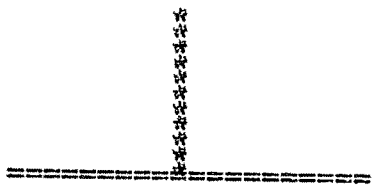
P A R T T W O

DISCUSSION OF WORK ON HAND



C H A P T E R IV

CREATIVITY AND GIFTEDNESS

= =

4.0 INTRODUCTION

This chapter deals with the study of creativity of the intellectually gifted children. As noted earlier, to study creativity, Torrance's tests of creativity (verbal form A and figural form B) were used.

The description of the tests, instructions to administer the tests and the procedure for scoring the responses have already been given in the manual by the author. This chapter now deals with the analysis of the data and the discussion of the results of creativity mainly in relation to different levels of intelligence, sex and age.

The investigator has divided the discussion on creativity under four parts as under.

(a) In the first part, all seven types of scores on creativity of all capably gifted children have been

separately studied with respect to their levels of intelligence (giftedness) and sex, i.e. the creativity scores of both boys and girls who possessed an I.Q. of 120 or above were analysed. This consideration presented a sample of 935 subjects (as shown in Table 3.4 earlier) and their data on creativity (seven types of scores as described earlier) were subjected to statistical technique of analysis of variance (F-test). The experimental design formed for tabulation and analysis of data was a 2 x 3 factorial design with two levels of sex, viz., boys and girls; and three levels of I.Q. representing giftedness viz. extraordinary (above 140 I.Q.), very superior (130 - 139 I.Q.), and superior (120 - 129 I.Q.), enabling the investigator to study the main effects of sex and giftedness as well as their interaction effects, if any.

(b) In the second part, the data were analysed, separating out the effect of one more variable of age, besides I.Q. and sex in the first analysis of capably gifted children. The classification or tabulation of data based on age, sex, and I.Q. with sufficient number of observations in cells, picked out from the first sample of 935 capably gifted subjects yielded a sample of 683 capably gifted subjects (as shown in Table 3.5 earlier), and their data on creativity (seven types of scores) were

again analysed in the same way in a 3 x 2 x 2 factorial design with three levels of age viz. 13, 14 and 15 years; two levels of sex viz., boys and girls, and only two levels of I.Q., viz., highly superior (above 130 I.Q.) and superior (120 - 129 I.Q.). In this case only two levels of I.Q. (giftedness) were studied viz. highly superior and superior. The extraordinary and very superior of the earlier section were combined to form one category, called highly superior (above 130 I.Q.), which consequently had sufficient number for purpose of statistical analysis. Moreover, the extraordinary and very superior groups, did not show much difference in many cases in the analysis of data of larger sample above. Hence also these two groups were combined into one group of highly superior in this case. This 3 x 2 x 2 factorial design enabled the investigator to understand the main effects of these three variables as well as their possible interactions.

(c) Further, the data of a special group of functionally gifted children or children with manifest giftedness, i.e. those who had I.Q. of 120 or above and who achieved 60 per cent of marks in last annual school examination (as described earlier) were studied. This consideration gave a sample of 325 out of 935 (as shown

in Table 3.6 earlier) and their data on creativity (seven types) in a 2 x 3 experimental factorial design representing two levels of sex and three levels of I.Q. (as shown earlier were analysed in the same way.

(d) Finally highly gifted (extraordinary with I.Q. above 140) and non-gifted (with I.Q. below 90) groups of children of both sexes were studied with respect to their creativity scores (seven types) in a 2 x 2 factorial design with two levels of sex and two levels of giftedness. The sample for these data consisted of 143 subjects as shown in Table 3.7 earlier.

The separate analysis of data in these four samples was done in order to gain more and specific information. All these results were compared also for a check on common findings. The following pages are now devoted to the discussion of all these results.

4.1 CREATIVITY OF CAPABLY GIFTED CHILDREN IN RELATION TO GIFTEDNESS AND SEX (SAMPLE OF 935 SUBJECTS)

As mentioned above, first, the creativity scores of all 935 intellectually (capably) gifted children were analysed to study creativity as a function of giftedness and sex. For this purpose, seven types of creativity scores were analysed, viz. verbal fluency, verbal flexibility, verbal originality, figural fluency, figural flexibility, figural originality

and figural elaboration, as scored on Torrance Creativity Tests (verbal Form A and figural Form B described earlier).

The data in these tables (a) of mean scores are given sexwise according to three levels of all intellectually capably gifted children (935), viz. (1) extra ordinary with I.Q. of 140 and above, (2) very superior with I.Q. 130-139 and (3) superior with I.Q. 120-129. This formed a 2 x 3 factorial design. All the scores on creativity were first converted into T-scores as required per manual, and then were analysed by adequate statistical techniques. In the present case the data were subjected to statistical technique of analysis of variance (F-test) to study over-all difference and also L.S.D. test to study the difference between any two specific main or sub-groups. All these results have been presented in Tables 4.1 to 4.7(a),(b) and (c) -(a) giving mean scores of main as well as sub-groups formed by 3 x 2 factorial design, (b) showing the summary of results of analysis of variance (F-test) and (c) displaying the results of L.S.D. test where needed. Scores on each of seven aspects of creativity have been analysed and discussed separately in the following lines, giving the results in respective seven tables 4.1 to 4.7. As regards the L.S.D. results, it should be noted that sometimes even the larger gap or mean

difference obtained has not been found significant, while in some cases the smaller gap turns out to be significant. This has been possible because of unequal number in each sub-group, when number is large or error term is small, relatively small gap may be significant, and when number is small or error term is large even large gap may be insignificant. The results all over should be understood in this light.

(i) Fluency (Verbal Tasks) :

To study the fluency of the intellectually gifted children, Torrance Tests of Creative Thinking(verbal test A) was administered to all the subjects and their responses were scored as per scoring key devised by the author of the test. These scores were converted into T-scores. These T-scores were summarized and analyzed statistically to study fluency of the intellectually gifted children, the sex differences in fluency and the interaction if any.

To test statistically whether level of giftedness and sex influence fluency scores of the intellectually gifted children, the scores on fluency were arranged in a 2 x 3 factorial design representing two levels of sex and three levels of I.Q. as described earlier, and they were subjected to the technique of analysis of variance (F-test) as well

as L.S.D. test, and the results have been summarized in Tables 4.1(a), (b) and (c); (a) giving mean scores of each group, (b) showing results of F-test and (c) presenting results of L.S.D. test.

Table 4.1(a) : Showing Mean Scores on Fluency (verbal) of each of main and sub-groups (Sample size : 935) (Sex X I.Q.)

Sex	Extraordinary	Very Superior	Superior	Total
Boys :				
Nos.	15	76	334	425
Scores	886	4010	16915	21811
Mean	59.06	52.76	50.64	51.32
Girls :				
Nos.	36	145	329	510
Scores	1767	7762	16683	26212
Mean	49.08	53.53	50.70	51.40
Total :				
Nos.	51	221	663	935
Scores	2653	11772	33598	48023
Mean	52.01	53.26	50.67	51.36

Table 4.1(b) : Showing Summary of Results of Analysis of Variance

Sources of Variance	df	Sum of Squares (SS)	Mean Squares (Variance)	F-ratios	Remarks
Between I.Q. (Giftedness)	2	1136.29	568.15	19.99	Sig. beyond .01 level
Between Sex	1	1.34	1.34	0.047	Not Sig.
Interaction : I.Q. x Sex	2	1084.03	542.02	19.07	Sig. beyond .01 level
Within Groups (Error Term)	929	26398.15	28.42	-	-
Total	934	28619.81	-	-	-

From the statistical Table :

For df =	2/929	1/929
F at .05 =	3.00	3.85
F at .01 =	4.63	6.66

Table 4.1(c) : Showing Results of L.S.D. Test for Pair Differences among I.Q. and Sex Sub-groups

$$L.S.D. = t \times \sqrt{MS_w / n_1 + MS_w / n_2}$$

(t for df of MS_w : at .05 = 1.96 and at .01 = 2.58)

	Obtained Mean Diff.	Required Diff. .05	Required Diff. .01	Significance
(i) For I.Q. Differences :				
Among Main Groups :				
Very Extraordinary vs Superior	1.25	1.74	2.29	Not Sig.
Extraordinary vs Superior	1.34	1.51	1.98	Not Sig.
Very Superior vs Superior	2.59	0.803	1.05	Sig. .01

(continued)

(Table 4.1(c) continued)

	Obtained Mean Differences	Required Differences .05	Required Differences .01	Significance
Among Boys :				
Extraordinary vs Very Superior	6.30	2.96	3.90	Sig. at .01
Extraordinary vs Superior	8.42	1.41	3.64	Sig. at .01
Very Superior vs Superior	2.12	1.23	1.62	Sig. at .01
Among Girls :				
Extraordinary vs Very Superior	4.45	1.94	2.55	Sig. at .01
Extraordinary vs Superior	1.62	1.84	2.43	Not Sig.
Very Superior vs Superior	2.83	1.04	1.37	Sig. .01
(ii) For Sex Differences				
Among Extraordinary Boys vs Girls	9.48	3.21	4.23	Sig. .01
Among Very Superior Boys vs Girls	0.77	1.47	1.94	Not Sig.
Among Superior Boys vs Girls	0.06	0.82	1.08	Not Sig.

As it could be seen from Table 4.1(b), intelligence (Giftedness) level on the whole played a highly significant role (beyond .01 level) in contributing to creativity (verbal fluency). And herein very superior was the best on fluency (with mean score of 53.26); next best was extraordinary (52.01) and then stood superior group (mean = 50.67); extra ordinary group was neither different from very superior group nor from superior group, but only one pair viz. very superior vs superior showed a significant difference beyond .01 level (Table 4.1(c)).

Next, sex was statistically an insignificant factor, but there was a significant interaction between I.Q. and Sex. This means that though sex by itself was on the whole insignificant in contributing to fluency, i.e. though there were no sex differences in fluency, sex interacted significantly (beyond .01 level) with intelligence in influencing the fluency scores. This becomes clear from closer examination of the mean scores of each sub-group in Table 4.1(a) and results of L.S.D. test in Table 4.1(c). Thus, among boys the extra - ordinary group was the best on fluency (59.06), then very superior (52.76) a nd last superior (50.64) as in expected direction, while in case of girls the very superior group stood highest on fluency (53.53) though not as much highest among boys, then superior (50.70) and last extraordinary (49.08) - all pairs being statistically and significantly different between themselves; except one insignificant pair viz. extraordinary vs superior girls (Table 4.1(c)-i). And there were significant sex differences only in case of extra- ordinary group, but not at all in case of very superior and superior groups (Table 4.1(c)-ii). This accounts for significant interaction between I.Q. level and sex.

To sum up, intelligence affected verbal fluency (creativity) on the whole and more specifically among boys; and sex was not significant factor on the whole, nor in the very superior and superior groups, but only in the extraordinary group.

(ii) Flexibility (Verbal Tasks) :

Similarly, the flexibility scores obtained by the intellectually gifted children on Torrance Test of Creativity Thinking (verbal test form A) were converted into T-scores, and these data arranged in a 2 x 3 factorial design were analysed with the help of statistical technique of analysis of variance (F-test) as well as the L.S.D. test. The results have been summarized in Tables 4.2(a), (b) and (c) below, presented on the same lines as the preceding tables.

Table 4.2(a) : Showing Mean Scores on Flexibility (Verbal) of each of main and Sub-groups (Sample Size : 935) (Sex X I.Q.)

Sex	Extra-ordinary	Very Superior	Superior	Total
Boys :				
Nos.	15	76	334	425
Scores	895	4144	16925	21964
Mean	59.66	54.52	50.67	51.68
Girls :				
Nos.	36	145	329	510
Scores	1897	7091	16837	25825
Mean	52.69	48.90	51.17	50.64
Total :				
Nos.	51	221	663	935
Scores	2792	11235	33762	47789
Mean	54.74	50.83	50.92	51.11

Table 4.2(b): Showing Summary of the Results of Analysis of Variance

Sources of Variance	df	Sum of Squares (Ss)	Mean Squares (Variance)	F-ratios	Remarks
Between I.Q. (Giftedness)	2	713.52	356.76	2.67	Not Sig.
Between Sex	1	252.06	252.06	1.88	Not Sig.
Interaction: I.Q. x Sex	2	1881.06	940.53	7.03	Sig.at .01
Within Groups (Error term)	929	124258.79	133.76		
Total	934	127105.43			

From the statistical table :

For df =	2/929	1/929
F at .05 =	3.00	3.85
F at .01 =	4.63	6.66

Table 4.2(c): Showing Results of L.S.D. Test and for Pair Differences among I.Q. and Sex Sub-groups

$$L.S.D. = t \times \sqrt{MS_W / N_1 + MS_W / N_2}$$

(t for df of MS_W : at .05 = 1.96 and at .01 = 2.58)

	Obtained Mean Differences	Required Differences .05	Required Differences .01	Significance
(i) For I.Q. Differences : Among Main Groups				
Extraordinary vs Very Superior	3.91	3.54	4.66	Sig.at .05
Extraordinary vs Superior	3.82	3.33	4.38	Sig. at .05
Very Superior vs Superior	0.09	1.76	2.32	Not Sig.

(continued)

(Table 4.2(c) continued)

	Obtained Mean Differences	Required Differences .05	Required Differences .01	Significance
Among Boys				
Extraordinary vs Very Superior	5.14	6.41	8.43	Not Sig.
Extraordinary vs Superior	8.99	5.98	7.87	Sig. at .01
Very Superior vs Superior	3.85	2.82	3.72	Sig. at .01
Among Girls				
Extraordinary vs very Superior	3.79	4.21	5.55	Not Sig.
Extraordinary vs superior	1.52	3.98	5.23	Not Sig.
Very Superior vs Superior	2.27	2.25	2.97	Sig. at .05
(ii) For Sex Differences :				
Among Extraordinary Boys vs Girls	6.97	6.96	9.15	Sig. at .05
Among very Superior Boys vs Girls	5.62	3.21	4.23	Sig. at .01
Among Superior Boys vs Girls	0.50	1.74	2.29	Not Sig.

As it would be seen from results in Table 4.2(b), neither the giftedness (I.Q. level) nor sex on the whole appeared to be a significant factor contributing to flexibility aspect of creativity (verbal). This apparent lack of significance in case of I.Q. level seems to be strange, though it is always expected to play a role. However, this does not mean that I.Q. level did not contribute, since there is significant interaction between I.Q. level and sex (beyond .01 level), which obscures the I.Q. main effect.

On examination of the results of sub-groups in Table 4.2(a) and 4.2(c), it is observed that though on the whole there were no overall differences (Table 4.2(b)) between I.Q. levels, the application of L.S.D. test shows that the extraordinary groups (54.74) significantly different from both very superior and superior groups which were mutually not different(Table 4.2(c)). This again seems apparantly inconsistent, but it may be possible because of unequal numbers in three groups, the significantly different group having the least number. Further (in Table 4.2(c) among the boys, the extraordinary group was significantly better (59.66) on flexibility than the superior group (50.67), and very superior group scored significantly higher (54.52) than the superior (50.67), while the extraordinary did not differ from the very superior though the former tended to be higher; but among the girls there were differences only between one pair, viz. very superior and superior, and there the superior scored higher (51.17) than the very superior (48.90). In other words, though the extraordinary were highest in case of both boys and girls; the very superior were significantly higher (as expected) than the superior in case of boys, while the superior were unexpectedly and significantly higher than the very superior in case of girls; and this accounts for lack

significant differences in I.Q. level on the whole, and at the same time this explained significant interaction.

Similarly, boys scored significantly higher than girls in case of the extraordinary (59.66 vs 52.69) as well as the very superior (54.52 vs 48.90) while girls secured somewhat (not significantly) higher (51.17) than boys (50.67) in case of the superior group. This accounts for overall lack of significant sex differences. This differential behaviour of boys and girls at different levels of I.Q. as seen from results in Table 4.2(c) accounts also for significant interaction between I.Q. and Sex.

To sum up, though apparently I.Q. and sex did not turn out to be significant on the whole, I.Q. level contributed significantly to verbal flexibility, particularly in case of boys, and sex was significant in case of the extraordinary and the very superior groups.

(iii) Originality (Verbal) :

The results of statistical analysis of T-scores on originality aspect of creativity on Torrance Test (F-test and L.S.D. tests applied to data in 2 x 3 factorial design), have been summarized in Tables 4.3(a), (b) and (c).

Table 4.3(a) : Showing Mean Scores on Originality (Verbal) of each of Main and Sub-Groups (Sample Size : 935) (Sex x I.Q.)

Sex	Extra-ordinary	Very Superior	Superior	Total
Boys :				
Nos.	15	76	334	425
Scores	896	4110	16485	21491
Mean	59.73	54.07	49.35	50.57
Girls :				
Nos.	36	145	329	510
Scores	1824	7705	16901	26430
Mean	50.66	53.13	51.37	51.82
Total :				
Nos.	51	221	663	935
Scores	2720	11815	33386	47921
Mean	53.33	53.46	50.35	51.25

Table 4.3(b) : Showing Summary of Results of Analysis of Variance

Sources of Variance	df	Sum of Squares (Ss)	Mean Squares (Variance)	F-Ratios	Remarks
Between I.Q. (Giftedness)	2	1832.18	916.09	3.12	Sig.at .05
Between Sex	1	365.97	365.97	1.24	Not Sig.
Interaction: I.Q. x Sex	2	1221.13	610.57	2.08	Not Sig.
Within Groups (Error Term)	929	273161.15	294.04	-	-
Total	934	276580.43	-	-	-

From the statistical table

For df =	2/929	1/929
F at .05 =	3.00	3.85
F at .01 =	4.63	6.66

Table 4.3(c) : Showing Results of L.S.D. Test for Pair Differences among I.Q. and Sex Sub-groups

$$L.S.D. = t \times \sqrt{MS_w / n_1 + MS_w / n_2}$$

(t for df of MS_w : at .05 = 1.96 and at .01 = 2.58)

	Obtained Mean Differences	Required Differences .05	Required Differences .01	Significance
(i) For I.Q. differences :				
Among Main Groups :				
Extraordinary vs very Superior	0.13	5.21	6.86	Not Sig.
Extraordinary vs Superior	2.98	4.90	6.45	Not Sig.
Very Superior vs Superior	3.11	2.58	3.40	Sig. at .05
Among Boys :				
Extraordinary vs Very Superior	5.66	9.49	12.49	Not Sig.
Extraordinary vs Superior	10.38	8.88	11.68	Sig. at .05
Very Superior vs Superior	4.72	4.27	5.62	Sig. at .05
Among Girls :				
Extraordinary vs Very Superior	2.47	6.25	8.25	Not Sig.
Extraordinary vs Superior	0.71	5.01	7.77	Not Sig.
Very Superior vs Superior	1.76	3.35	4.41	Not Sig.
(ii) For Sex Differences				
Among Extraordinary Boys vs Girls	9.07	10.33	13.60	Not Sig.
Among Very Superior Boys vs Girls	0.94	4.76	6.26	Not Sig.
Among Superior Boys vs Girls	2.02	2.61	3.43	Not Sig.

It is evident from results in Table 4.3(b) that only giftedness was a significant factor contributing to originality scores, as in other cases. Sex was not a significant factor nor was there any significant interaction.

Further examination of results on L.S.D. test in Table 4.3(c) shows that among the I.Q. levels, only the very superior standing highest scored significantly higher (53.46) than the superior (50.35) standing lowest; no other pair of sub-groups differed on the whole. Among the boys, the extraordinary was the highest (59.73), the very superior next best (54.07) and the superior last (49.35) ; the superior was significantly different from both the extraordinary as well as the very superior, which between themselves were not different statistically. Among girls, I.Q. made no effect at any level.

To sum up, only I.Q. level i.e. giftedness in the present case contributed significantly to verbal originality; there were no significant sex differences nor the interaction.

(iv) Fluency (Figural) :

The results of statistical analysis (by F-test and L.S.D. test on data in 2 x 3 factorial design) of figural fluency T-scores on Torrance Test, have been presented in Tables 4.4(a), (b) and (c).

Table 4.4(a) : Showing Mean Scores on Fluency (Figural) of each of Main and Sub-groups (Sample Size : 935) (Sex x I.Q.)

Sex	Extra-ordinary	Very Superior	Superior	Total
Boys :				
Nos.	15	76	334	425
Scores	877	3987	16932	21796
Mean	58.46	52.46	50.69	51.28
Girls :				
Nos.	36	145	329	510
Scores	2003	7740	16491	26234
Mean	55.63	53.37	50.12	51.44
Total :				
Nos.	51	221	663	935
Scores	2880	11727	33423	48030
Mean	56.47	53.06	50.41	51.37

Table 4.4(b) : Showing Summary of Results of Analysis of Variance

Sources of Variance	df	Sum of Squares (SS)	Mean Squares (Variance)	F-ratios	Remarks
Between I.Q. (Giftedness)	2	2569.29	1284.65	29.49	Sig.at .01
Between Sex	1	5.54	5.54	0.13	Not Sig.
Interaction: I.Q. and Sex	2	175.07	87.54	2.01	Not Sig.
Within Groups (Error Term)	929	40462.81	43.56	-	-
Total	934	43212.71	-	-	-

From the statistical table

For df =	2/929	1/929
F at .05 =	3.00	3.85
F at .01 =	4.63	6.66

Table 4.4(c): Showing Results of L.S.D. Test for Pair Differences among I.Q. and Sex Sub-groups

$$L.S.D. = t \times \sqrt{MS_w / n_1 + MS_w / n_2}$$

(t for df of MS_w at .05 = 1.96 and at .01 = 2.58)

	Obtained Mean Differences	Required Differences .05	.01	Significance
(i) For I.Q. differences :				
Among Main Groups :				
Extraordinary vs Very Superior	3.41	1.99	2.63	Sig. at .01
Extraordinary vs Superior	6.06	1.88	2.48	Sig. at .01
Very Superior vs Superior	2.65	0.99	1.32	Sig. at .01
Among Boys :				
Extraordinary vs Very Superior	6.00	3.65	4.80	Sig. at .01
Extraordinary vs Superior	7.77	3.41	4.49	Sig. at .01
Very Superior vs Superior	1.77	1.65	2.17	Sig. at .05
Among Girls :				
Extraordinary vs Very Superior	2.26	2.41	3.17	Not Sig.
Extraordinary vs Superior	5.51	2.27	2.99	Sig. at .01
Very Superior vs Superior	3.25	1.29	1.70	Sig. at .01
(ii) For Sex Differences :				
Among Extraordinary Boys vs Girls	2.83	3.98	5.24	Not Sig.
Among Very Superior Boys vs Girls	0.91	1.82	2.40	Not Sig.
Among Superior Boys vs Girls	0.57	0.99	1.32	Not Sig.

It is again revealed by Table 4.4(b) similar to results of analysis of originality scores in Table 4.3(b) that only I.Q. (Giftedness) contributed significantly to figural fluency;

neither sex nor the interaction (Table 4.4(b)) were significant.

The closer examination of figures in Table 4.4(a) reveals that the extraordinary group secured highest, the very superior next best and the superior last on the whole as well as in case of boys and girls separately too, as expected. Detailed results in Table 4.4(c) reveal that all the I.Q. level pairs were significantly different on the whole and among the boys as well as girls except one pair of girls, viz. the extraordinary and the very superior. Further, there were no significant sex differences on the whole nor at any I.Q. level.

To sum up, only giftedness contributed obviously and significantly to figural fluency; neither sex nor interaction was significant.

(v) Flexibility (Figural) :

The T-scores on figural flexibility obtained on Torrance Test were subjected to statistical analysis applying F-test and L.S.D. test to data arranged in 2 x 3 factorial design; and the results have been summarized in Tables 4.5(a), (b) and (c).

Table 4.5(a): Showing Mean Scores on Flexibility(Figural) of each of Main and Sub-groups (Sample Size : 935) (Sex x I.Q.)

Sex	Extra-ordinary	Very Superior	Superior	Total
Boys :				
Nos.	15	76	334	425
Scores	885	3953	16969	21807
Mean	59.00	52.01	50.81	51.31
Girls :				
Nos.	36	145	329	510
Scores	1927	7698	16378	26003
Mean	53.52	53.08	49.78	50.99
Total :				
Nos.	51	221	663	635
Scores	2612	11651	33347	47810
Mean	55.13	52.71	50.29	51.13

Table 4.5(b) : Showing Summary of Results of Analysis of Variance

Sources of Variance	df	Sum of Squares (Ss)	Mean Squares (Variance)	F-ratios	Remarks
Between I.Q. (Giftedness)	2	1337.17	918.59	8.30	Sig.at .0
Between Sex	1	24.37	24.37	0.22	Not Sig.
Interaction: I.Q. x Sex	2	628.32	314.16	2.84	Not Sig.
Within Groups (Error term)	929	102762.43	110.62	-	-
Total	934	105252.29			

From the statistical table

For df =	2/929	1/929
F at .05 =	3.00	3.85
F at .01 =	4.63	6.66

Table 4.5(c) : Showing Results of L.S.D. Test for Pair Differences among I.Q. and Sex Sub-groups

$$L.S.D. = t \times \sqrt{MS_w / n_1 + MS_w / n_2}$$

(t for df of MS_w at .05 = 1.96 and at .01 = 2.58)

	Obtained Mean Differences	Required Differences .05	Required Differences .01	Significance
(i) For I.Q. Differences :				
Among Main Groups :				
Extraordinary vs Very Superior	2.42	2.19	4.21	Not Sig.
Extraordinary vs Superior	4.84	2.99	3.95	Sig. at .01
Very Superior vs Superior	2.42	1.61	2.11	Sig. at .01
Among Boys :				
Extraordinary vs Very Superior	6.99	5.82	7.66	Sig. at .05
Extraordinary vs Superior	8.99	5.49	7.22	Sig. at .01
Very Superior vs Superior	1.20	2.61	3.43	Not Sig.
Among Girls :				
Extraordinary vs Very Superior	0.44	3.86	5.08	Not Sig.
Extraordinary vs Superior	3.74	3.63	4.77	Sig. at .05
Very Superior vs Superior	3.30	2.04	2.68	Sig. at .01
(ii) For Sex Differences :				
Among Extraordinary: Boys vs Girls	5.48	6.33	8.33	Not Sig.
Among Very Superior : Boys vs Girls	1.07	2.92	3.84	Not Sig.
Among Superior : Boys vs Girls	1.03	1.61	2.12	Not Sig

Again, it is found from Table 4.5(b) that only giftedness brought about overall significant differences in figural flexibility; neither sex nor interaction was significant (Table 4.5(b)).

The figures in Table 4.5(a) show that the order of I.Q. groups in terms of their extent of contribution was the extraordinary, the very superior and the superior, as expected, on the whole as well as among boys and girls separately.

The closer examination of results in Table 4.5(c) reveals that superior differed significantly from both the extraordinary as well as the very superior, both of which mutually did not differ significantly on the total scores of boys and girls. But on the separate scores of boys, the extraordinary differed significantly from both the very superior and the superior, the latter two not differing mutually; while among the girls the picture was the same as on the total, i.e. the superior differed from both the extraordinary as well as the very superior, the latter two not mutually differing. There were no sex differences at any I.Q. level. To sum up, only giftedness (I.Q. level) contributed significantly to figural flexibility; neither sex nor interaction was significant.

(vi) Originality (Figural) :

The scores obtained on figural originality on Torrance Test, after being converted into T-scores, were statistically analysed, applying F-test and L.S.D. test to data arranged in the 2 x 3 factorial design to study the effect of sex and giftedness. The results of this analysis have been summarized

in Tables 4.6(a),(b) and (c).

Table 4.6(a): Showing Mean Scores on Originality(Figural) of Each of Main and Sub-groups (Sample Size:935) (Sex x I.Q.)

Sex	Extra-ordinary	Very Superior	Superior	Total
Boys :				
Nos.	15	76	334	425
Scores	848	3918	16550	21316
Mean	56.53	51.55	49.55	50.16
Girls :				
Nos.	36	145	329	510
Scores	1839	7603	16659	26101
Mean	51.08	52.43	50.63	51.18
Total :				
Nos.	51	221	663	935
Scores	2687	11521	33209	47417
Mean	52.68	52.13	50.08	50.71

Table 4.6(b): Showing Summary of Results of Analysis of Variance

Sources of Variance	df	Sum of Squares (Ss)	Mean Squares (Variance)	F-ratios	Remarks
Between I.Q.(Giftedness)	2	901.25	450.63	5.42	Sig.at.01
Between Sex	1	242.67	242.67	2.92	Not Sig.
Interaction : I.Q. x Sex	2	305.40	152.70	1.84	Not Sig.
Within Groups (Error Term)	929	77249.86	83.15	-	-
Total	934	78699.18			

From the statistical table

For df =	2/929	1/929
F at .05 =	3.00	3.85
F at .01 =	4.63	6.66

Table 4.6(c) : Showing Results of L.S.D. Test for Pair Differences among I.Q. and Sex Sub-groups

$$L.S.D. = t \times \sqrt{MS_w / n_1 + MS_w / n_2}$$

(t for df of MS_w : at .05 = 1.96 and at .01 = 2.58)

	Obtained Mean Differences	Required Differences .05	.01	Significance
(i) For I.Q. Differences :				
Among Main Groups :				
Extraordinary vs Very Superior	0.55	2.78	3.66	Not Sig.
Extraordinary vs Superior	2.60	2.58	3.41	Sig.at .05
Very Superior vs Superior	2.05	1.99	1.83	Sig.at .01
Among Boys :				
Extraordinary vs Very Superior	4.98	5.04	6.63	Not Sig.
Extraordinary vs Superior	6.98	4.72	6.22	Sig.at .01
Very Superior vs Superior	2.00	2.27	2.99	Not Sig.
Among Girls :				
Extraordinary vs Very superior	1.35	3.33	4.39	Not Sig.
Extraordinary vs Superior	0.45	3.14	4.13	Not Sig.
Very Superior vs Superior	1.80	1.78	2.35	Sig.at .05
(ii) For Sex Differences :				
Among Extraordinary : Boys vs Girls	5.45	5.49	7.22	Not Sig.
Among Very Superior : Boys vs Girls	0.88	2.53	3.33	Not Sig.
Among Superior : Boys vs Girls	1.08	1.39	1.83	Not Sig.

It is again observed from Table 4.6(b) that only giftedness (I.Q. level) contributed significantly to figural originality; neither sex nor interaction was significant. The extraordinary group was highest (52.68); slightly below was the very superior

group (52.13); and the superior group stood last (50.08) on figural originality.

The closer examination or results in Table 4.6(c) revealed that on the whole, the superior were significantly different from both the extraordinary as well as the very superior, both of which mutually did not differ statistically. Among the boys, only the extraordinary - superior pair showed differences, and among girls only the very superior - superior pair exhibited differences; no other I.Q. pair displayed significant differences. As far as sex differences were concerned, sex did not play a significant role on the whole or at any level of I.Q.

To sum up, only giftedness played a significant role in figural originality, particularly raising the extra ordinary and very superior groups; sex made no difference; neither was there any interaction.

(vii) Elaboration (Figural) :

Finally, the T-scores obtained from scores on figural elaboration in Torrance Test were arranged in a 2 x 3 factorial design and subjected statistical analysis by F-test and L.S.D. test. The results have been presented in Tables 4.7(a), (b) and (c).

Table 4.7(a) : Showing Mean Scores on Elaboration (Figural) of Each of Main and Sub-groups (Sample Size:935) (Sex x I.Q.)

	Extra-ordinary	Very Superior	Superior	Total
Boys :				
Nos.	15	76	334	425
Scores	882	4148	16761	21791
Mean	58.80	54.57	50.18	51.27
Girls :				
Nos.	36	145	329	510
Scores	1951	7247	16307	25505
Mean	54.19	49.97	49.56	50.01
Total :				
Nos.	51	221	663	935
Scores	2833	11395	33068	47296
Mean	55.54	51.56	49.87	50.58

Table 4.7(b) : Showing Summary of Results of Analysis of Variance

Sources of Variance	df	Sum of Squares (SS)	Mean Squares (Variance)	F-ratios	Remarks
Between I.Q. (Giftedness)	2	1801.15	900.58	6.47	Sig.at .01
Between Sex	1	369.87	369.87	2.66	Not Sig.
Interaction: I.Q. X Sex	2	971.92	485.96	3.49	Sig.at .05
Within Groups (Error Term)	929	129229.22	139.11	-	-
Total	934	132372.16	-	-	-

From the statistical table

For df	=	2/929	1/929
F at .05	=	3.00	3.85
F at .01	=	4.63	6.66

Table 4.7(c) : Showing Results of L.S.D. Test for Pair Differences among I.Q. and Sex Sub-groups

$$L.S.D. = t \times \sqrt{MS_W / n_1 + MS_W / n_2}$$

(t for df = MS_W : at .05 = 1.96 and at .01 = 2.58)

	Obtained Mean Differences	Required Differences .05	.01	Significance
(i) For I.Q. Differences :				
Among Main Groups :				
Extraordinary vs Very Superior	3.98	3.59	4.72	Sig. at .05
Extraordinary vs Superior	5.67	3.35	4.41	Sig. at .01
Very Superior vs Superior	1.69	1.80	2.37	Not Sig.
Among Boys :				
Extraordinary vs Very Superior	4.23	6.53	8.59	Not Sig.
Extraordinary vs Superior	8.62	6.10	8.02	Sig. at .01
Very Superior vs Superior	4.39	2.72	3.84	Sig. at .01
Among Girls :				
Extraordinary vs Very Superior	4.22	4.29	3.65	Not Sig.
Extraordinary vs Superior	4.63	4.06	5.34	Sig. at .05
Very Superior vs Superior	0.41	2.29	3.02	Not Sig.
(ii) For Sex Differences :				
Among Extraordinary : Boys vs Girls	4.61	7.10	9.34	Not Sig.
Among Very Superior : Boys vs Girls	4.60	3.27	4.31	Sig. at .01
Among Superior : Boys vs Girls	0.62	1.80	2.37	Not Sig.

It is revealed from results in Table 4.7(b) that on the whole giftedness (I.Q. level) was significant at .01 level of confidence; the extraordinary were highest (55.54); next were

the very superior (51.56) and last were the superior (49.87). Sex did not play a significant role. However, these conclusions are to be modified in view of the significant interaction between sex and I.Q.

The true effect of sex and I.Q. would thus be clear from the closer examination of results of L.S.D. test in Table 4.7(c), showing the sub-group pair differences, i.e. differences in pairs of one variable at each level of the other variable. It would be seen from results in Table 4.7(c) that on the total scores, the extraordinary differed significantly from both very superior and superior both of which mutually did not differ. Among the boys, superior differed from both extraordinary and very superiof, which mutually did not differ. Among girls, only one extreme pair viz. extraordinary and superior, differed, and no other pair showed differences. Similarly, there were sex differences only among the very superior, not among the extraordinary nor among the superior.

To sum up, only giftedness contributed significantly to figural elaboration, particularly raising the scores of the extraordinary; sex did not play any significant role, except among the very superior; there was ... interaction.

4.2 CREATIVITY OF CAPABLY GIFTED CHILDREN IN RELATION TO GIFTEDNESS, SEX AND AGE (Sample of 683 Subjects)

As mentioned earlier, in addition to studying the role of giftedness (I.Q.) and sex in creativity, the inclusion of subjects of different ages enabled the investigator to study also the role of age in creativity. In view of this, all these subjects (935) who were intellectually gifted and who have been studied in the previous section were again classified age-wise, sex-wise and I.Q. level-wise. From this consideration emerged the sample of 683 as described in Table 3.5 earlier, arranged in a 2 x 2 x 3 factorial design, representing two levels of I.Q., viz. highly superior (with I.Q. 130 and above) and superior (with I.Q. 120-129), two levels of sex, viz. boys and girls and only three levels of age viz., 13 years, 14 years and 15 years. In view of sufficient number of subjects needed in each of sub-groups, formed by I.Q. x Sex x Age for the purpose of analysis, only two I.Q. levels (in contrast to three I.Q. levels of preceding section) and three age levels were taken up for the study. There were very few numbers in 13 below and 15 above age groups, as well as in extraordinary group when broken up age-wise. Hence the two I.Q. groups, viz. extraordinary and very superior were combined into one called highly superior (i.e. $\overset{\text{I.Q.}}{\wedge}$ 130 and above) as distinguished from the usual second group of the superior

(120 - 129 I.Q.). Moreover, even on consideration that the extraordinary and the very superior did not differ much often on some aspects of creativity, as found in the preceding section, it was thought advisable to combine the two in the present case of studying the role of age alongwith that of sex and giftedness.

Thus, the same data of 683 subjects separated out of 935 intellectually gifted subjects were rearranged in a 2 x 2 x 3 factorial design and subjected to the same statistical techniques of F-test and L.S.D. test for analysis, separately on each of seven aspects of creativity. All these results have been presented below in tables 4.8 to 4.14 (a), (b), (c) and discussed on the same lines as those presented in the earlier section. It should be often noted that significance of small or large groups in results of L.S.D. test varies, depending on size of sub-group and of error variance.

(i) Fluency (Verbal) :

The verbal fluency scores obtained by 683 subjects, were converted into T-scores, tabulated in a 2 x 2 x 3 (I.Q. x Sex x Age) factorial design and analyzed by technique of analysis of variance (F-test) as well as by L.S.D. test to study main and interaction effects as well as to examine the pair differences. These results have

summarized in Tables 4.8 (a),(b),(c); thus (a) showing mean scores of main and sub-groups, (b) giving summary of results of analysis of variance (F-test) and (c) presenting the results of L.S.D. test.

It would be seen from results in Table 4.8 (b) that giftedness (I.Q.) was a highly significant factor (beyond .01 level of confidence) contributing to verbal fluency on the whole ~~gifted~~. (confirming the same results in Table 4.1(b) earlier where age is not separated out.) Obviously, the highly superior group(with I.Q. 130 and above) showed higher performance (Mean 53.52) on verbal fluency than the superior group(with I.Q. 120-129) (Mean = 50.34). Further, sex was not significant here too as earlier (Table 4.1(b)). However, age was a significant factor, just at .05 level of confidence. As the age increased, the creativity score (verbal fluency) also increased (50.78 at 13, 50.84 at 14 and 52,67 at 15 age). However, though age was a significant factor on the whole, all age levels did not differ from one another. As such from Table 4.8(c), 13 age group did not differ from 14 age group, but 15 age group differed from both 13 and 14 age groups. This means that verbal fluency (creativity) was significantly higher only at age of 15; age was not significantly contributing at lower age levels in the present case. Finally, there was neither any of the interactions significant.

Table 4.8(a): Showing Mean Scores on Fluency (Verbal) of each of Main and Sub-groups (Sample Size:683)
(I.Q. x Sex x Age) (According to Age)

		Age in Years									Total (Sexwise)		
		13			14			15			Total					
		No.	Scores	Mean	No.	Scores	Mean	No.	Scores	Mean	No.	Scores	Mean	No.	Scores	Mean
Boys (M) :																
Highly Superior	I_1	31	1691	54.54	32	1724	53.87	32	1755	54.84	95	5170	54.42	304	15759	51.84
Superior	I_2	39	1908	48.92	85	4261	50.12	85	4420	52.00	209	10589	52.91			
Girls (F) :																
Highly Superior	I_1	30	1539	51.30	64	3326	51.96	71	3881	54.66	165	8746	53.01	379	19451	51.32
Superior	I_2	56	2784	49.71	75	3704	49.38	83	4217	50.80	214	10705	50.02			
Total (I.Q.wise)																
Highly Superior	I_1	61	3230	52.95	96	5050	52.60	103	5636	54.71	260	13916	53.52	683	35210	51.55
Superior	I_2	95	4692	49.38	160	7965	49.78	168	8637	51.41	423	21294	50.34			
Total (Agewise)		156	7922	50.78	256	13015	50.84	271	14273	52.67	683	35210	51.55			

Table 4.8(b) : Showing Summary of Results of Analysis of Variance

Sources of Variance	df	Sum of Squares (SS)	Mean Squares (Variance)	F-ratios	Significance
Between I.Q. (Giftedness)	1	1631.07	1631.07	19.76	Sig. at .01
Between Sex	1	45.07	45.07	0.55	Not Sig.
Between Age	2	559.61	279.81	3.39	Sig.at .05
Interaction : I.Q. x Sex	1	119.12	119.12	1.44	Not Sig.
Interaction : I.Q. x Age	2	16.93	8.47	0.11	Not Sig.
Interaction : Sex x Age	2	29.55	14.78	0.18	Not Sig.
Interaction : I.Q. x Sex x Age	2	132.60	66.30	0.81	Not Sig.
Within Groups (Error term)	671	55365.96	82.51		
Total	682	57899.91			

From the statistical table :

For df	= 1/671	2/671
F at .05	= 3.857	3.007
F at .01	= 6.681	4.644

Table 4.8(c) : Showing Results of L.S.D. Test for Pair Differences among I.Q., Sex and Age Sub-groups

$$L.S.D. = t \times \sqrt{MS_w / N_1 + MS_w / N_2}$$

(t for df of MS_w at .05 = 1.96 at .01 = 2.58)

	Obtained Mean Difference	Required Difference .05	.01	Significance
(i) For I.Q. Differences :				
Among Boys of -				
13 years : Highly Sup. vs Sup.	5.62	4.29	5.65	Sig.at.05
14 years : " " "	3.75	3.70	4.88	Sig.at.05
15 years : " " "	2.84	3.70	4.88	Not Sig.
Among Girls of -				
13 years : Highly Sup. vs Sup.	1.59	4.02	5.29	Not Sig.
14 years : " " "	2.58	3.04	3.99	Not Sig.
15 years : " " "	3.86	2.88	3.79	Sig.at.01
(ii) For Sex Differences :				
Among Highly Superior of -				
13 years : Boys vs Girls	3.24	4.57	6.01	Not Sig.
14 years : " "	1.91	3.86	5.08	Not Sig.
15 years : " "	0.18	3.78	4.98	Not Sig.
Among Superior of -				
13 years : Boys vs Girls	0.79	3.72	4.90	Not Sig.
14 years : " "	0.74	2.82	3.71	Not Sig.
15 years : " "	1.20	2.74	3.61	Not Sig.
(iii) For Age Differences :				
Among Main Groups -				
13 years vs 14 years :	0.06	1.80	2.37	Not Sig.
13 years vs 15 years :	1.89	1.78	2.35	Sig.at.05
14 years vs 15 years	1.83	1.55	2.04	Sig.at .05
Among Sub-groups -				
Among Highly Superior Boys -				
13 years vs 14 years	0.67	4.51	5.93	Not Sig.
13 years vs 15 years	0.30	4.51	5.93	Not Sig.
14 years vs 15 years	0.97	4.50	5.86	Not Sig.

(Continued)

Table 4.8(c) continued

	Obtained Mean Difference	Required Difference .05	.01	Significance
Among Superior Boys -				
13 years vs 14 years	1.20	3.45	4.54	Not Sig.
13 years vs 15 years	3.08	3.45	4.54	Not Sig.
14 years vs 15 years	1.88	2.72	3.59	Not Sig.
Among Highly Superior Girls -				
13 years vs 14 years	0.66	3.94	5.19	Not Sig.
13 years vs 15 years	3.36	3.88	5.11	Not Sig.
14 years vs 15 years	2.70	3.06	4.02	Not Sig.
Among Superior Girls -				
13 years vs 14 years	0.33	3.14	4.13	Not Sig.
13 years vs 15 years	1.09	3.02	3.97	Not Sig.
14 years vs 15 years	1.42	2.84	3.74	Not Sig.

Even the close examination of the sub-group results of L.S.D. test in Table 4.8(c) reveals that two I.Q. groups, viz., the highly superior and the superior, differed among boys at age level 13 and 14, but not at 15; and among girls at age level 15 only and not at 13 and 14. In other words, giftedness played significant role on the whole at 15 and particularly among girls of 15.

There were no significant sex differences on the whole as well as at any age or I.Q. level. This explains lack of interaction of sex with any other factor. Sex and I.Q. did

interact significantly earlier in sample of 935, but here when age was separated out in sample of 683, there was no significant interaction between sex and I.Q.

Similarly, age (Table 4.8(b)) played a significant role on the whole, and particularly at 15 only; strangely no sub-group age-pair at any I.Q. level or sex showed significant differences. It is likely that smaller insignificant differences in sub-groups would cumulate into significant overall difference due to large sample size. This explains lack of significant interactions of age with any other variable.

To sum up, giftedness (I.Q. level) and age were significant factors contributing to verbal fluency on the whole, but more specifically at age 15, sex did not play any effective part, nor any interaction was effective in contributing to verbal fluency.

(ii) Flexibility (Verbal) :

Again, the converted T-scores of verbal flexibility on Torrance Test were arranged in a 2 x 2 x 3 factorial design and analysed by F-test and L.S.D. test to examine the effect of I.Q., sex and age in the data of 683 subjects. The results have been summarized in Tables 4.9(a), (b) and (c) similarly.

Table 4.9(a) : Showing Mean Scores on Flexibility (Verbal) of each of Main and Sub-Groups
(Sample Size :683) (I.Q. x Sex x Age) (According to Age)

	Age in Years									Total		
	13			14			15			Total			(Sexwise)		
	No.	Scores	Mean	No.	Scores	Mean	No.	Scores	Mean	No.	Scores	Mean	No.	Scores	Mean
Boys (M) :															
Highly Superior I_1	31	1700	54.83	32	1617	50.53	32	1813	56.65	95	5130	54.00	304	15866	52.19
Superior I_2	39	1913	49.05	85	4371	51.42	85	4452	52.37	209	10736	51.36			
Girls (F) :															
Highly Superior I_1	30	1527	50.90	64	3347	52.29	71	3861	54.38	165	8735	52.93	379	19447	51.31
Superior I_2	56	2681	47.87	75	3785	50.46	83	4246	51.15	214	10712	50.05			
Total (I.Q.wise) :															
Highly Superior I_1	61	3227	52.90	96	4964	51.70	103	5674	55.08	260	13865	53.32	683	35313	51.7
Superior I_2	95	4594	48.35	160	8156	50.97	168	8698	51.77	423	21448	50.70			
Total (Agewise)	156	7821	50.13	256	13120	51.25	271	14372	53.03	683	35313	51.70			

Results of

Table 4.9(b) : Showing Summary of Analysis of Variance

Sources of Variance	df	Sum of Squares (SS)	Mean Squares (Variance)	F Ratios	Remarks
Between I.Q. (Giftedness)	1	1107.39	1107.39	13.06	Sig. at .01
Between Sex	1	130.47	130.47	1.53	Not Sig.
Between Age	2	915.78	457.89	5.40	Sig. at .01
Interaction : I.Q. x Sex	1	109.98	109.98	1.29	Not Sig.
Interaction : I.Q. x Age	2	392.88	196.44	2.31	Not Sig.
Interaction : Sex x Age	2	202.94	101.47	1.19	Not Sig.
Interaction among I.Q. x Sex x Age	2	104.74	52.37	0.62	Not Sig.
Within Groups (Error term)	671	56892.49	84.78		
Total	682	59856.67			

From the statistical table -

For df =	1/671	2/671
F at .05 =	3.857	3.007
F at .01 =	6.681	4.644

Table 4.9(c) : Showing Results of L.S.D. Test for Pair Differences Among I.Q., Sex and Age Sub-groups

$$L.S.D. = t \times \sqrt{MS_w/N_1 + MS_w/N_2}$$

(t for df of MS_w at .05 = 1.96 at .01 = 2.58

	Obtained Mean Difference	Required Difference .05	.01	Significance
(i) For I.Q. Differences :				
Among Boys of -				
13 years : Highly Sup. vs Sup.	5.78	4.35	5.73	Sig.at .0

(continued)

(Table 4.9(c) continued)

	Obtained Mean Differences	Required Differences .05	.01	Significance
14 years : Highly Sup. vs Sup.	0.89	3.74	4.93	Not Sig
15 years : " " "	4.28	3.74	4.93	Sig. at .05
Among Girls of -				
13 years : " " "	3.03	4.08	5.37	Not Sig.
14 years : " " "	1.83	3.08	4.05	Not Sig.
15 years : " " "	3.23	2.92	3.84	Sig. at .05
(ii) For Sex Differences :				
Among Highly Superior of -				
13 years : Boys vs Girls	3.93	4.63	6.09	Not Sig.
14 years : " "	1.76	3.90	5.13	Not Sig.
15 years : " "	2.27	3.84	5.06	Not Sig.
Among Superior of -				
13 years : " "	1.18	3.76	4.95	Not Sig.
14 years : " "	0.96	2.86	3.77	Not Sig.
15 years : " "	1.22	2.78	3.66	Not Sig.
(iii) For Age Differences :				
Among Main Groups -				
13 years vs 14 years	1.12	1.82	2.39	Not Sig.
13 years vs 15 years	2.90	1.80	2.58	Sig. at .01
14 years vs 15 years	1.78	1.57	2.07	Sig. at .05
Among Sub-groups -				
Among Highly Superior Boys :				
13 years vs 14 years	4.30	4.55	5.99	Not Sig.
13 years vs 15 years	1.82	4.55	5.99	Not Sig.
14 years vs 15 years	6.12	4.51	5.93	Sig.at .01

(continued)

(Table 4.9(c). continued)

	Obtained Mean Differences	Required Differences .05	.01	Significance
Among Superior Boys :				
13 years vs 14 years	2.37	3.49	4.59	Not Sig.
13 years vs 15 years	3.32	3.49	4.59	Not Sig.
14 years vs 15 years	0.95	2.76	3.64	Not Sig.
Among Highly Superior Girls :				
13 years vs 14 years	1.39	3.99	5.26	Not Sig.
13 years vs 15 years	3.48	3.94	5.19	Not Sig.
14 years vs 15 years	2.09	3.12	4.10	Not Sig.
Among Superior Girls :				
13 years vs 14 years	2.59	3.19	4.21	Not Sig.
13 years vs 15 years	3.28	3.12	4.10	Sig.at .05
14 years vs 15 years	0.69	2.88	3.79	Not Sig.

Table 4.9(b) reveals that as in preceding case of verbal fluency, in this case of verbal flexibility, giftedness as well as age played a significant role at .01 level in contributing to verbal flexibility. Neither sex nor any interaction was significant. As expected, the highly superior group was better (53.32) on verbal flexibility than the superior group (50.70). Among age groups, the trend was the same as earlier; as age increased, flexibility score increased(50.13, 51.25, 53.03). I.Q. level was not significant on the whole in earlier sample

of 935 (Table 4.2(b)), but in the present case of 683 separating age group in I.Q. level, the I.Q. showed its effectiveness. In the earlier case the I.Q. effect was significant, but was obscured by significant interaction between sex and I.Q. In the present case when age was also considered separately, I.Q. did show its effect and there was no any significant interaction.

Similarly, age was significant on the whole, but in detail, the 15 age group was different from both 13, and 14, groups mutually not differing. The closer examination of sub-group results in Table 4.9(c) reveals that the two I.Q. groups differed among boys of 13 and 15 and among girls of only 15. In other words, again giftedness played significant role on the whole, and more specifically at 15, as in case of verbal fluency.

There were no sex differences on the whole nor at any age level or I.Q. level.

Age was effective on the whole, specifically at 15, as in case of verbal fluency. Among sub-group age-pairs, only two pairs differed, viz. 14 vs 15 highly superior boys, and 13 vs 15 superior girls; no other age pair was significantly differing.

To sum up, giftedness and age were significant factors contributing to verbal flexibility, neither sex nor any interaction was effective in verbal flexibility.

(iii) Originality (Verbal) :

On lines similar to earlier cases, the verbal originality scores (converted T-scores) on Torrance Test, arranged in 2 x 2 x 3 factorial design were analysed by F-test and L.S.D. test, and the summary of results is presented in Tables 4.10(a), (b) and (c).

As it would be seen from results in Table 4.10(b), again both giftedness (I.Q.) and age were significant factors contributing to verbal originality. Neither sex nor any interaction was significant. These results are confirmed by similar results in Table 4.3(b) earlier. Among the I.Q. groups, as expected the highly superior stood higher (52.68) than the superior (50.35). Among the age groups, the trend was same as in earlier cases; i.e., as the age increased, originality score also increased. However, there were no significant differences between 13 and 14 age groups, but 15 age group differed from both 13 and 14 age groups on the whole; i.e. age was effective specially at 15 age.

Table 4.10(a) : Showing Mean Scores on Originality (Verbal) of each of Main and Sub-groups
(Sample Size : 683) (I.Q. x Sex x Age) (According to Age)

	Age in Years												Total (Sexwise)		
	13			14			15			Total					
	No.	Scores	Mean	No.	Scores	Mean	No.	Scores	Mean	No.	Scores	Mean	No.	Scores	Mean
Boys (M) :															
Highly Superior I_1	31	1609	51.90	32	1704	53.25	32	1732	54.12	95	5045	53.10	304	15714	51.69
Superior I_2	39	1941	49.76	85	4211	49.54	85	4517	53.14	209	10669	51.04			
Girls (F) :															
Highly Superior I_1	30	1530	51.00	64	3283	51.29	71	3841	54.09	165	8654	52.44	379	19287	50.85
Superior I_2	56	2794	49.89	75	3745	49.93	83	4094	49.32	214	10633	49.68			
Total (I.Q.wise)															
Highly Superior I_1	61	3139	51.45	96	4987	51.94	103	5573	54.10	260	13699	52.68	683	35001	51.25
Superior I_2	95	4735	49.84	160	7956	49.72	168	8611	51.25	423	21302	50.35			
Total(Agewise)	156	7874	50.47	256	12943	50.56	271	14184	52.34	683	35001	51.25			

Table 4.10(b) : Showing Summary of Results of Analysis of Variance

Sources of Variance	df	Sum of Squares (SS)	Mean Squares (Variance)	F-Ratios	Remarks
Between I.Q. (Giftedness)	1	873.54	873.54	12.90	Sig. at .01
Between Sex	1	108.50	108.50	1.60	Not Sig.
Between Age	2	537.89	268.95	3.97	Sig. at .05
Interaction : I.Q. x Sex	1	113.43	113.43	1.67	Not Sig.
Interaction : I.Q. x Age	2	39.01	19.51	0.29	Not Sig.
Interaction : Sex x Age	2	134.93	67.47	0.99	Not Sig.
Interaction : I.Q. x Sex X Age	2	354.96	177.48	2.62	Not Sig.
Within Groups (Error Term)	671	45416.42	67.68		
Total	682	47578.68			

From the statistical table -

For df	=	1/671	2/671
F at .05	=	3.857	3.007
F at .01	=	6.681	4.644

Table 4.10(c) : Showing Results of L.S.D. Test for Pair Differences among I.Q., Sex and Age Sub-Groups

$$L.S.D. = t \times \sqrt{MS_w / N_1 + MS_w / N_2}$$

(t for df of MS_w at .05 = 1.96 and at .01 = 2.58)

	Obtained Mean Differences	Required Differences .05	.01	Significance
(i) For I.Q. Differences :				
Among Boys of -				
13 years : Highly Sup. vs Sup.	2.14	3.88	5.11	Not Sig.
14 years : " " "	3.71	3.35	4.41	Sig.at .05
15 years : " " "	0.98	3.35	4.41	Not Sig.
Among Girls of -				
13 years : " " "	1.11	3.65	4.80	Not Sig.
14 years : " " "	1.36	2.72	3.59	Not Sig.
15 years : " " "	4.77	2.61	3.43	Sig.at .01
(ii) For Sex Differences :				
Among Highly Superior of -				
13 years : Boys vs Girls	0.90	4.14	5.44	Not Sig.
14 years : " "	1.96	3.49	4.59	Not Sig.
15 years : " "	0.03	3.43	4.52	Not Sig.
Among Superior of -				
13 years : " "	0.13	3.37	4.43	Not Sig.
14 years : " "	0.39	2.55	3.35	Not Sig.
15 years : " "	3.82	2.49	3.28	Sig.at .01
(iii) For Age Differences :				
Among Main Groups -				
13 years vs 14 years :	0.09	1.63	2.14	Not Sig.
13 years vs 15 years :	1.87	1.61	2.12	Sig.at .05
14 years vs 15 years :	1.78	1.39	1.83	Sig.at .05

(Continued)

(Table 4.10(c) continued)

	Obtained Mean Differences	Required Differences .05	.01	Significance
Among Sub-groups -				
Among Highly Superior Boys -				
13 years vs 14 years :	1.35	4.06	5.34	Not Sig.
13 Years vs 15 years :	2.22	4.06	5.34	Not Sig.
14 years vs 15 years :	0.87	4.04	5.31	Not Sig.
Among Superior Boys -				
13 years vs 14 years :	0.22	3.12	4.10	Not Sig.
13 years vs 15 years :	3.38	3.12	4.10	Sig.at .05
14 years vs 15 years :	3.60	2.47	3.25	Sig.at.01
Among Highly Superior Girls -				
13 years vs 14 years :	0.29	3.57	4.70	Not Sig.
13 years vs 15 years :	3.09	3.51	4.62	Not Sig.
14 years vs 15 years :	2.80	2.78	3.66	Sig.at.05
Among Superior Girls -				
13 years vs 14 years :	0.04	2.84	3.74	Not Sig.
13 years vs 15 years :	0.57	2.78	3.66	Not Sig.
14 years vs 15 years :	0.61	2.57	3.38	Not Sig.

The closer examination of results in Table 4.10(c) reveals that among I.Q. sub-groups, highly superior differed from superior only in case of boys of 14 years and girls of 15 years. As regards sex differences, there were significant sex differences in case of only 15 years superior, and not in any other sub-group pair nor on the whole. And among the age sub-groups, 13 age group differed from 15 age group in case of superior boys,

and 14 age group differed from 15 age group in case of superior boys and highly superior girls; no other age pair was significantly differing.

To sum up, giftedness and age contributed significantly to verbal originality on the whole and particularly at 15 age. Neither sex nor interaction was significant in contributing to verbal originality.

(iv) Fluency (Figural) :

Next, the figural fluency scores (T-scores) obtained on Torrance Test by 683 subjects arranged in a 2 x 2 x 3 factorial design were statistically analysed by F-test and L.S.D. test and the results have been summarized in Tables 4.11(a), (b) and (c).

A cursory glance at Table 4.11(b) reveals again that giftedness (I.Q.) and age were significantly contributing to figural fluency; neither sex nor any interaction was significant. This again confirms the earlier results in Table 4.4(b), regarding I.Q. groups. As usual, the highly superior group scored significantly higher (54.04) on figural fluency than the superior group (50.35) on the whole. Among the age groups, again as expected the 15 year age group scored highest (52.98); however, next best was the 13 year age group (51.42) and lowest was the 14 year age group (50.67). However, only the

Table 4.11(a) Showing Mean Scores on Fluency (Figural) of each of Main and Sub-groups (Sample Size : 683) (I.Q. x Sex x Age) (According to Age)

		Age in Years									Total		
		13			14			15			Total			Sexwise		
		No.	Scores	Mean	No.	Scores	Mean	No.	Scores	Mean	No.	Scores	Mean	No.	Scores	Mea
Boys (M) :																
Highly Superior	I_1	31	1668	53.80	32	1676	52.37	32	1741	54.40	95	5085	53.52	304	15671	51.5
Superior	I_2	39	1929	49,46	85	4278	50.32	85	4379	51.51	209	10586	50.65			
Girls (F) :																
Highly Superior	I_1	30	1595	53.16	64	3414	53.34	71	3958	55.74	165	8967	54.34	379	19671	51.9
Superior	I_2	56	2829	50.51	75	3604	48.05	83	4281	51.57	214	10714	50.06			
Total (I.Q.wise)																
Highly Superior	I_1	61	3263	53.49	96	5090	53.02	103	5699	55.33	260	14052	54.04	683	35352	51.7
Superior	I_2	95	4788	50.08	160	7882	49.26	168	8660	51.54	423	21300	50.35			
Total (Agewise)		156	8021	51.42	256	12972	50.67	271	14359	52.98	683	35352	51.76			

Table 4.11(b) : Showing Summary of Results of Analysis of Variance

Sources of Variance	df	Sum of Squares (SS)	Mean Squares (Variance)	F-Ratios	Remarks
Between I.Q. (Giftedness)	1	2194.37	2194.37	23.99	Sig. at .01
Between Sex	1	24.29	24.29	0.26	Not Sig.
Between Age	2	728.73	364.37	3.98	Sig. at .05
Interaction : I.Q. x Sex	1	52.36	52.36	0.57	Not Sig.
Interaction : I.Q. x Age	2	2.02	1.01	0.01	Not Sig.
Interaction : Sex x Age	2	80.47	40.24	0.44	Not Sig.
Interaction : I.Q. x Sex x Age	2	138.91	69.46	0.75	Not Sig.
Within Groups (Error term)	671	61369.52	91.45		
Total	682	64586.63			

From the statistical table

For df =	1/671	2/671
F at .05 =	3.857	3.007
F at .01 =	6.681	4.644

Table 4.11(c) : Showing Results of L.S.D. Test for Pair Differences among I.Q., Sex and Age Sub-groups

$$L.S.D. : t \times \sqrt{MS_w/N_1 + MS_w/N_2}$$

(t for df of MS_w at .05 = 1.96 and at .01 = 2.58)

	Obtained Mean Difference	Required Difference .05	.01	Significance
(i) For I.Q. Differences :				
Among Boys of -				
13 years : Highly Sup. vs Sup.	4.35	4.55	5.99	Not Sig.
14 years : " "	2.05	3.88	5.11	Not Sig.
15 years : " "	2.89	3.88	5.11	Not Sig.
Among Girls of -				
13 years : Highly Sup. vs Sup.	2.65	4.23	5.57	Not Sig.
14 years : " "	5.29	3.19	4.21	Sig. at .01
15 years : " "	4.17	3.02	3.97	Sig. at .01
(ii) For Sex Differences :				
Among Highly Superior of -				
13 years : Boys vs Girls	0.64	4.80	6.32	Not Sig.
14 years : " "	0.97	4.06	5.34	Not Sig.
15 years : " "	1.34	3.99	5.26	Not Sig.
Among Superior of -				
13 years : Boys vs Girls	1.05	3.90	5.13	Not Sig.
14 years : " "	2.27	2.98	3.92	Not Sig.
15 years : " "	0.06	2.88	3.79	Not Sig.
(iii) For Age Differences :				
Among Main Groups -				
13 years vs 14 years :	0.75	1.90	2.50	Not Sig.
13 years vs 15 years :	1.56	1.88	2.48	Not Sig.
14 years vs 15 years :	2.31	1.63	2.14	Sig. at .01

(Continued)

(Table 4.11(c) continued)

	Obtained Mean Difference	Required Difference .05	.01	Significance
Among Sub-groups -				
Among Highly Superior Boys -				
13 years vs 14 years :	1.43	4.72	6.22	Not Sig.
13 years vs 15 years :	0.60	4.72	6.22	Not Sig.
14 years vs 15 years :	2.03	4.68	6.17	Not Sig.
Among Superior Boys -				
13 years vs 14 years :	0.86	3.63	4.77	Not Sig.
13 years vs 15 years :	2.05	3.63	4.77	Not Sig.
14 years vs 15 years :	1.19	2.88	3.79	Not Sig.
Among Highly Superior Girls -				
13 years vs 14 years :	0.18	4.16	5.47	Not Sig.
13 years vs 15 years :	2.58	4.08	5.37	Not Sig.
14 years vs 15 years :	2.40	3.25	4.28	Not Sig.
Among Superior Girls -				
13 years vs 14 years :	2.46	3.31	4.36	Not Sig.
13 years vs 15 years :	0.86	3.23	4.26	Not Sig.
14 years vs 15 years :	3.32	2.98	3.92	Not Sig.

14 year age group differed significantly from the 15 year group, and not any other age group pair on the whole, i.e. age was effective, especially at 15 year.

The closer analysis of results in Table 4.11(c) reveals that among I.Q. sub-groups, the highly superior differed from the superior only with respect to girls of 14 age and of 15 age. Among the sex sub-groups, not a single sex pair showed

significant difference. As regards the age sub-groups, it is surprising that not a single age pair showed significant difference, though on the whole 14 age differed from the 15 age group. This is possible because of large size of main groups and smaller size of sub-groups whose insignificant differences cumulate into significant over all differences.

To sum up, both giftedness and age were significant factors contributing to figural fluency on the whole, and specifically at 15 age. Neither sex nor interaction played any significant role in figural fluency.

(v) Flexibility (Figural) :

The T-scores on figural flexibility of the Torrance Test, as arranged in a 2 x 2 x 3 factorial design were analysed by F-test and L.S.D. test and the results have been presented in Tables 4.12 (a), (b) and (c) as in other earlier cases.

Again it is observed from Table 4.12(b) that giftedness and age were significantly contributing to figural flexibility and sex or any interaction did not play any significant role. This effectiveness of I.Q. is confirmed by earlier similar results in Table 4.5(b) on the sample of 935 analysed in a 3 x 2 factorial design (with age mixed up). As expected, the highly superior scored significantly higher (52.79) than the superior (50.36) on the whole. As regards age, there was the

Table 4.12(a) : Showing Mean Scores on Flexibility (Figural) of each of Main and Sub-groups
(Sample Size : 683) (I.Q. x Sex x Age) (According to Age)

		Age in Years									Total		
		13			14			15			Total			(Sexwise)		
		No.	Scores	Mean	No.	Scores	Mean	No.	Scores	Mean	No.	Scores	Mean	No.	Scores	Mean
Boys (M) :																
Highly Superior	I_1	31	1625	52.41	32	1630	50.93	32	1779	55.59	95	5034	52.98	304	15651	51.48
Superior	I_2	39	1897	48.64	85	4308	50.68	85	4412	48.10	209	10617	50.79			
Girls (F) :																
Highly Superior	I_1	30	1511	50.36	64	3326	51.96	71	3856	54.30	165	8693	52.68	379	19379	51.13
Superior	I_2	56	2801	50.01	75	3672	48.96	83	4213	50.75	214	10686	49.93			
Total (I.Q.wise) :																
Highly Superior	I_1	61	3136	51.40	96	4956	51.62	103	5635	54.70	260	13727	52.79	683	35030	51.29
Superior	I_2	95	4698	49.45	160	7980	49.87	168	8625	51.33	423	21303	50.36			
Total (Agewise)		156	7834	50.22	256	12936	50.53	271	14260	52.62	683	35030	51.29			

Table 4.12(b) : Showing Summary of Results of Analysis of Variance

Sources of Variance	df	Sum of squares (SS)	Mean Squares (Variance)	F-Ratios	Remarks
Between I.Q. (Giftedness)	1	954.31	954.31	8.91	Sig. at .01
Between Sex	1	20.85	20.85	0.19	Not Sig.
Between Age	2	805.98	402.99	3.76	Sig. at .05
Interaction : I.Q. x Sex	1	63.76	63.76	0.59	Not Sig.
Interaction : I.Q. x Age	2	96.60	48.30	0.45	Not Sig.
Interaction : Sex x Age	2	8.69	4.35	0.04	Not Sig.
Interaction : I.Q. x Sex x Age	2	247.05	123.53	1.15	Not Sig.
Within Groups (Error Term)	671	71896.94	107.14		
Total	682	74094.18			

From the statistical table -

For df =	1/671	2/671
F at .05 =	3.857	3.007
F at .01 =	6.681	4.644

Table 4.12(c) : Showing Results of L.S.D. Test for Pair Differences among I.Q., Sex and Age Sub-groups

$$L.S.D. = t\sqrt{MS_w/N_1 + MS_w/N_2}$$

(t for df of MS_w at .05 = 1.96 and at .01 = 2.58)

	Obtained Mean Differences	Required Differences .05	.01	Significance
(i) For I.Q. Differences :				
Among Boys of -				
13 years : Highly Sup. vs Sup.	3.77	4.88	6.42	Not Sig.
14 years : " " "	0.25	4.21	5.55	Not Sig.
15 years : " " "	7.49	4.21	5.55	Sig.at .01
Among Girls of -				
13 years : " " "	0.35	4.59	6.04	Not Sig.
14 years : " " "	3.00	3.45	4.54	Not Sig.
15 years : " " "	3.55	3.27	4.30	Not Sig.
(ii) For Sex Differences :				
Among Highly Superior of -				
13 years : Boys vs Girls	2.05	5.19	6.84	Not Sig.
14 years : " "	1.03	4.39	5.78	Not Sig.
15 years : " "	1.29	3.31	4.36	Not Sig.
Among Superior of -				
13 years : " "	1.37	4.23	5.57	Not Sig.
14 years : " "	1.72	3.21	4.23	Not Sig.
15 years : " "	2.65	3.12	4.10	Not Sig.
(iii) For Age Differences :				
Among Main Groups -				
13 years vs 14 years :	0.31	2.06	2.71	Not Sig.
13 years vs 15 years :	2.40	2.04	2.68	Sig.at .05
14 years vs 15 years :	2.09	1.76	2.32	Sig.at .05

(continued)

(Table 4.12(c) continued)

	Obtained Mean Differences	Required Differences .05	.01	Significance
Among Sub-groups -				
Among Highly Superior Boys -				
13 years vs 14 years :	1.48	5.12	6.73	Not Sig.
13 years vs 15 years :	3.18	5.12	6.73	Not Sig.
14 years vs 15 years :	4.66	5.08	6.68	Not Sig.
Among Superior Boys -				
13 years vs 14 years :	2.04	3.92	5.17	Not Sig.
13 years vs 15 years :	0.54	3.92	5.17	Not Sig.
14 years vs 15 years :	2.58	3.12	4.10	Not Sig.
Among Highly Superior Girls -				
13 years vs 14 years :	1.60	4.49	5.91	Not Sig.
13 years vs 15 years :	3.94	4.39	5.78	Not Sig.
14 years vs 15 years :	2.34	3.51	4.62	Not Sig.
Among Superior Girls -				
13 years vs 14 years :	1.05	3.59	4.72	Not Sig.
13 years vs 15 years :	0.74	3.51	4.62	Not Sig.
14 years vs 15 years :	1.79	3.23	4.26	Not Sig.

same tendency for creativity (Figural : flexibility) score to increase with age, the 15 age group scoring highest (52.62), significantly higher than 13 age group (50.22) and 14 age group (50.53), both of which however, did not differ mutually, implying that age contributed significantly to figural flexibility particularly at age of 15, as in other cases.

The closer examination of results in Table 4.12(c) shows that among I.Q. sub-groups, the highly superior differed from

the superior only in case of boys of 15 years and this was also responsible for the overall significant difference in main I.Q. groups.

Among the sex sub-groups, not a single sex pair showed significance difference at any I.Q. level or age level.

Among the age sub-groups strangely not a single age pair showed significant difference though on the whole age was significant (15 age group differing from both 13 and 14 age groups). The overall significant difference with a large size of sample is possible, occuring cumulatively from some differences of sub-groups, though insignificant due to smaller size.

To sum up, giftedness and age were significantly contributing to figural flexibility on the whole and particularly at age 15. Neither sex nor any interaction played a significant role in figural flexibility.

(vi) Originality(Figural) :

On the same lines, the T-scores on figural originality obtained on Torrance Test by 683 intellectually gifted subjects arranged in 2 x 2 x 3 factorial design were analysed by the F-test and the L.S.D. test. The results have been summarized in Tables 4.13(a), (b) and (c).

Table 4.13(a) : Showing Mean Scores on Originality (Figural) of each of Main and Sub-groups
(Sample Size 683) (I.Q. x Sex x Age) (According to Age)

	Age in Years												Total		
	13			14			15			Total			(Sexwise)		
	No.	Scores	Mean	No.	Scores	Mean	No.	Scores	Mean	No.	Scores	Mean	No.	Scores	Mean
Boys (M) :															
Highly Superior I_1	31	1571	50.67	32	1641	51.28	32	1745	54.53	95	4957	52.17	304	15432	50.76
Superior I_2	39	1887	48.87	85	4276	50.30	85	4312	50.72	209	10475	50.11			
Girls (F) :															
Highly Superior I_1	30	1522	50.73	64	3293	51.45	71	3839	54.07	165	8654	52.44	379	19593	51.70
Superior I_2	56	2812	50.21	75	3796	50.61	83	4331	52.18	214	10939	51.11			
Total (I.Q.wise):															
Highly Superior I_1	61	3093	50.70	96	4934	51.39	103	5584	54.21	260	13611	52.35	683	35025	51.28
Superior I_2	95	4699	49.46	160	8072	50.45	168	8643	51.44	423	21414	50.62			
Total (Agewise)	156	7792	49.95	256	13006	50.81	271	14227	52.49	683	35025	51.28			

Table 4.13(b) : Showing Summary of Results of Analysis of Variance

Sources of Variance	df	Sum of Squares (Ss)	Mean Squares (Variance)	F-Ratios	Remarks
Between I.Q. (Giftedness)	1	479.65	479.65	6.09	Sig.at .05
Between Sex	1	146.97	146.97	1.86	Not Sig.
Between Age	2	736.48	368.24	4.67	Sig.at .01
Interaction: I.Q. x Sex	1	37.50	37.50	0.23	Not Sig.
Interaction: I.Q. x Sex	2	120.19	60.10	0.76	Not Sig.
Interaction: Sex x Age	2	12.22	6.11	0.07	Not Sig.
Interaction: I.Q. x Sex x Age	2	52.83	26.42	0.33	Not Sig.
Within Groups (Error term)	671	52837.19	78.74		
Total	682	54348.03			

From the statistical table

For df	=	1/671	2/671
F at .05	=	3.857	3.007
F at .01	=	6.681	4.644

Table 4.13(c) : Showing Results of L.S.D. Test for Pair Differences among I.Q., Sex and Age Sub-groups

$$L.S.D. = t \sqrt{MS_w/N_1 + MS_w / N_2}$$

(t for df of MS_w at .05 = 1.96 and at .01 = 2.58)

	Obtained Mean Difference	Required Difference .05	.01	Significance
(i) For I.Q. Differences :				
Among Boys of -				
13 years : Highly Sup. vs Sup.	2.29	4.19	2.29	Not Sig.
14 years : " "	0.98	3.61	4.74	Not Sig.
15 Years : " "	3.81	3.61	4.74	Sig.at .05
Among Girls of -				
13 years : " "	0.52	3.94	5.19	Not Sig.
14 years : " "	0.84	2.96	3.89	Not Sig.
15 years : " "	1.89	2.80	3.69	Not Sig.
(ii) For Sex Differences :				
Among Highly Superior of -				
13 years : Boys vs Girls	0.06	4.45	5.86	Not Sig.
14 years : " "	0.17	3.76	4.95	Not Sig.
15 years : " "	0.46	3.70	4.88	Not Sig.
Among Superior of -				
13 years : " "	1.83	3.63	4.77	Not Sig.
14 years : " "	0.31	2.76	3.64	Not Sig.
15 years : " "	1.46	2.69	3.53	Not Sig.
(iii) For Age Differences :				
Among Main Groups -				
13 years vs 14 years :	0.86	1.76	2.32	Not Sig.
13 years vs 15 years :	2.54	1.74	2.30	Sig.at .01
14 years vs 15 years :	1.68	1.51	1.99	Sig.at .05

(continued)

(Table 4.13(c) continued)

	Obtained Mean Difference	Required Difference .05	.01	Significance
Among Sub-groups -				
Highly Superior Boys :				
13 years vs 14 years	0.61	4.39	5.78	Not Sig.
13 years vs 15 years	3.86	4.39	5.78	Not Sig.
14 years vs 15 years	3.25	4.35	5.73	Not Sig.
Superior Boys :				
13 years vs 14 years	1.92	3.37	4.44	Not Sig.
13 years vs 15 years	2.34	3.37	4.44	Not Sig.
14 years vs 15 years	0.42	2.57	3.38	Not Sig.
Highly Superior Girls :				
13 years vs 14 years	0.72	3.84	5.06	Not Sig.
13 years vs 15 years	3.34	3.78	4.98	Not Sig.
14 years vs 15 years	2.62	2.99	3.95	Not Sig.
Superior Girls :				
13 years vs 14 years	0.40	3.05	4.02	Not Sig.
13 years vs 15 years	1.97	2.99	3.95	Not Sig.
14 years vs 15 years	1.57	2.76	3.64	Not Sig.

It would be seen from Table 4.13(b) that as in earlier cases, here too the giftedness (I.Q. level) and age contributed significantly to figural originality. Sex or any interaction did not play any role. This is again confirmed by results in Table 4.6(b) earlier. Between the two I.Q. groups, the highly superior were significantly higher (52.35) than the superior (50.62) on the whole. Among the age groups, there was the

increasing trend as found earlier, the $^{15}_{\wedge}$age group stood highest (52.49), next best was 14 age group (50.81) and lowest (49.95) was the 13 age group; the latter two did not mutually differ, though 15 age group was significantly different from the other two, again implying that age was significantly contributing factor, particularly at 15 years.

The closer examination of Table 4.13(c) displays that though I.Q. was a significant factor on the whole, only one sub-group I.Q. pair viz. highly superior vs superior boys of 15 showed significant difference.

Among sex sub-groups, not a single sub-group sex pair showed significant difference at any I.Q. level or age level, just as on the whole.

Among the age sub-groups, strangely not a single sub-group age pair showed significant difference, though on the whole age was significant, particularly at 15 age. As explained earlier, the overall significant difference seems to have accumulated from small insignificant subgroup differences, not feasible because of small, unequal size of sub-groups.

To sum up, giftedness and age contributed significantly to figural originality on the whole and specifically at age of 15, as in other cases; neither sex nor any interaction was significant in figural originality.

Table 4.14(a) : Showing Mean Scores on Elaboration (Figural) of each of Main and Sub-groups (Sample Size : 683)

(I.Q. x Sex x Age) (According to Age)

	Age in Years									Total		
	13			14			15			Total			(Sexwise)		
	No.	Scores	Mean	No.	Scores	Mean	No.	Scores	Mean	No.	Scores	Mean	No.	Scores	Mean
Boys (M) :															
Highly Superior I_1	31	1717	55.38	32	1715	53.59	32	1798	56.18	95	5230	55.05	304	15999	52.63
Superior I_2	39	1994	51.12	85	4331	50.95	85	4444	52.28	209	10769	51.52			
Girls (F) :															
Highly Superior I_1	30	1514	50.46	64	3317	51.82	71	3317	51.82	71	3640	51.26	379	18984	50.09
Superior I_2	56	2768	49.42	75	3740	49.86	83	4005	48.25	214	10513	49.12			
Total (I.Q.wise):															
Highly Superior I_1	61	3281	52.96	96	5032	52.41	103	5438	52.79	260	13701	52.69	683	34983	51.22
Superior I_2	95	4762	50.12	160	8071	50.44	168	8449	50.29	423	21282	50.31			
Total (Agewise)	156	7993	51.23	256	13103	51.18	271	13887	51.24	683	34983	51.22			

(vii) Elaboration (Figural) :

Finally, the scores on figural elaboration of Torrance Test were converted into T-scores, tabulated in a 2 x 2 x 3 factorial design and statistically analysed by F-test and L.S.D. test. The results have been as usual summarized in Tables 4.14(a), (b) and (c)

Table 4.14(b) : Showing Summary of Results of Analysis of Variance

Sources of Variance	df	Sum of Squares (SS)	Mean Squares (Variance)	F-Ratios	Remarks
Between I.Q. (Giftedness)	1	915.26	915.26	8.27	Sig.at .01
Between Sex	1	1087.12	1087.12	9.83	Sig.at .01
Between Age	2	0.53	0.27	0.02	Not Sig.
Interaction: I.Q. x Sex	1	353.25	353.25	3.19	Not Sig.
Interaction: I.Q. x Age	2	18.58	9.29	0.84	Not Sig.
Interaction: Sex x Age	2	279.89	139.95	1.26	Not Sig.
Interaction: I.Q. x Sex x Age	2	95.45	47.70	0.43	Not Sig.
Within Groups (Error terms)	671	74181.98	110.55		
Total	682	76932.06			

From the statistical table

For df =	1/671	2/671
F at .05 =	3.857	3.007
F at .01 =	6.681	4.644

Table 4.14(c) : Showing Results of L.S.D. Test for Pair Differences among I.Q., Sex and Age Sub-Groups

$$L.S.D = t \sqrt{MS_w / N_1 + MS_w / N_2}$$

(t for df of MS_w at .05 = 1.96 and at .01 = 2.58)

	Obtained Mean Difference	Required Differences .05	.01	Significance
(i) For I.Q. Differences :				
Among Boys of -				
13 years : Highly Sup. vs Sup.	4.26	4.96	6.53	Not Sig.
14 years : " "	2.64	4.27	5.62	Not Sig.
15 years : " "	3.90	4.27	5.62	Not Sig.
Among Girls of -				
13 years : " "	1.04	4.66	6.14	Not Sig.
14 years : " "	1.96	3.50	4.62	Not Sig.
15 years : " "	3.01	3.31	4.36	Not Sig.
(ii) For Sex Differences :				
Among Highly Superior -				
13 years : Boys vs Girls	4.92	5.27	6.94	Not Sig.
14 years : " "	1.77	4.47	5.88	Not Sig.
15 years : " "	4.92	4.39	5.78	Sig.at .05
Among Superior -				
13 years : Boys vs Girls	1.70	4.29	5.65	Not Sig.
14 years : " "	1.09	3.21	4.23	Not Sig.
15 years : " "	4.03	3.17	4.18	Sig.at .05
(iii) For Age Differences :				
Among Main Groups -				
13 years vs 14 years	0.05	2.08	2.76	Not Sig.
13 years vs 15 years	0.01	2.06	2.71	Not Sig.
14 years vs 15 years	0.06	1.78	2.35	Not Sig.

(continued)

(Table 4.14(c) continued)

	Obtained Mean Difference	Required Difference .05	.01	Significance
Among Sub-groups -				
Among Highly Superior Boys-				
13 years vs 14 years :	1.79	5.19	6.84	Not Sig.
13 years vs 15 years :	0.80	5.19	6.84	Not Sig.
14 years vs 15 years :	2.59	5.15	6.79	Not Sig.
Among Superior Boys -				
13 years vs 14 years :	0.17	3.98	5.24	Not Sig.
13 years vs 15 years :	1.16	3.98	5.24	Not Sig.
14 years vs 15 years :	1.33	3.16	4.15	Not Sig.
Among Highly Superior Girls-				
13 years vs 14 years :	1.36	4.57	6.01	Not Sig.
13 years vs 15 years :	0.80	4.49	5.91	Not Sig.
14 years vs 15 years :	0.56	3.55	4.67	Not Sig.
Among Superior Girls -				
13 years vs 14 years :	0.44	3.65	4.80	Not Sig.
13 years vs 15 years :	1.17	3.57	4.70	Not Sig.
14 years vs 15 years :	1.61	3.29	4.33	Not Sig.

In contrast to earlier findings in Tables 4.8(b) to 4.13(b), revealing I.Q. and age as significant, the present Table 4.14(b) reveals that I.Q. and sex (not age) were significant factors contributing to figural elaboration on the whole. Significance of I.Q. here is confirmed also by results in Table 4.7(b) earlier. Between the two I.Q. groups, the highly superior stood as usual significantly higher(52.69) than

the superior (50.31) on the total. Between the two sexes, boys scored significantly higher (52.63) than girls (50.09) on the whole. Age was not at all significant on the whole; neither any interaction.

The closer examination of results in Table 4.14(c) reveals that though I.Q. was significant on the whole, not a single sub-group I.Q. pair showed significant difference, perhaps due to unequal and smaller sizes of sub-group samples, whose insignificant differences might have accumulated into a significant overall difference in total samples of large size. More specifically, as seen from figures in Table 4.14(a), the highly superior and superior groups of boys were highest at 15, while among girls, superior and highly superior groups were highest at 14. This accounted for lack of significant differences in I.Q., on the whole.

Between the sex groups, though on the whole boys were significantly different from and higher the girls, the results of L.S.D. test on sub-groups show that only two sex pairs, viz., boys vs girls of 15 years at superior as well as highly superior levels, showed significant sex differences, implying again that sex was significant specifically at 15 years of age, and that more pronouncedly among boys.

Among age sub-groups, there was not a single pair showing significant differences, just as on the whole.

To sum up, giftedness and sex were significant factors contributing to figural elaboration on the whole, and more particularly at age of 15. Neither age nor any interaction was significant.

4.3 CREATIVITY OF FUNCTIONALLY (MANIFEST) GIFTED CHILDREN IN RELATION TO GIFTEDNESS AND SEX (SAMPLE OF 325 SUBJECTS)

As noted in the beginning of this chapter, a special study was made of intellectually gifted children who exhibited their giftedness not only on I.Q. test, but who also functionally displayed their giftedness through high achievement or performance in school subjects (with 60 per cent or above marks in final school examination). With this view, a special sample of such children was taken out from the original sample of 935 capably intellectually gifted children and this sample amounted to 325, distributed sexwise among three levels of I.Q. viz. extraordinary (I.Q. 140 and above), very superior (I.Q. 130 - 139) and superior (I.Q. 120 - 129), as shown earlier in Table 3.6 in Chapter III. Their scores on different aspects of creativity, as being converted into T-scores, were arranged in a 3 x 2 factorial design representing three levels of I.Q. and two sexes, as mentioned above and these data were subjected to statistical analysis, applying F-test as well as L.S.D. test to study overall differences as well as pairwise differences in sub-groups. Scores on each of seven aspects of creativity were analysed separately, and all these results have been summarised in tables 4.15 to 4.21(a,b,c) and discussed below on similar lines as results in earlier Tables 4.1 to 4.7.

(i) Fluency (Verbal) :

The fluency (verbal) scores on Torrance Test, obtained by 325 subjects, converted into T-scores and arranged in a 3 x 2 factorial design representing three levels of I.Q. viz. extraordinary (with I.Q. 140 and above), very superior (with I.Q. 130-139) and superior (with I.Q. 120-129), and two sexes, were statistically analysed by F-test and L.S.D. test as in earlier cases to study overall differences and pairwise differences in main and sub-groups. The results have been presented in Tables 4.15(a), (b) and (c), thus (a) giving mean scores of main as well as sub-groups, (b) showing summary of results of analysis of variance (F-test) and (c) summarizing the results of the L.S.D. test, on lines similar to those presented earlier.

Table 4.15(a) Showing Mean Scores on Fluency (Verbal) of each of Main and Sub-groups (Sample size :325) (I.Q. x Sex)

		Extra-ordinary	Very Superior	Superior	Total
Boys :	Nos.	10	49	106	165
	Scores	610	2723	5578	8911
	Mean	61.00	55.57	52.62	54.01
Girls :	Nos.	19	51	90	160
	Scores	1006	2826	4613	8445
	Mean	52.95	55.41	51.26	52.78
Total :	Nos.	29	100	196	325
	Scores	1616	5549	10191	17356
	Mean	55.72	55.49	51.99	53.40

Table 4.15(b) : Showing Summary of Results of Analysis of Variance

Sources of Variance	df	Sum of Squares (SS)	Mean Squares (Variance)	F Ratios	Remarks
Between I.Q. (Giftedness)	2	980.42	490.21	5.25	Sig.at .01
Between Sex	1	121.85	121.85	1.31	Not Sig.
Interaction : I.Q. x Sex	2	394.58	197.29	2.11	Not Sig.
Within Groups (Error term)	319	29923.34	93.31		
Total	324	31420.19			

From the statistical tables -

For df =	2/319	1/319
F at .05 =	3.028	3.868
F at .01 =	4.676	6.716

Table 4.15(c) : Showing Results of L.S.D. Test for Pair Differences among I.Q. and Sex Sub-groups

$$L.S.D. = t \sqrt{MS_W / N_1 + MS_W / N_2}$$

(t for df of MS_W at .05 = 1.97 and at .01 = 2.59)

	Obtained Mean Difference	Required Difference .05	.01	Significance
(i) For I.Q. Differences :				
Among Main Groups -				
Extraordinary vs Very Sup.	0.23	4.02	5.28	Not Sig.
Extraordinary vs Superior	3.73	3.78	4.97	Not Sig.
Very Superior vs Superior	3.50	2.34	3.08	Sig.at .0
Among Boys -				
Extraordinary vs Very Sup.	5.43	6.60	8.68	Not Sig.
Extraordinary vs Superior	8.38	6.28	8.26	Sig.at .0
Very Superior vs Superior	2.95	3.29	4.33	Not Sig.

(Continued)

(Table 4.15(c) continued)

	Obtained Mean Difference	Required Difference .05	.01	Significance
Among Girls -				
Extraordinary vs Very Superior	2.46	5.10	6.71	Not Sig.
Extraordinary vs Superior	1.69	4.81	6.32	Not Sig.
Very Superior vs Superior	4.15	3.33	4.38	Sig.at .05
(ii) For Sex Differences :				
Among Extraordinary : Boys vs Girls	8.05	7.93	9.76	Sig.at. .05
Among Very Superior : Boys vs Girls	0.16	3.82	5.02	Not Sig.
Among Superior : Boys vs Girls	1.36	2.72	3.57	Not Sig.

It would be seen from the results in Table 4.15(b) that only giftedness (I.Q. level) was significantly contributing to verbal fluency in case of functionally (manifest or overt) gifted children (325 in number). Neither sex nor its interaction with I.Q. was significantly contributing to verbal fluency. These results can be contrasted with similar results in Table 4.1(b) on the total sample of all 935 capably intellectually gifted children, in which case giftedness as well as interaction between giftedness and sex was significant. In the present case of manifest gifted children, only giftedness by itself was responsible for verbal fluency. As would be seen from figures in Table 4.15(a), the extraordinary group stood highest (55.72), slightly next best was the very superior group (55.49), and lowest was the superior group (51.99) - the first two being not

mutually significantly different, neither the extraordinary from the superior, though the gap is comparatively high (because of probably large difference in sample size of each, the extraordinary sample size being very low). The only significant difference existed between very superior and superior.

A closer examination of results in Table 4.15(c) reveals that among I.Q. sub-groups, in case of boys the extraordinary differed from the superior, and in case of girls the very superior differed from the superior, as on the total. As regards the sex sub-groups, there were sex differences only among the extraordinary group, and not among other two I.Q. levels, just as there were no overall sex differences.

To sum up, in case of functionally gifted children, only giftedness was significantly contributing to verbal fluency on the whole, and particularly among the extraordinary and very superior groups, thereby lowering the creativity score of the superior. Neither sex nor interaction was significant.

(ii) Flexibility (Verbal) :

Similarly the verbal flexibility T-scores (on Torrance Test) of functionally gifted children in a 3 x 2 factorial design were analysed by F-test and L.S.D. test and the results have been summarized in Tables 4.16 (a), (b) and (c).

Table 4.16(a) : Showing Mean Scores on Flexibility (Verbal) of each of Main and Sub-groups (Sample Size : 325) (I.Q. x Sex)

		Extra-ordinary	Very Superior	Superior	Total
Boys :	Nos.	10	49	106	165
	Scores	632	2726	5543	8901
	Mean	63.20	55.63	52.29	53.95
Girls :	Nos.	19	51	90	160
	Scores	1020	2815	4634	8469
	Mean	53.63	55.19	51.49	52.93
Total :	Nos.	29	100	196	325
	Scores	1652	5541	10177	17370
	Mean	56.97	55.41	51.92	53.45

Table 4.16(b) : Showing Summary of Results of Analysis of Variance

Sources of Variance	df	Sum of Squares (SS)	Mean Squares (Variance)	F Ratios	Remarks
Between I.Q. (Giftedness)	2	1199.30	599.65	6.61	Sig. at .01
Between Sex	1	83.55	83.55	0.92	Not Sig.
Interaction : I.Q. x Sex	2	545.89	272.94	3.01	Not Sig.
Within groups (Error term)	319	28954.57	90.76		
Total	324	30783.31			

From the statistical table

For	df =	2/319	1/319
F at	.05 =	3.028	3.868
F at	.01 =	4.676	6.716

Table 4.16(c) : Showing Results of L.S.D. Test for Pair Differences among I.Q. and Sex Sub-groups.

$$L.S.D. = t\sqrt{MS_w / N_1 + MS_w / N_2}$$

(t for df of MS_w at .05 = 1.47 and at .01 = 2.59)

	Obtained Mean Difference	Required Difference .05	.01	Significance
(i) For I.Q. Differences :				
Among Main Groups -				
Extraordinary vs Very Sup.	1.56	4.02	5.28	Not Sig.
Extraordinary vs Superior	5.05	3.78	4.97	Sig. at .01
Very Superior vs Superior	3.49	2.30	3.03	Sig.at .01
Among Boys -				
Extraordinary vs Very Sup.	7.57	6.52	8.57	Sig.at .05
Extraordinary vs Superior	10.91	8.16	6.21	Sig.at .01
Very Superior vs Superior	2.34	3.23	4.25	Not Sig.
Among Girls -				
Extraordinary vs Very Sup.	1.56	5.04	6.63	Not Sig.
Extraordinary vs Superior	2.14	4.75	6.24	Not Sig.
Very Superior vs Superior	3.70	3.29	4.33	Sig.at .05
(ii) For Sex Differences :				
Among Extraordinary Boys vs Girls	9.57	7.33	9.63	Sig.at .05
Among Very Superior Boys vs Girls	0.44	3.76	4.95	Not Sig.
Among Superior Boys vs Girls	0.80	3.33	4.38	Not Sig.

It would be observed from the results in Table 4.16(b) that again only giftedness (I.Q. level) was significantly contributing to verbal flexibility; neither sex nor interaction was significant. In contrast to this I.Q. and sex were not significant but their interaction was significant in case of larger sample of capably gifted 935 children (Ref. Table 4.2(b)). When only functionally gifted children were studied, I.Q. level by itself turned out to be an independent, significant factor of verbal flexibility as of verbal fluency in preceding paragraph. Hereto, the extra-ordinary and very superior were not mutually different, but the superior differed sufficiently from both extraordinary and very superior, again giftedness affecting adversely only the superior group and favouring equally the first two I.Q. level groups.

The closer examination of results in Table 4.16(c) reveals that among I.Q. sub-groups, with boys the extraordinary differed both from very superior and from superior; while with girls only one pair, viz. very superior differed from superior group. Among sex sub-groups, there were sex differences only in case of extraordinary group, not in other two I.Q. groups.

To sum up, only giftedness affected significantly to verbal flexibility on the whole, and particularly of the

extraordinary group and very superior group; sex or interaction was insignificant therein.

(iii) Originality (Verbal) :

Again the verbal originality T-scores (on Torrance Test) of functionally gifted subjects in a 3 x 2 factorial design were analysed by F-test and L.S.D. test and the results have been presented in Tables 4.17(a), (b) and (c) as usual.

Table 4.17(a) : Showing Mean Scores on Originality (Verbal) of each of Main and Sub-groups (Sample Size : 325) &(I.Q. x Sex)

		Extra-ordinary	Very Superior	Superior	Total
Boys	: Nos.	10	49	106	165
	Scores	626	2728	5560	8914
	Mean	62.60	55.67	52.45	54.02
Girls	: Nos.	19	51	90	160
	Scores	982	2803	4600	8385
	Mean	51.68	54.96	51.11	52.41
Total	: Nos.	29	100	196	325
	Scores	1608	5531	10160	17299
	Mean	55.45	55.31	51.84	53.23

Table 4.17(b): Showing Summary of Results of Analysis of Variance

Sources of Variance	df	Sum of Squares	Mean Squares (Variance	F Ratios	Remarks
Between I.Q. (Giftedness)	2	955.80	477.90	4.74	Sig.at .01
Between Sex	1	212.64	212.64	2.11	Not Sig.
Interaction: I.Q. x Sex	2	668.33	334.16	3.32	Sig.at .05
Within Groups (Error term)	319	32145.38	100.76		
Total	324	33982.15			

From the statistical table

For df =	2/319	1/319
F at .05 =	3.028	3.868
F at .01 =	4.676	6.716

Table 4.17(c) : Showing Results of L.S.D. Test for Pair Differences among I.Q. and Sex Sub-groups

$$L.S.D. = t\sqrt{MS_W/N_1 + MS_W/N_2}$$

(t for df of MS_W at .05 = 1.97 and at .01 = 2.59)

	Obtained Mean Differences	Required Differences .05	.01	Signi-ficance
(i) For I.Q. Differences :				
Among Main Groups -				
Extraordinary vs Very Superior	0.14	3.61	4.74	Not Sig.
Extraordinary vs Superior	3.61	3.78	4.97	Not Sig.
Very Superior vs Superior	3.47	1.48	1.94	Sig.at.01
Among Boys -				
Extraordinary vs Very Superior	6.93	6.86	9.01	Sig.at.01
Extraordinary vs Superior	10.15	6.54	8.60	Sig.at.01
Very Superior vs Superior	3.22	3.43	4.51	Not Sig.
Among Girls -				
Extraordinary vs Very Superior	3.28	5.32	6.99	Not Sig.
Extraordinary vs Superior	0.57	4.98	6.55	Not Sig.
Very Superior vs Superior	3.85	3.45	4.56	Sig.at .05
(ii) For Sex Differences -				
Among Extraordinary Boys vs Girls	10.92	7.72	10.15	Sig.at .01
Among Very Superior Boys vs Girls	0.71	3.96	5.21	Not Sig.
Among Superior Boys vs Girls	1.34	2.84	3.73	Not Sig.

The results in Table 4.17(b) reveal that only giftedness (I.Q.) was a significant factor contributing to verbal originality, and sex was found insignificant, as in case of results of larger sample in Table 4.3(b); but unlike that in Table 4.3(b) where interaction is insignificant, the sex x I.Q. interaction was found to be significant in the present case. In case of I.Q. main groups, the extraordinary were highest (55.45), next best very superior (55.31) and lowest were the superior (51.84) - and yet only the superior were significantly different from the very superior, and not different from extraordinary (though with a little larger gap, possibly because of low number), which was itself almost equal to very superior on verbal originality, as in case of verbal fluency.

The closer examination of results in Table 4.17(c) reveals that among the I.Q. sub-groups in case of boys the extraordinary differed from both the very superior and the superior which were mutually not different, while in case of girls only very superior-superior pair differed, as on the whole. As would be seen from sex sub-groups, there were much significant sex differences only among the extraordinary, and not at all among the very superior and the superior. Among boys, extra-ordinary were best, and among girls the very superior were best. All this accounts for significant interaction between I.Q.

and sex.

To sum up, giftedness contributed significantly to verbal originality on the whole, and particularly in case of the extraordinary boys and the very superior boys and girls both, accounting for significant interaction and lack of overall sex differences.

(iv) Fluency (Figural) :

Next, figural fluency T-scores on Torrance Test, obtained by manifest gifted children arranged in 3 x 2 factorial design were analysed by F-test and L.S.D. test and the summary of results is presented in Tables 4.18(a),(b),(c).

Table 4.18(a) : Showing Mean Scores on Fluency (Figural) of each of Main and Sub-groups (Sample Size : 325)
(I.Q. x Sex)

		Extra-ordinary	Very Superior	Superior	Total
Boys :	Nos.	10	49	106	165
	Scores	618	2604	5337	8559
	Mean	61.80	53.14	50.35	51.87
Girls:	Nos.	19	51	90	160
	Scores	1091	2705	4689	8485
	Mean	53.63	53.04	52.10	53.03
Total:	Nos.	29	100	196	325
	Scores	1709	5309	10026	17044
	Mean	58.93	53.09	51.15	52.44

Table 4.18(b) : Showing Summary of Results of Analysis of Variance

Sources of Variance	df	Sum of Squares (SS)	Mean Squares (Variance)	F Ratios	Remarks
Between I.Q. (Giftedness)	2	1588.64	794.32	7.46	Sig.at .01
Between Sex	1	109.01	109.01	1.02	Not Sig.
Interaction I.Q. x Sex	2	166.19	83.95	0.79	Not Sig.
Within Groups (Error term)	319	33926.35	106.35		
Total	324	35790.19			

From the statistical table

for df =	2/319	1/319
F at .05 =	3.028	3.868
F at .01 =	4.67	6.76

Table 4.18(c) : Showing Results of L.S.D. Test for Pair Differences among I.Q. and Sex Sub-groups

$$L.S.D. = t\sqrt{MS_w / N_1 + MS_w / N_2}$$

(t for df of MS_w at .05 = 1.97 and at .01 = 2.59)

	Obtained Mean Differences	Required Differences .05	.01	Significance
(i) For I.Q. Differences :				
Among Main Groups -				
Extraordinary vs Very Superior	5.84	4.27	5.62	Sig.at .0
Extraordinary vs Superior	7.78	4.04	5.31	Sig.at .0
Very Superior vs Superior	1.94	2.48	3.26	Not Sig.

(continued)

(Table 4.18(c) continued)

	Obtained Mean Differences	Required Differences .05	.01	Significance
Among Boys -				
Extraordinary vs Very Sup.	8.66	7.05	9.27	Sig.at .05
Extraordinary vs Superior	11.45	6.71	8.83	Sig.at .01
Very Superior vs Superior	2.79	3.51	4.61	Not Sig.
Among Girls -				
Extraordinary vs Very Sup.	0.59	5.46	7.17	Not Sig.
Extraordinary vs Superior	1.53	5.12	6.73	Not Sig.
Very Superior vs Superior	0.94	2.97	3.91	Not Sig.
(ii) For Sex Differences :				
Among Extraordinary Boys vs Girls	8.17	7.94	10.44	Sig.at .05
Among Very Superior " "	0.10	4.06	5.34	Not Sig.
Among Superior " "	1.75	2.78	3.65	Not Sig.

Again it would be seen from results in Table 4.18(b) that only giftedness (I.Q.) was significantly contributing to figural fluency ; neither sex nor interaction was significant. These findings tally exactly with those in earlier Table 4.4(b). Among the I.Q. main groups, the extraordinary scored highest (58.93), next best was the very superior (53.09) and last was the superior (51.15). The extraordinary with its very high score differed from both the very superior and the superior both of which were mutually not different statistically, implying

that giftedness contributed mostly to figural fluency of the extraordinary only on the whole. Examining results of boys and girls separately, the picture remains the same with boys as with the total group; in case of girls no I.Q. pair showed difference. Similarly, examining sex sub-groups, it is again observed that there were sex differences only at the extra-ordinary I.Q. level and not at any other I.Q. level. In other words, giftedness affected creativity (figural fluency) mostly in case of extraordinary boys group.

To sum up, only giftedness was the significant factor contributing to figural fluency on the whole, and particularly of extraordinary boys ; neither sex nor interaction was significant.

(v) Flexibility (Figural) :

Similarly, the figural flexibility T-scores on Torrance Test, obtained by functionally gifted children in a 3 x 2 factorial design were analysed by F-test and L.S.D. test, and the results have been presented in Tables 4.19(a), (b) and (c).

Table 4.19(a) : Showing Mean Scores on Flexibility (Figural) of each of Main and Sub-groups (Sample Size : 325)
(I.Q. x Sex)

		Extra-ordinary	Very Superior	Superior	Total
Boys :	Nos.	10	49	106	165
	Scores	619	2583	5325	8527
	Mean	61.90	52.71	50.24	51.68
Girls :	Nos.	19	51	90	160
	Scores	1048	2699	4621	8368
	Mean	55.16	52.92	51.34	52.30
Total :	Nos.	29	100	196	325
	Scores	1667	5282	9946	16895
	Mean	57.48	52.82	50.74	51.98

Table 4.19(b) : Showing Summary of Results of Analysis of Variance

Sources of Variance	df	Sum of Squares (SS)	Mean Squares (Variance)	F Ratios	Remarks
Between I.Q. (Giftedness)	2	1247.67	623.83	5.26	Sig.at .01
Between Sex	1	31.36	31.36	0.26	Not Sig.
Interaction : I.Q. x Sex	2	327.28	163.64	1.38	Not Sig.
Within groups (Error term)	319	37848.62	118.64		
Total	324	39454.93			

From the statistical table

for df	=	2/319	1/319
F at .05	=	3.028	3.868
F at .01	=	4.676	6.716

Table 4.19(c) : Showing Results of L.S.D. Test for Pair Differences among I.Q. and Sex Sub-groups

$$L.S.D. = t \sqrt{MS_w / N_1 + MS_w / N_2}$$

(t for df of MS_w at .05 = 1.97 and at .01 = 2.59)

	Obtained Mean Difference	Required Difference .05	.01	Significance
(i) For I.Q. Differences :				
Among Main Groups -				
Extraordinary vs Very Superior	4.66	4.53	5.96	Sig.at .05
Extraordinary vs Superior	6.74	4.27	5.62	Sig.at .01
Very Superior vs Superior	2.08	2.56	3.37	Not Sig.
Among Boys -				
Extraordinary vs Very Superior	9.19	7.45	9.79	Sig.at .05
Extraordinary vs Superior	11.66	7.09	9.32	Sig.at .01
Very Superior vs Superior	2.47	3.70	4.87	Not Sig.
Among Girls -				
Extraordinary vs Very Superior	2.24	5.77	7.59	Not Sig.
Extraordinary vs Superior	3.82	5.42	7.12	Not Sig.
Very Superior vs Superior	1.58	3.76	4.95	Not Sig.
(ii) For Sex Differences :				
Among Extraordinary Boys vs Girls	6.74	8.37	11.01	Not Sig.
Among Very Superior Boys vs Girls	0.21	4.29	5.65	Not Sig.
Among Superior Boys vs Girls	1.10	3.07	4.04	Not Sig.

The results in Table 4.19(b) reveal that only giftedness was a significantly contributing factor to figural flexibility; neither sex nor interaction. These results tally also with earlier

results in Table 4.5(b). Here too, the extraordinary stood highest (57.48), the very superior (52.82) next best and the superior (50.74) lowest. Again, the extraordinary was significantly different from both the very superior and the superior both of which were mutually not different on the whole.

The closer examination of results in Table 4.19(c) further reveals that among the boys the picture remains the same as on the total, i.e., the extraordinary were different from both very superior and superior (being mutually not different), and among the girls no I.Q. pair showed difference. These results with I.Q. groups are same as those, for preceding figural fluency. Among sex sub-groups, only the extraordinary group showed no sex differences, not at any other I.Q. level, though on the whole also there were no sex differences.

To sum up, only giftedness contributed significantly to figural flexibility on the whole, and particularly among the extraordinary boys. Neither sex nor interaction showed significance.

(vi) Originality (Figural) :

Again, the figural originality T-scores on Torrance Test, obtained by manifest gifted children were statistically analysed in a 3 x 2 factorial design with the help of F-test

and L.S.D. test. The results have been presented in Tables 4.20(a), (b) and (c).

Table 4.20(a) : Showing Mean Scores on Originality (Figural) of each of Main and Sub-groups (Sample Size : 325) (I.Q. x Sex)

		Extra-ordinary	Very Superior	Superior	Total
Boys :	Nos.	10	49	106	165
	Scores	624	2527	5345	8496
	Mean	62.40	51.57	50.42	51.49
Girls :	Nos.	19	51	90	160
	Scores	1006	2623	4718	8347
	Mean	52.95	51.43	52.42	52.17
Total :	Nos.	29	100	196	325
	Scores	1630	5150	10063	16843
	Mean	56.21	51.50	51.34	51.82

Table 4.20(b) : Showing Summary of Results of Analysis of Variance

Sources of Variance	df	Sum of Squares (SS)	Mean Squares (Variance)	F Ratios	Remarks
Between I.Q. (Giftedness)	2	613.16	306.58	2.74	Not Sig.
Between Sex	1	37.32	37.32	0.33	Not Sig.
Interaction : I.Q. x Sex	2	742.78	371.39	3.32	Sig.at .05
Within Groups (Error Term)	319	35711.75	111.94		
Total	324	37105.01			

From the statistical tables

For df =	2/319	1/319
F at .05=	3.028	3.868
F at .01 =	4.676	6.716

Table 4.20(c): Showing Results of L.S.D. Test for Pair Differences among I.Q. and Sex Sub-groups

$$L.S.D. = t\sqrt{MS_w / N_1 + MS_w / N_2}$$

(t for df of MS_w at .05 = 1.97 and at .01 = 2.59)

	Obtained Mean Difference	Required Difference .05	.01	Significance
(i) For I.Q. Differences :				
Among Main Groups -				
Extraordinary vs Very Sup.	4.71	4.39	5.78	Sig.at .05
Extraordinary vs Superior	4.87	4.14	5.43	Sig.at .05
Very Superior vs Superior	0.16	3.37	2.56	Not Sig.
Among Boys -				
Extraordinary vs Very Sup.	10.83	7.73	9.51	Sig.at .01
Extraordinary vs Superior	11.98	6.90	9.07	Sig.at .01
Very Superior vs Superior	0.85	3.70	4.87	Not Sig.
Among Girls -				
Extraordinary vs Very Sup.	1.52	5.59	7.36	Not Sig.
Extraordinary vs Superior	0.53	5.26	6.92	Not Sig.
Very Superior vs Superior	0.99	3.64	4.79	Not Sig.
(ii) For Sex Differences :				
Among Extraordinary Boys vs Girls	9.45	8.14	10.70	Sig.at .05
Among Very Superior " "	0.14	4.16	5.46	Not Sig.
Among Superior " "	2.00	2.99	3.94	Not Sig.

The results in Table 4.20(b) reveal that neither giftedness (I.Q.) nor sex were significant factors contributing to figural originality on the whole; but there was significant interaction

of the two. This is in contrast to earlier similar results on figural originality in Table 4.6(b) of 935 capably gifted subjects, where only giftedness was significant, neither sex nor interaction. In the present case of manifest gifted children, interaction between I.Q. and sex was found significant.

This becomes clearer from examination of results in Table 4.20(a) and (c). It would be seen in Table 4.20(a) and (c) that among the main total I.Q. groups as well as I.Q. groups of boys, the extraordinary stood highest, differing from both very superior and superior, both being mutually not significantly different, while in case of girls no I.Q. pair showed significant difference. Among sex sub-groups, there were sex differences at only extraordinary level, not at any other I.Q. level. Looking from other angle, boys scored significantly higher than girls at extraordinary I.Q. level, while girls scored somewhat higher than boys at superior I.Q. level. All this accounts for significant interaction obscuring the main effects of I.Q. and sex.

To sum up, giftedness and sex were on the whole found to be not significantly (apparently) contributing to figural originality; the main effect of giftedness particularly affecting or favouring the extraordinary boys has been obscured by significant interaction found between I.Q. and sex in this respect.

(vii) Elaboration (Figural) :

Finally, the figural elaboration T-scores, obtained on Torrance Test by manifest gifted group arranged in 3 x 2 factorial design were analysed by F-test and L.S.D. test, and the results have been summarized in Tables 4.21(a), (b), and (c) presented below.

Table 4.21(a) : Showing Mean Scores on Elaboration (Figural) of each of Main and Sub-groups (Sample Size : 325)
(I.Q. x Sex)

		Extra-ordinary	Very Superior	Superior	Total
Boys :	Nos.	10	49	106	165
	Scores	606	2715	5460	8781
	Mean	60.60	55.41	51.51	53.22
Girls :	Nos.	19	51	90	160
	Scores	1086	2644	4551	8281
	Mean	57.16	51.84	50.57	51.76
Total :	Nos.	29	100	196	325
	Scores	1692	5359	10011	17062
	Mean	58.34	53.59	51.08	52.49

Table 4.21(b) : Showing Summary of Analysis of Variance

Sources of Variance	df	Sum of Squares (SS)	Mean Squares (Variance)	F Ratios	Remarks
Between I.Q. (Giftedness)	2	1506.68	753.34	6.34	Sig.at .01
Between Sex	1	173.65	173.65	1.58	Not Sig.
Interaction: I.Q. x Sex	2	264.85	132.42	1.20	Not Sig.
Within Groups (Error term)	319	35145.11	110.17		
Total	324	37090.29			

From statistical table

For df	=	2/319	1/719
F at .05	=	3.028	3.868
F at .01	=	4.676	6.716

Table 4.21(c) : Showing Results of L.S.D. Test for Pair Differences among I.Q. and Sex Sub-groups

$$L.S.D. = t \sqrt{MS_W / N_1 + MS_W / N_2}$$

(t for df of MS_W at .05 = 1.97 and .01 = 2.59)

	Obtained Mean Difference	Required Difference .05	.01	Significance
(i) For I.Q. Differences :				
Among Main Groups -				
Extraordinary vs Very Sup.	4.75	4.75	4.72	Sig.at .0
Extraordinary vs Superior	7.26	4.12	5.41	Sig.at .0
Very Superior vs Superior	2.51	2.54	3.34	Not Sig.

(continued)

(Table 4.21(c) continued)

	Obtained Mean Difference	Required Difference .05	.01	Significance
Among Boys -				
Extraordinary vs Very Sup.	5.19	7.17	9.43	Not Sig.
Extraordinafy vs Superior	9.09	6.83	8.98	Sig.at .01
Very Superior vs Superior	3.90	3.57	4.68	Sig.at .05
Among Girls -				
Extraordinary vs Very Sup.	5.32	5.56	7.30	Not Sig.
Extraordinary vs Superior	6.59	5.22	6.86	Sig.at .05
Very Superior vs Superior	1.27	3.62	4.76	Not Sig.
(ii) For Sex Differences :				
Extraordinary Boys vs Girls	3.44	8.08	10.62	Not Sig.
Among Very Superior Boys vs Girls	3.57	4.11	5.41	Not Sig.
Among Superior Boys vs Girls	0.94	3.03	3.99	Not Sig.

Results in Table 4.21(b) reveal that only giftedness (I.Q.) was significantly contributing to figural elaboration; neither sex nor interaction was significant. These results should be compared with earlier results in Table 4.7(b), where both I.Q. and interaction of I.Q. with sex were significant. However, when only manifest gifted children were separated out for study, only I.Q. was independently found to be significant. The extraordinary group stood highest (58.34) on figural elaboration aspect of creativity, the very

superior next best (53.59) and the superior last (51.08) as expected. However, the extraordinary with its high score was significantly different from both the very superior as well as the superior, both of which were mutually not different on the whole, implying that giftedness was effective only at extraordinary I.Q. level.

The closer examination of results in Table 4.21(c) further reveals that among I.Q. sub-groups, in case of boys the superior differed from both mutually not different extraordinary and very superior, while in case of girls only the pair extraordinary and superior differed. Among the sex sub-groups, there were no sex differences at any I.Q. level, as on the total.

To sum up, only giftedness contributed significantly to figural elaboration on the whole, and particularly at the extraordinary I.Q. level. Neither sex nor interaction was significant.

4.4 COMPARISON OF THE EXTRAORDINARY (HIGHLY GIFTED) AND THE BACKWARD (NON-GIFTED) ON CREATIVITY (SAMPLE OF 143 SUBJECTS)

Finally, it was thought to be more interesting and instructive to compare the two extremely vis. the gifted and the non-gifted or more specifically the extraordinary (with I.Q. 140 and above) and the backward (with I.Q. below 90),

as to how each group stood with respect to creativity or its seven aspects. With this view in mind the investigator separated out of the 935 intellectually gifted children only those that were at the top, viz. the extraordinary group with I.Q. of 140 and above. This group happened to consist of 51 subjects includes 15 boys and 36 girls. Against this group was selected for comparison another lowest I.Q. group viz. the backward with I.Q. below 90 from the sample of 3503 that was first administered Dr. Desai's Intelligence Test. This turned out to be 92 made up by 61 boys and 31 girls. Both the groups together yielded a sample of 143, represented I.Q.wise and sexwise, as shown in Table 3.7 in Chapter III. The T-scores on different creativity aspects of all these subjects were obtained separately and tabulated in a 2 x 2 factorial design representing two sexes and two levels of I.Q. viz. the extraordinary (gifted) and the backward (non-gifted). These data of 143 subjects were again subjected to statistical analysis by means of the F-test and the L.S.D. test to study the overall difference in the main variables (main effects as well as interaction effects) as well as the sub-group pair differences. All these results have been presented below in Table 4.22 to 4.28 (a), (b), (c) separately for each of seven types of creativity scores and discussed in the next section, treated in the same lines as in earlier sections.

(i) Fluency (Verbal) :

The scores obtained by these 143 subjects (Extraordinary and Backward) on Torrance Test of Creative Thinking, (Form A - Verbal) were converted into T-scores and tabulated in a 2 x 2 factorial design for analysis. These data were statistically analysed by F-test and L.S.D. test as usual and the results have been summarized in Tables 4.22(a), (b) and (c).

Table 4.22(a) : Showing Mean Scores on Fluency (Verbal) of each of Main and Sub-groups (Sample Size : 143) (I.Q. x Sex)

		Extraordinary (Highly gifted)	Backward (Non-gifted)	Total
Boys :	Nos.	15	61	76
	Scores	886	2264	3150
	Mean	59.06	37.11	41.45
Girls:	Nos.	36	31	67
	Scores	1767	1116	2883
	Mean	49.08	36.00	43.03
Total:	Nos.	51	92	143
	Scores	2653	3380	6033
	Mean	52.01	36.73	42.19

Table 4.22(b) : Showing Summary of Analysis of Variance Results of

Sources of Variance	df	Sum of Squares (SS)	Mean Squares (Variance)	F Ratios	Remarks
Between I.Q. (Giftedness)	1	7661.18	7661.18	66.64	Sig. beyond .01
Between Sex	1	89.17	89.17	0.78	Not Sig.
Interaction : I.Q. x Sex	1	991.67	991.67	8.63	Sig. at .01
Within Groups: (Error term)	139	15978.89	114.96		
Total	142	24720.91			

From statistical table -

For df = 1/139

F at .05 = 3.91

F at .01 = 6.825

Table 4.22(c) : Showing Results of L.S.D. Test for Pair Differences among I.Q. and Sex Sub-groups

$$L.S.D. = t \sqrt{MS_w / N_1 + MS_w / N_2}$$

(t for df of MS_w at .05 = 1.98 and at .01 = 2.615)

	Obtained Mean Difference	Required Difference .05	.01	Signi-ficance
(i) For I.Q. Differences :				
Among Boys : Extraordinary vs Backward	21.95	6.12	8.08	Sig.at .(
Among Girls : " "	13.08	5.21	6.88	Sig.at.0
(ii) For Sex Differences :				
Among Extraordinary : Boys vs Girls	9.98	6.51	8.60	Sig.at.0
Among Backward : Boys vs Girls	1.11	4.60	6.20	Not Sig.

It would be seen from Table 4.22(b) that again the giftedness (I.Q. level) was very highly significant beyond .01 level of confidence, contributing to verbal fluency even when the specific sample of 143 gifted vs non-gifted subjects were studied. The extraordinary group secured faf more on verbal fluency (52.01) than the backward (36.73) on the whole. The sex was not significant, but the sex x I.Q. interaction was significant. These results are the same as the comparable results of 935 subjects in Table 4.1(b) and slightly different from those of 325 subjects in Table 4.15(b) where there was no significant interaction between I.Q. and sex. The present significant interaction between I.Q. and sex can be explained from closer examination of figures in Table 4.22(a) and L.S.D. results in Table 4.22(c).

The closer examination of figures of sub-groups in Table 4.22(a) and results in Table 4.22(c) reveals that among the I.Q. sub-groups, both the I.Q. sub-groups differed significantly in case of boys as well as girls, though the difference in case of boys was far greater (21.95) than that in case of girls (13.08). However, looking to the sex groups, there were much significant sex differences among the extraordinary (with a gap of 9.98), while there was no significant sex difference among the backward. All these results account for significant interaction between I.Q. and Sex.

To sum up, giftedness was undoubtedly contributing significantly to verbal fluency on the whole, and also separately among boys and girls. Sex was not significant on the whole, though sufficiently significant among the extra-ordinary only, making interaction also significant.

(ii) Flexibility (Verbal) :

Next, the available T-scores on verbal flexibility (Torrance Test) obtained by 143 subjects arranged in 2 x 2 factorial design were analysed by F-test and L.S.D. test and these results have been summarized in Tables 4.23(a), (b) and (c) as usual.

Table 4.23(a) : Showing Mean Scores on Flexibility (Verbal) of each Main and Sub-groups (Sample Size:143 (I.Q. x Sex)

		Extraordinary (Highly gifted)	Backward (Non-gifted)	Total
Boys :	Nos.	15	61	76
	Scores	895	2263	3158
	Mean	59.66	37.09	41.55
Girls:	Nos.	36	31	67
	Scores	1897	1086	2983
	Mean	52.69	35.03	44.52
Total:	Nos.	51	92	143
	Scores	2792	3349	6141
	Mean	54.74	36.40	42.94

Table 4.23(b) : Showing Summary of Analysis of Variance Results of

Sources of Variance	df	Sum of squares (SS)	Mean Squares (Variance)	F Ratios	Remarks
Between I.Q. (Giftedness)	1	11039.75	11039.75	232.81	Sig.at .01
Between Sex	1	314.05	314.05	6.62	Not Sig.
Interaction (I.Q. x Sex)	1	223.88	223.88	4.72	Not Sig.
Within Groups (Error term)	139	6591.88	47.42		
Total	142	18169.56			

From statistical table

For df = 1/139

F at .05 = 3.91

F at .01 = 6.825

Table 4.23(c) : Showing Results of L.S.D. Test for Pair Differences among I.Q. and Sex Sub-groups

$$L.S.D. = t \sqrt{MS_W / N_1 + MS_W / N_2}$$

(t for df of MS_W at .05 = 1.98 and at .01 = 2.615)

	Obtained Mean Difference	Required Difference .05	.01	Signi-ficance
(i) For I.Q. Differences :				
Among Boys : Extra Ordi. vs Back-Ward	22.57	3.92	7.16	Sig.at .0
Among Girls : " "	17.66	3.34	6.11	Sig.at .0
(ii) For Sex Differences :				
Among Extraordinary : Boys vs Girls	6.97	4.18	7.63	Sig.at .0
Among Backward : Boys vs girls	2.06	3.01	5.49	Not Sig.

It would be again observed from Table 4.23(b) only giftedness was found to be significantly contributing to verbal flexibility; neither sex nor interaction was significant. These results are the same as those in Table 4.16(b) of 325 subjects, while somewhat different from those in Table 4.2(b) of 935 subjects, in which case neither I.Q. nor sex by themselves was significant, but their interaction was significant. The present case reveals that giftedness was independently a significant factor, and the extraordinary scored far more (54.74 than the backward (36.40) on the whole.

The closer examination of sub-group results in Table 4.23(c) reveals that the two I.Q. groups differed significantly both among boys as well as girls just as on the total. However, there were significant sex differences in verbal flexibility at extraordinary level (but not much for making overall sex difference) though not at backward level and on the whole.

To sum up, giftedness was a significantly contributing factor to verbal flexibility on the whole as well as separately in case of boys and ~~also~~ girls. Sex was not significant on the whole, though contributed in case of the extraordinary. There was no significant interaction.

(iii) Originality (Verbal) :

Again, the available T-scores on verbal originality (Torrance Test) obtained by 143 subjects arranged in 2 x 2 factorial design were analysed by F-test and L.S.D. test and the results have been presented in Tables 4.24(a), (b) and (c).

Table 4.24(a) : Showing Mean Scores on Originality (verbal) of each of Main and Sub-groups (Sample Size : 143) (I.Q. x Sex)

		Extraordinary (Highly gifted)	Backward (Non-gifted)	Total
Boys :	Nos.	15	61	76
	Scores	896	2386	3282
	Mean	59.73	39.11	43.18
Girls :	Nos.	36	31	67
	Scores	1824	1163	2987
	Mean	50.66	37.51	44.58
Total :	Nos.	51	92	143
	Scores	2720	3549	6269
	Mean	53.33	38.57	43.84

Table 4.24(b) : Showing Summary of Analysis of Variance Results of

Sources of Variance	df	Sum of Squares (Ss)	Mean Squares (Variance)	F Ratios	Remarks
Between I.Q. (Giftedness)	1	7145.50	7145.50	333.89	Sig.at .01
Between Sex	1	69.59	69.59	3.23	Not Sig.
Interaction : I.Q. x Sex	1	853.33	853.33	39.63	Sig.at .01
Within Groups (Error term)	139	2992.89	21.53		
Total	142	11061.31			

From statistical table

For df = 1/391

F at .05 = 3.91

F at .01 = 6.825

Table 4.24(c) : Showing Results of L.S.D. test for Pair Differences among I.Q. and Sex Sub-groups

$$L.S.D. = t \sqrt{MS_W / N_1 + MS_W / N_2}$$

(t for df of MS_W at .05 = 1.98 and at .01 = 2.615)

	Obtained Mean Difference	Required Difference .05	.01	Signif-icance
(i) For I.Q. Differences :				
Among Boys -				
Extraordinary vs Backward	20.62	2.65	3.50	Sig.at .01
Among Girls -				
Extraordinary vs Backward	13.15	2.26	2.98	Sig.at .01
(ii) For Sex Differences :				
Among Extraordinary : Boys vs Girls	9.07	2.83	3.74	Sig.at .01
Among Backward : Boys vs "	1.60	2.02	2.67	Not Sig.

The results in Table 4.24(b) show that giftedness as well as its interaction with sex was significantly contributing to verbal originality; sex by itself was insignificant. Again these findings tally with those in Table 4.17(b) of 325 subjects and almost with those in Table 4.3(b) of 935 subjects where only giftedness independently was significant. In the present case, the extraordinary scored far higher (53.33) than the backward (38.57) on the whole.

The closer examination of figures in Table 4.24(a) and sub-group results in Table 4.24(c) shows that I.Q. level was significant both among boys and girls, but there were significantly much sex differences among the extraordinary though not on the whole and not also among the backward. In other words, sex played a role at higher I.Q., and this accounted for significant interaction, as in case of verbal fluency.

To sum up, giftedness was a significant factor contributing to verbal originality on the whole as well as separately among boys and girls. But sex was not a significant factor on the whole, though sufficiently significant among the extraordinary groups, making interaction also significant.

(iv) Fluency (Figural) :

Further, the T-scores on figural fluency (Torrance Test) of 143 subjects arranged in 2 x 2 factorial design are statistically analysed by F-test and L.S.D. test and the results have been summarized in Tables 4.25(a), (b) and (c) as usual.

Table 4.25(a) Showing Mean Scores on Fluency (Figural) of each of Main and Sub-groups (sample size : 143)

(I.Q. x Sex)

		Extraordinary (Highly gifted)	Backward (Non-gifted)	Total
Boys :	Nos.	15	61	76
	Scores	877	2497	3374
	Mean	58.46	40.93	44.39
Girls :	Nos.	36	31	67
	Scores	2003	1352	3355
	Mean	55.63	43.61	50.07
Total :	Nos.	51	92	143
	Scores	2880	3849	6729
	Mean	56.47	41.83	47.06

Table 4.25(b) : Showing Summary of Results of Analysis of Variance

Sources of Variance	df	Sum of Squares (Ss)	Mean Squares (Variance)	F Ratios	Remarks
Between I.Q. (Giftedness)	1	7026.29	7026.29	49.51	Sig.at .01
Between Sex	1	1148.77	1148.77	8.09	Sig.at .01
Interaction : I.Q. x Sex		916.65	916.65	6.46	Sig.at .05
Within Groups (Error term)	139	19725.85	141.91		
Total	142	28817.56			

From statistical table

For df = 1/139

F at .05 = 3.91

F at .01 = 6.825

Table 4.25(c) : Showing Results of L.S.D. Test for Pair Differences among I.Q. and Sex Sub-groups

$$L.S.D. = t\sqrt{MS_W / N_1 + MS_W / N_2}$$

(t for df of MS_W at .05 = 1.98 and at .01 = 2.615)

	Obtained Mean Difference	Required Difference .05	.01	Significance
(i) For I.Q. Differences :				
Among Boys -				
Extraordinary vs Backward:	17.53	6.79	8.97	Sig.at .01
Among Girls -				
Extraordinary vs Backward:	12.02	5.76	7.61	Sig.at .01
(ii) For Sex Differences :				
Among Extraordinary: Boys vs Girls	1.83	7.23	9.55	Not Sig.
Among Backward : Boys vs Girls	2.68	5.19	6.85	Not Sig.

The results in Table 4.25(b) reveal that both giftedness and sex as well as their interaction were found to be significantly contributing to figural fluency in the present case, unlike the results of similar analysis in Table 4.4(b) of 935 subjects and Table 4.18(b) of 325 subjects, in which cases only giftedness independently was significant. In the present case, the extraordinary scored significantly far higher (56.47) than the backward (41.83) and girls scored significantly higher (50.07) than boys (44.39) on the whole.

However, the examination of figures in Table 4.25(a) and sub-group results in Table 4.25(c) shows that both I.Q. groups differed significantly among boys and girls, each time far in favour of the extraordinary, as in case of the total. However, looking to sex sub-groups, it is found that there were no significant sex differences at any I.Q. level; at the same time only 15 boys scored almost three points higher than 36 girls at extraordinary I.Q. level, while 31 girls scored almost three points higher than 61 boys at backward I.Q. level, thus making the sex differences significant in the total sample because of varying trends of unequal number in sub-groups, bringing about results contrary to expected insignificant sex differences on the whole.

To sum up, giftedness was evidently a significant factor in figural fluency on the whole as well as separately among

boys and girls; while separately at each I.Q. level sex was not significant but because of different trends at two I.Q. levels, sex as well as interaction appeared to be significant.

(v) Flexibility (Figural) :

The T-scores on figural flexibility (Torrance Test) of 143 subjects in a 2 x 2 factorial design were analysed by F-test and L.S.D. test. The results arrived at have been summarized in Tables 4.26(a), (b) and (c) below.

Table 4.26(a) : Showing Mean Scores on Flexibility (Figural) of each of Main and Sub-groups : (Sample Size : 143)
(I.Q. x Sex)

		Extraordinary (Highly gifted)	Backward (Non-gifted)	Total
Boys	: Nos.	15	61	76
	Scores	885	2786	3671
	Mean	59.00	45.67	48.04
Girls	: Nos.	36	31	67
	Scores	1927	1361	3288
	Mean	53.52	43.90	49.07
Total	: Nos.	51	92	143
	Scores	2812	4147	6959
	Mean	55.13	45.07	48.66

Table 4.26(b) : Showing Summary of Results of Analysis of Variance

Sources of Variance	df	Sum of Squares (Ss)	Mean Squares (Variance)	F Ratios	Remarks
Between I.Q. (Giftedness)	1	3321.38	3321.38	30.39	Sig.at .01
Between Sex	1	21.23	21.23	0.19	Not Sig.
Interaction : I.Q. x Sex	1	360.14	360.14	3.29	Not Sig.
Within Groups: (Error term)	139	15191.14	109.29		
Total	142	18893.89			

From statistical table

For df = 1/139

F at .05 = 3.91

F at .01 = 6.825

Table 4.26(c) : Showing Results of L.S.D. Test for Pairs Differences among I.Q. and Sex Sub-groups

$$L.S.D. = t\sqrt{MS_w / N_1 + MS_w / N_2}$$

(t for df of MS_w at .05 = 1.98 and at .01 = 2.615)

	Obtained Mean Difference	Required Difference .05	.01	Significance
(i) For I.Q. Differences :				
Among Boys : Extraordi. vs Backward	13.33	5.96	7.87	Sig.at .01
Among Girls: " "	9.62	5.07	6.69	Sig.at .01
(ii) For Sex Differences :				
Among Extraordi. Boys vs Girls	5.48	6.36	8.39	Not Sig.
Among Backward : Boys vs Girls	1.77	4.57	6.04	Not Sig.

The results in Table 4.26(b) clearly point out that only giftedness was the significant factor contributing to figural flexibility; neither sex nor interaction was significant. These findings tally exactly with similar findings on figural flexibility in Table 4.5(b) of 935 subjects and Table 4.19(b) of 325 subjects. In the present case, the extraordinary group stood far better on figural flexibility (55.13) than the backward group (45.07).

Even the examination of sub-group results in Table 4.26(c) shows that both in case of the boys as well as girls the extra-ordinary was significantly better than the backward. There were no significant sex differences at any I.Q. level, as on the whole.

To sum up, giftedness was the only independently significant factor contributing to figural flexibility in the present case; neither sex nor interaction showed significance.

(vi) Originality (Figural) :

Again, the T-scores on figural originality (Torrance Test) obtained by 143 subjects arranged in 2 x 2 factorial design were statistically analysed by F-test and L.S.D. test and the results have been summarized in Tables 4.27(a), (b) and (c) as usual.

Table 4.27(a) : Showing Mean Scores on Originality (Figural) of each of Main and Sub-groups. (Sample size:143) (I.Q. x Sex)

		Extraordinary (Highly gifted)	Backward (Non-gifted)	Total
Boys :	Nos.	15	61	76
	Scores	848	2880	3728
	Mean	56.53	47.21	49.05
Girls :	Nos.	36	31	67
	Scores	1839	1451	3290
	Mean	51.08	46.80	49.10
Total :	Nos.	51	92	143
	Scores	2687	4331	7018
	Mean	52.68	47.07	49.08

Table 4.27(b) : Showing Summary of Results of Analysis of Variance

Sources of Variance	df	Sum of Squares (Ss)	Mean Square (Variance)	F Ratios	Remarks
Between I.Q. (Giftedness)	1	1032.70	1032.70	56.77	Sig. at .01
Between Sex	1	0.10	0.10	.0055	Not Sig.
Interaction: I.Q. x Sex	1	317.73	317.73	17.47	Sig.at .01
Within Groups (Error term)	139	2529.63	18.19		
Total	142	3880.16			

From statistical table

For df = 1/139

F at .05 = 3.91

F at .01 = 6.825

Table 4.27(c) : Showing Results of L.S.D. Test for Pair Differences among I.Q. and Sex Sub-groups

$$L.S.D. = t \sqrt{MS_w / N_1 + MS_w / N_2}$$

(t for df or MS_w at .05 = 1.98 and at .01 = 2.615)

	Obtained Mean Difference	Required Difference .05	.01	Significance
(i) For I.Q. Differences :				
Among Boys - Extraordinary vs Backward	9.32	2.44	3.22	Sig.at .01
Among Girls - Extraordinary vs Backward	4.28	2.06	2.72	Sig.at .01
(ii) For Sex Differences :				
Among Extraordi. Boys vs Girls	5.45	2.59	3.43	Sig.at .01
Among Backward Boys vs Girls	0.41	1.86	2.46	Not Sig.

The results in Table 4.27(b) indicate that giftedness as well as its interaction with sex, and not sex independently, contributed significantly to figural originality. These results are slightly different from those in Table 4.6(b) of 935 subjects, where only giftedness (I.Q.) independently was significant, and from those in Table 4.20(b) were only I.Q.x Sex interaction was significant. In the present case giftedness(I.Q.) as in other cases played a significant role; the extraordinary

scored significantly higher (52.68) than the backward (47.07) on the whole, and sex showed no difference on the whole.

However, the closer examination of figures in Table 4.27(a) and results in Table 4.27(c) reveals that both among boys and girls the two I.Q. groups differed significantly. However, there were significant sex differences only among the extra-ordinary (not sufficient to make sex differences significant enough on the whole), and not significant among the backward, and this accounts for significant interaction. The present picture on figural originality is the same as that on verbal fluency and verbal originality of 143 subjects.

To sum up, giftedness was definitely a significant factor contributing to figural originality on the whole as well as at each sex. However, sex was significant not on the whole, but only at extraordinary level in favour of boys, making interaction significant.

(vii) Elaboration (Figural) :

Finally, the available T-scores on figural elaboration (Torrance Test of Creative Thinking : Figural Form B) of 143 subjects arranged in a 2 x 2 factorial design were analysed statistically by the F-test and the L.S.D. test and the results have been summarized in Tables 4.28(a),(b) and (c) and discussed below as in preceding sections.

Table 4.28 (a) : Showing Mean Scores on Elaboration (Figural) of each of Main and Sub-groups (Sample Size : 143) (I.Q. x Sex)

		Extraordinary (Highly gifted)	Backward (Non-gifted)	Total
Boys	: Nos.	15	61	76
	Scores	882	2554	3436
	Mean	58.80	41.86	45.21
Girls	: Nos.	36	31	67
	Scores	1951	1261	3212
	Mean	54.19	40.67	47.94
Total	: Nos.	51	92	143
	Scores	2833	3815	6648
	Mean	55.54	41.46	46.45

Table 4.28(b) : Showing Summary of Results of Analysis of Variance

Sources of Variance	df	Sum of Squares (Ss)	Mean Squares (Variance)	F Ratios	Remarks
Between I.Q. (Giftedness)	1	6506.20	6506.20	80.25	Sig.at .01
Between Sex	1	265.35	265.35	3.27	Not Sig.
Interaction : I.Q. x Sex	1	11.59	11.59	0.14	Not Sig.
Within Groups (Error term)	139	11268.60	81.07		
Total	142	18051.74			

From statistical table

For df = 1/139

F at .05 = 3.91

F at .01 = 6.825

Table 4.28(c) : Showing Results of L.S.D. Test for Pair Differences among I.Q. and Sex Sub-groups

$$L.S.D. = t \sqrt{MS_w / N_1 + MS_w / N_2}$$

(t for df of MS_w at .05 = 1.98 and at .01 = 2.615)

	Obtained Mean Difference	Required Difference .05	.01	Significance
(i) For I.Q. Differences :				
Among Boys :				
Extraordinary vs Backward	17.34	5.15	6.80	Sig. at .01
Among Girls :				
Extraordinary vs Backward	13.52	4.38	5.78	Sig.at .01
(ii) For Sex Differences :				
Among Extraordinary :Boys vs Girls	4.61	7.24	5.48	Not Sig.
Among Backward : Boys vs Girls	1.19	3.92	5.18	Not Sig.

Again the results in Table 4.28(b) indicate that only giftedness was significantly contributing to figural elaboration; neither sex nor interaction was significant. These findings tally with those in Table 4.21(b) of 325 manifest gifted subjects, but slightly different from similar results in Table 4.7(b) of all 935 capably gifted subjects, where not only giftedness, but also its interaction with sex was significant In the present case, only giftedness was significant; the extraordinary scored far higher (55.54) than the backward(41.46)

on figural elaboration on the whole.

Even, the closer examination of results in Table 4.28(c) reveals that the extraordinary scored significantly higher than the backward in case of boys as well as girls, though more effectively in case of boys with larger gap of 17.34 in case of boys than the gap of 13.52 in case of girls. Sex was not significant at any I.Q. level as on the whole.

To sum up, giftedness alone was significantly contributing to figural elaboration on the whole as well as among boys and girls; sex or interaction was not significant.

4.5 A COMPARATIVE PICTURE

A few lines need be mentioned at the end to give a comparative picture of contribution of all the three variables, viz., giftedness, sex and age, as based on analysis of data of all the four samples, viz. (i) 935 capably gifted (3 x 2) studying I.Q. and sex, (ii) 683 again capably gifted (3 x 2 x 2) studying I.Q., sex and age and (iii) 325 functionally gifted (3 x 2) studying I.Q. and sex, and (iv) gifted vs non-gifted sample (2 x 2) studying I.Q. x sex. From the general comparison of all these findings, it can be summarized that all the results mostly confirm one another thus :

(a) Giftedness was the most effectively contributing factor to all types of creativity scores on the whole as well as at all I.Q. levels, particularly at the extraordinary I.Q. level;

(b) Sex was hardly a significant factor on the whole, though affecting at extraordinary boys level.

(c) Age was mostly a significant factor, particularly at 15 age level.

This completes the discussion on creativity and giftedness (intelligence) in the present study. The next chapter deals with personality traits of the gifted.