integrated and split styles is 1.52, 0.39, and 1.83 which is well below the table value of  $t$  2.14, 1.99 and 1.99 at 0.05 level of significance for 14, 77 and 77 degrees of freedom respectively. It can therefore, said that there were no significant gender differences in adaptive flexibility among college students having intuitive, integrated and split styles. But significant differences were found between male and female college students in adaptive flexibility having systematic and undifferentiated style as the value of  $t$  2.25 and 3.20 exceeded the table value of  $t$  which is 1.99 at 0.05 level of significance for 40 and 77 degrees of freedom. It can therefore, said that there were significant gender differences in adaptive flexibility among college students having systematic and undifferentiated style.

**TABLE 7: Values of Mean, S.D., SE<sub>DM</sub> and ‘t’ for male and female college students in originality as a dimension of divergent production abilities having different cognitive styles**

Cognitive Styles	Group	N	Mean	S.D	SE <sub>DM</sub>	t	df	Significance
Systematic	Male	21	50.80	12.32	3.41	<b>0.05</b>	40	NS
	Female	21	50.61	9.03				
Intuitive	Male	11	48.00	8.87	4.91	<b>0.16</b>	14	NS
	Female	5	47.2	7.72				



Integrated	Male	35	51.4	10.31	2.38	<b>0.32</b>	77	NS
	Female	44	52.18	10.70				
Undifferentiated	Male	45	50.82	8.45	2.10	<b>**2.65</b>	72	Significant at 0.01 level
	Female	29	45.24	9.21				
Split	Male	33	48.60	10.18	2.23	<b>1.01</b>	77	NS
	Female	46	50.86	9.51				

Review of table 7 shows that the computation value of  $t$  for male and female college students in originality having systematic, intuitive, integrated and split styles is 0.05, 0.16, 0.32, and 1.01 which is well below the table value of  $t$  2.02, 2.14, 1.99 and 1.99 at 0.05 level of significance for 40, 14, 77 and 77 degrees of freedom respectively. It can therefore, said that there exist no significant gender differences in originality among college students having systematic, intuitive, integrated and split styles. But significant differences were found between male and female college level science students in originality having undifferentiated style as the value of  $t$  2.65 is greater than the table value of  $t$  1.99 at 0.05 level of significance for 72 degrees of freedom. It can therefore, said that there were significant gender differences in originality among college students having undifferentiated style.

**TABLE 8: Values of Mean, S.D.,  $SE_{DM}$  and ‘t’ for male and female college students in elaboration as a dimension of divergent production abilities having different cognitive styles**

Cognitive Styles	Group	N	Mean	S.D	$SE_{DM}$	T	df	Significance
Systematic	Male	21	51.52	7.70	2.59	<b>0.05</b>	40	NS
	Female	21	51.38	8.68				
Intuitive	Male	11	49.45	12.84	6.38	<b>0.54</b>	14	NS
	Female	5	46.00	5.36				
Integrated	Male	35	49.74	11.54	2.32	<b>1.15</b>	77	NS
	Female	44	52.43	9.09				
Undifferentiated	Male	45	50.84	8.74	2.29	<b>1.16</b>	72	NS
	Female	29	48.17	10.32				
	Male	33	48.66	9.75				

Split	Female	46	47.95	10.97	2.39	<b>0.07</b>	77	NS
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Review of table 8 shows that the computation value of  $t$  for male and female college students in elaboration, having systematic, intuitive, integrated, undifferentiated and split styles is 0.05, 0.54, 1.15, 1.16 and 0.07 which is well below the table value of  $t$  2.02, 2.14, 1.99, 1.99 and 1.99 at 0.05 level of significance for 40, 14, 77, 72 and 77 degrees of freedom respectively. The value of  $t$  is therefore, not significant. It can therefore, be said that there exists no significant gender differences in elaboration among college students having systematic, intuitive, integrated, undifferentiated and split cognitive style.

**Table 9: Results of correlation between the dimensions of divergent production abilities i.e., 1 word fluency, 2 Ideational fluency, 3 Associational fluency, 4 Expressional fluency, 5 Spontaneous flexibility, 6 Adaptive flexibility, 7 originality and 8 Elaboration among male college students (N=145)**

Pearson correlation	Mean	SD	1	2	3	4	5	6	7	8
1	50.01	10	—							
2	50	10	0.50	—						
3	50	10	0.32	0.43	—					
4	50	10	0.23	0.00	-0.00	—				
5	51.73	10.00	0.47	0.87	0.46	0.02	—			
6	51.5	10	0.15	0.16	0.07	0.28	0.14	—		
7	50	10	0.14	0.13	0.21	0.34	0.14	0.60	—	
8	50.05	10.05	0.21	0.27	0.19	0.07	0.33	0.27	0.32	—

Review of table 9 revealed that word fluency ( $r=.50, .32, .23, .47, .15, .14, .21$ ) was significantly correlated with ideational fluency, associational fluency, expressional fluency, spontaneous flexibility, adaptive flexibility, originality and elaboration. Ideational fluency ( $r=.43, 0.00, 0.87, 0.16, .13, .27$ ) was significantly correlated with associational fluency, spontaneous flexibility, adaptive flexibility, originality and elaboration but have no association with expressional fluency. Associational fluency ( $r= -0.00694, 0.464155, 0.075773, 0.210497, 0.199438$ ) was significantly correlated with, spontaneous flexibility, adaptive flexibility, originality and elaboration while as negatively associated with expressional fluency. Expressional fluency ( $r=0.021442, 0.289339, 0.344165, 0.075075$ ) was significantly correlated with spontaneous flexibility, adaptive flexibility, originality and not associated with elaboration. Spontaneous flexibility ( $0.144948, 0.143927, \text{ and } 0.332935$ ) was significantly correlated with adaptive flexibility, originality and elaboration. Adaptive flexibility ( $0.600841, 0.278909$ ) was significantly correlated with originality and elaboration. Originality ( $0.325065$ ) was significantly correlated with elaboration.

**Table 10: Results of correlation between the dimensions of divergent production abilities i.e., 1 word fluency, 2 Ideational fluency, 3 Associational fluency, 4 Expressional fluency, 5 Spontaneous flexibility, 6 Adaptive flexibility, 7 originality and 8 Elaboration among female college students (N=145)**

Pearson correlation	Mean	S.D	1	2	3	4	5	6	7	8
1	50.01	10.01	--							
2	50.07	10.01	0.42	---						
3	50	10	0.46	0.44	--					
4	50	10	-0.14	0.10	-0.04	--				
5	51.38	10.01	0.34	0.83	0.39	0.14	--			
6	47.25	10.1	-0.06	0.25	0.13	0.31	0.28	--		
7	50	10	-0.12	0.16	-0.00	0.42	0.20	0.74	--	
8	50	10.01	0.36	0.32	0.21	0.10	0.39	0.10	0.14	--

Review of table 10 revealed that word fluency ( $r=0.429617, 0.463782, -0.14602, 0.346371, -0.06695, -0.12963, 0.36482$ ) was significantly correlated with ideational fluency, associational fluency, spontaneous flexibility, and elaboration while as negatively correlated with expressional fluency, adaptive flexibility, originality. Ideational fluency ( $r=0.440067, 0.108049, 0.839781, 0.255856, 0.167595, 0.324135$ ) was significantly correlated with associational fluency, spontaneous flexibility, adaptive flexibility, originality and elaboration but have no association with expressional fluency. Associational fluency ( $r= -0.04822, 0.395127, 0.131908, -0.00682, 0.213387$ ) was significantly correlated with adaptive flexibility and elaboration while as negatively associated with spontaneous flexibility and originality. Expressional fluency ( $r=0.149311, 0.316043, 0.423018, 0.105154$ ) was significantly correlated with spontaneous flexibility, adaptive flexibility, originality and elaboration. Spontaneous flexibility ( $r=0.284153, 0.202139, 0.396341$ ) was significantly correlated with adaptive flexibility, originality and elaboration. Adaptive flexibility( $r= 0.74732, 0.108898$ ) was significantly correlated with originality and elaboration. Originality( $r=0.142607$ ) was significantly correlated with elaboration.

**Discussion**

Creativity is the most valued human quality. It is considered vital for shaping the man s future. Hardly there may be any one to overlook the importance of creativity. But it is not enough to recognize its importance the more important is that how we can gather knowledge on scientific principles and thus the knowledge accumulated is used to help man in the development of his creative potential. The discussion of the results based on the analysis and interpretation of data is presented in the foregoing pages. The results are discussed as under.

It was found that there were no significant gender differences in word fluency among college students having systematic cognitive style, intuitive cognitive style, integrated cognitive style, undifferentiated cognitive style and split cognitive styles. It may be due to the fact that in schools teachers treating both of them equally, parents are now more conscious about girl s education; girls are now becoming more advanced, both are getting and providing the same opportunities. Girls are now more open minded, bold, may have knowledge of current affairs all these reasons may lead them to have similar

divergent production ability as the boys. Also one more reason may be the accessibility of modern technology.

The results of the study were supported by findings of Siddiqui (2011) reported that boys and girls do not differ on the measure of fluency. Murugan and Rajendran (2013) found men and women teachers are similar so far as their word fluency is concerned.

Our results were not supported by the Ghosh (2013) found significant difference in fluency dimension of creativity among male and female school students. Sharma and Goyal (2012) found significant difference in fluency dimension of creativity among male and female high school students.

It was found that there were no significant gender differences in ideational fluency among college students having systematic cognitive style, intuitive cognitive style, integrated cognitive style, undifferentiated cognitive style and split cognitive styles.

The results were not supported by the findings of Murugan & Rajendran (2013) found that men and women teachers differ so far as their ideational fluency is concerned.

It was found that there were no significant gender differences in associational fluency among college students having systematic cognitive style, intuitive cognitive style, undifferentiated cognitive style and split cognitive styles whereas significant gender differences were found in associational fluency among college students having integrated cognitive style. It may be also because there is no social, religious, and cultural differences between them. One more reason may be due to the fact that these five districts are balanced in terms of economic development.

The results of the present study are in line with the findings of Siddiqui (2011) found that boys and girls do not differ on the measure of flexibility. Murugan and Rajendran (2013) observed men and women teachers differ so far as their associational fluency is concerned.

It was revealed that there were no significant gender differences in expressional fluency among college students having systematic cognitive style, intuitive cognitive style, integrated cognitive style, undifferentiated cognitive style and split cognitive styles.

The results of the present study do not supported by the findings of Murugan and Rajendran (2013) reported that men and women teachers differ so far as their expressional fluency is concerned.

It was found that there were no significant gender differences in spontaneous flexibility among college students having systematic style, intuitive style, and undifferentiated style and split styles whereas significant gender differences were found in spontaneous flexibility among college students having integrated cognitive style.

The findings were not supported by the results of Murugan and Rajendran (2013) observed that, the women B.Ed. trainees are better in their spontaneous flexibility than the men B.Ed. trainees. Ghosh (2013) reported significant differences in flexibility dimension of creativity among male and female school students. Sharma and Goyal (2012) found significant differences in flexibility dimension of creativity among male and female school students.

It was found that there were no significant gender differences in adaptive flexibility among college students having intuitive cognitive style, integrated cognitive style and split cognitive styles, whereas significant gender differences were found in adaptive flexibility among college students having systematic cognitive style and undifferentiated cognitive styles. The findings of the study were supported by the finding of Murugan and Rajendran (2013) found men and women teachers are similar so far as their adaptive flexibility is concerned.

It was found that there were no significant gender differences in originality among college students having systematic cognitive style, intuitive cognitive style, integrated cognitive style and split cognitive styles whereas significant gender differences were found in originality among college students having undifferentiated cognitive style. It may be due to the reason that girls are now equally active and become dominant risk takers as boys.

The findings of the study were supported by the findings of Siddiqi (2011) revealed that boys do not differ significantly on the dimension of originality.

Results of the present study were not supported by Khan and Gash (2012) found significant differences among male and female collegians in originality dimension of non-verbal creativity. Ghosh (2013) found significant difference in originality dimension of creativity among male and female school students. Sharma and Goyal (2012) found significant difference in originality dimension of creativity among male and female school students.

It was found that there were no significant gender differences in elaboration among college students having systematic cognitive style, intuitive cognitive style, integrated cognitive style, undifferentiated cognitive style and split cognitive style styles. It may be due to the fact that boys and girls are paying equal attention to details and have equal pace of concentration. The findings of the study were not supported by the results of Ozdemir and Cakmak (2008) found that male and female students differ on elaboration dimension of creativity. Cakmak (2005) found that creativity scores of female students in elaboration dimension were higher than the scores of male students. Nadim and Tariq (2013) found that female academically gifted students were found to be more creative. Sethi (2012) observed that female students were more creative as compared to the male students. Sharma and Rai (2012) found that girls juvenile delinquents children have more creativity than boys juvenile delinquent child. Results were supported by the findings of Khan and Gash (2012) observed that the male and female collegians show no significant difference on the elaboration dimension of non-verbal creativity. Kumar (1995) found that the sex difference is not a matter for the creativity.

#### **Limitations**

The Present study should be viewed in light of several limitations. Since the sample of the present study was small (male 145 and female 145) due to paucity of time, resources and availability of students. Therefore, results may limit the generalizability to the larger population. This study only focussed on five major districts of Jammu division i.e. Jammu, Samba, Udhampur, Kathua and Reasi; did not include all the districts of Jammu division and mostly included male and female population. Therefore, the results cannot be generalized to whole population. It did not included locality of students as one of its independent variable. It was also limited to general category students so the results cannot be generalized to reserved category students. In the study the researcher could not include the academic achievement of the students due to certain academic formalities and complexities. The research was limited to verbal creativity only.

#### **References**

- Aitken-Harris, J. (2004). Measured intelligence, achievement, openness to experience, and creativity. *Personality and Individual Differences*, 36(4), 913-929.
- Al-Salameh, E. M. (2011). A study of al-balqa applied university students cognitive style. *International Education Studies*, 4(3), 189-193.

- Anwar, M. N., Shamim-ur-Rasool, S., & Haq, R. (2012). A comparison of creative thinking abilities of high and low achievers secondary school students. *International Interdisciplinary Journal of Education, 1(1)*, 166.
- Armstrong, S. J. (2010). The influence of individual cognitive style on performance in management education. *Educational Psychology, 20(3)*, 323-339
- Awamleh, H., Al Farah, Y., & El-Zraigat, I. (2012). The level of creative abilities dimensions according to Torrance formal test (B) and their relationship with some variables (Sex, Age GPA). *International Education Studies, 5(6)*, 1386-148. <http://dx.doi.org/10.5539/ies.v5n6p138>
- Ayyildiz-Potur, A., & Barkul, O. (2009). Gender and creative thinking in education: A theoretical and experimental overview. *ITU Journal of the Faculty of Architecture, 6(2)*, 446-57.
- Baer, J., & Kaufman, J. C. (2008). Gender differences in creativity. *Journal of Creative Behavior, 42*, 75-105.
- Bowers, K.S. (1971). Sex and susceptibility as moderator variables in the relationships of creativity and hypnotic suggestibility. *J. of Abnormal Psychology, 78(1)*, 93-100.
- Cakmak, A. (2005). An investigation of creativity of 6 year pupils attending pre-school in village and city. *Ankara University, (11)*.
- Conti, R., Collins, M., & Picariello, M. (2001). The impact of competition on intrinsic motivation and creativity: Considering gender, gender segregation, and gender role identity. *Personality and Individual Differences, 31*, 1273-1289.
- Dalal, S., & Rani, G. (2013). Relationship of creativity and intelligence of senior secondary students. *International Journal of Humanities and Social Science Invention, 2(7)*, 70-74
- DeMoss, K., Milich, R., & DeMers, S. (1993). Gender, creativity, depression, and attributional style in adolescents with high academic ability. *Journal of Abnormal Child Psychology, 21(4)*, 455-467.
- Deshmukh, M.N. (1984). *Creativity in Classroom?* S. Chand & Co. Ltd., Ramnagar.
- Ghosh, S. M. (2013). Gender differences in creativity among school students. *Indian journal of applied research, 3(7)*, 583-584.
- Ghosh, S.M. (2013). Gender differences in creativity among school students. *Indian journal of applied research, 3 (7)*, 583-584.
- Goldsmith, R. E., & Matherley, T. A. (1988). Creativity and self-esteem: A multiple operationalization validity study. *Journal of Psychology, 122*, 47-56.
- Halpern, D. F., & LaMay, M. L. (2000). The smarter sex: A critical review of sex differences in intelligence. *Educational Psychology Review, 12(2)*, 229-246. doi:10.1023/A:1009027516424
- He, W., Wong, W., Li, Y., & Xu, H. (2013). A study of the greater male variability hypothesis in creative thinking in Mainland China: Male superiority exists. *Personality and Individual Differences, 55*, 882-886.
- Hong, E., Peng, Y., O Neil, H. F., & Wu, J. (2013). Domain-general and domain-specific creative-thinking tests: Effects of gender and item content on test performance. *The Journal of Creative Behavior, 47(2)*, 89-105. <http://dx.doi.org/10.1002/jocb.26>
- Jena, P. C. (2013). Cognitive styles of rural senior secondary school students in relation to their gender and stream. *International Journal of Education and Psychological Research (IJEPR), 2(4)*, 37-44.

- Rabari, J. A., Indoshi, F. C. and Okwach, T. (2011). Differences in divergent thinking among secondary school physics students. *Journal of Emerging Trends in Educational Research and Policy Studies (JETERAPS)*, 2(4), 216-227.
- Kaur, J., & Oberoi, S. (2010). Impact of gender, locale and school environment on cognitive style of adolescents. *Journal of education and pedagogy*, 2(2), 24-30
- Khaleefa, O.H., Erdos, G., & Ashria, I.H. (1996). Gender and creativity in an Afro- Arab Islamic culture: the case of Sudan. *The Journal of Creative Behavior*, 30, 52-60.
- Khan, N., & Gash, N.A. (2012). A comparative study of collegians on the non-verbal dimensions of creativity - in Kashmir. *Basic Research Journal of Education Research and Review*, 1(2), 19-22.
- Kousoulas, F., & Mega, G. (2009). Students' divergent thinking and teachers' ratings of creativity: Does gender play a role? *The Journal of Creative Behavior*, 43(3), 209-222. <http://dx.doi.org/10.1002/j.2162-6057.2009.tb01315.x>
- Kumar, S. (1995). A study of creative thinking among boys and girls in relation to socio-economic status. M. Phil. University of Kashmir, *Review of Educational Research*, (22), [www.edupsy.article.org](http://www.edupsy.article.org).
- Lau, S., & Li, W.L. (1996). Peer status and perceived creativity: Are popular children viewed by peers and teachers as creative. *Creativity Research Journal*, 9(4), 347-352.
- Murugan, P. V., & Rajendran, K.K. (2013). Creativity and social intelligence of Bed trainees. *International Journal of Informative and Futuristic Research (IJIFR)*, 1(5), 70-76.
- Nadeem, N.A., & Wani, T.A. (2013). Personality structure and creativity potential of male and female academically gifted students. *Basic Research Journal of Education Research and Review*, 2(3), 55-58.
- Ozdemir, S. M., and cakmak, A. (2008). The effect of drama education on prospective teachers' creativity. *International journal of instruction*, 1(1), 14-30.
- Raina, T. (1980). Sex differences in creativity in India: A second look. *The Journal of Creative Behavior*, 14, 218-219.
- Rathod, M. (2012). A study of correlation between the divergent production ability in relation to socio-economic status. *International Indexed & Referred Research Journal*, 4(40), 17-18.
- Razik, T.M.A. (1964). An *Investigation of Creative Thinking among College Students*. *Dissertation Abstracts International*, 24(7), 2775.
- Reddy, M. (2013). Cognitive styles of primary school teachers. *International Journal of Scientific Research*, 2(7), 16-18
- Rejskind, F. G., Rapagna, S. O., & Gold, D. (1992). Gender differences in children's divergent
- Ruth, J.E., & Birren, J.E. (1985). Creativity in adulthood and old age: Relations to intelligence, sex, and mode of testing. *International Journal of Behavioral Development*, 8, 99-109.
- Sethi, N. (2012). A study of academic achievement in mathematics in relation to creativity of high school students. *Indian Streams Research Journal*, 2(4), 1-4
- Sharma, M. R., & Rai, R. (2012). A study of creativity among delinquent children at secondary level in Meerut. *International Journal of Scientific and Research Publications*, 2(10), 2-4.
- Sharma, N. (2013). Scientific creativity in relation to cognitive style and achievement in science of secondary school students. *Scholarly Research Journal for Interdisciplinary Studies*, 1(4), 1354-1363.
- Siddiqui, S. (2011). A comparative study of creativity among boys and girls of class VII. *Indian Educational Review*, 49(2), 5-14

- Singh, R. P. (1979). Divergent thinking abilities and creative personality dimensions of bright adolescent boys and girls. *Indian Educational Review*, 13, 82-91.
- Stephens, K. R., Karnes, F. A., & Whorton, J. (2001). Gender differences in creativity among American Indian third and fourth grade students. *Journal of American Indian Education*, 40(1), 1619.
- Tripathi, V.K.D. (1983). A study of personality traits as related to creativity among male and female teacher trainees of high, middle and low socioeconomic status, Ph.D. Edu., Avadh U.
- Trivedi. K., & Bhargava, R. (2010). Relation of creativity and educational achievement in adolescence. *J Psychology*, 1 (2), 85-89.
- Victor, K.P., & Anne L.H. (1974). Relationship between creativity and Rule orientation Behaviour. *Perceptual Motor Skills*. 38(3), 1163-71.
- Wang, A. Y. (2011). Contexts of creative thinking: A comparison on creative performance of student teachers in Taiwan and the United States. *Journal of International and Cross-Cultural Studies*, 2(1), 1614.
- Wasake, P.M. (2014). A comparative study of creativity of male and female senior college students in Chandrapur taluka reference to their achievement. *Online International Interdisciplinary Research Journal*, (4), 258-261.