Chapter 6

STYLES OF LEARNING, LOCUS OF CONTROL, ACHIEVEMENT MOTIVATION, AND INTELLIGENCE IN RELATION TO THE TOTAL GROUP. HIGH-, AVERAGE-, AND LOW-ACHIEVERS.

In the present chapter, efforts have been made to analyze the status of styles of learning, locus of control, achievement motivation, and intelligence in relation to academic achievement of the total sample, high-, average-, and low-achievers. The following hypotheses were tested:

1. Differentials would exist with regard to the styles of learning for the total group, high-, average-, and low-achievers.

2. Differentials would exist with regard to the locus of control for the total group, high-, average-, and low-achievers.

3. Differentials would exist with regard to the achievement motivation for the total group, high-, average-, and low-achievers.

4. Differentials would exist with regard to the IQ for the total group, high-, average-, and low-achievers.

To verify the above-stated hypotheses, t-test comparison was carried out among the total group and the three discrepant academic achievement groups (HAs, AAs, & LAs). Results have been entered in Table 6.

Results

Related to each of the 37 measures, six t values have been worked out for total group, high-, average-, and low-achievers. The first t value aimed at finding out the significance of difference between mean scores on all measures, of total group and high-achievers (TS-HA). The second t value sought to determine the significance of
<table>
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<th>Measure of Achievement</th>
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<tr>
<td>30 Analogies</td>
<td>14.45 (12.98)</td>
<td>1.92 (0.43)</td>
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<tr>
<td>26 Following Instruction</td>
<td>1.50 (1.58)</td>
<td>1.62 (0.41)</td>
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<tr>
<td>20 Achieving Orientation</td>
<td>1.92 (1.92)</td>
<td>0.04 (0.04)</td>
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<tr>
<td>Locus of Control</td>
<td>11.42 (11.25)</td>
<td>3.08 (3.19)</td>
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<td>Disorganized Study</td>
<td>10.87 (10.90)</td>
<td>3.73 (3.64)</td>
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<tr>
<td>Strategic Approach</td>
<td>11.67 (11.82)</td>
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<td>Mathematical Instruction</td>
<td>4.16 (3.64)</td>
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<td>Operation Learning</td>
<td>11.27 (11.55)</td>
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<td>Globaltrotting</td>
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difference between mean scores of total group and average-achievers (TS-AA). The third t value sought to explore the significance of difference between mean scores of total group and low-achievers (TS-LA). The last three t values aimed at finding out the significance of differences between mean scores on all measures, of high- and average-achievers (HA-A), high- and low-achievers (HA-LA), and average- and low-achievers (AA-LA). These six t values were calculated to test the hypotheses given in the present chapter.

**Total Sample as related to High-, Average-, and Low-Achievers**

For partial testing of the hypotheses of this chapter, the total sample, high-, average-, and low-achievers were compared among their groups. The rationale of the hypotheses was that the high-, average-, and low-achievers behaved distinctly and differently from the total sample, once identified. Data were subjected to a t test to establish whether the mean differences observed among total sample, high-, average-, and low-achievers were statistically significant. Table 6 summarizes the means, standard deviations, and t values for both total sample, high-, average-, and low-achievers.

**Academic Achievement**

Table 6 reveals that the mean and standard deviation for the total sample for academic achievement were 52.64
9.10 respectively. Compared with the mean and standard deviation for the total sample, the mean achievement score for high-achievers was 63.42 (SD=4.28), t= 16.19, P<.05, the mean achievement score for average-achievers was 52.92 (SD=3.04), t= .57, P<.05, while that for low-achievers was 41.36 (SD=5.44), t=16.65, P<.05. The finding indicated that the mean ACH score for high-achievers was significantly greater than that reported for the total sample, while that for low-achievers was significantly lower than the total sample's ACH mean. However, the average-achievers did not significantly distinguish themselves from the total sample, much to the researchers expectation.

As can be seen in this table, the mean ACH score for high-achievers was significantly above those found for average- and low-achievers, 63.42 (SD=4.28), compared to 52.92 (SD=3.04), t= 33.10, P<.05 and 41.36 (SD=5.44), t=44.84, P<.05 respectively. The mean score for average-achievers was found to be significantly higher than that reported for the low-achievers, 52.92 (SD=3.04) compared with 41.36 (SD=5.44), t=31.59, P<.05.

**Style of learning**

Table 6 reveals the results of the survey of styles of learning for the total sample, high-, average-, and low-achievers, indicating that high-achievers seem to
have better approaches to studying than total sample, average-, and low-achievers. As seen from this table, out of the 16 learning style subvariables, significant mean differences were observed in the following 11 areas: DA, IM, SA, SA, NA, CL, MO, and AO. The mean and standard deviation for the total sample for DA were 12.27 and 2.97 respectively. Compared with the mean and standard deviation for the total sample, the mean DA score for high-achievers was 12.97 (SD=2.72), t=3.01, P<.05, the mean DA score for average-achievers was 12.00 (SD=2.98), t=1.38, P>.05, while that for low-achievers was 12.03 (SD=3.09), t=1.01, P>.05. This finding suggested that the mean DA score for average-achievers was significantly greater than that reported for the total sample. The mean DA score for total sample was found to be above those reported for the average- and low-achievers. However, neither difference was statistically significant.

As can also be seen in the table, the mean DA score for high-achievers was significantly above those found for average- and low-achievers, 12.97 (SD=2.72) compared to 12.00 (SD=2.98), t=3.76, P<.05, and 12.03 (SD=3.09), t=3.23, P<.05 respectively. The mean DA score for average-achievers was highly comparable to that for low-achievers as there was no statistically significant mean difference reported between those two groups.

Regarding intrinsic motivation (IM), Table C shows
that the mean and standard deviation for the total sample were 10.54 and 3.60 respectively. Compared with the mean and standard deviation for the total sample, the mean IM score for high-achievers was 10.97 (SD=3.70), $t= 1.47$, $P>.05$, the mean IM score for average-achievers was 10.87 (SD=3.47), $t= 1.41$, $P>.05$, while that for low-achievers was 9.56 (SD=3.55), $t=3.44$, $P<.05$. This finding indicated that the mean IM score for total sample was lower than those reported for high- and average-achievers (though neither difference was statistically significant), while conversely, the mean IM score for total sample was found to be significantly higher than that reported for low-achievers.

As is evident from the table, the mean IM score for high-achievers was highly comparable to that of average-achievers but significantly higher than that reported for low-achievers, 10.97 (SD=3.70) compared to 10.87 (SD=3.47) $t=.30$, $P>.05$, and 9.56 (SD=3.55), $t=3.88$, $P<.05$ respectively. The mean IM score for average-achievers was also found to be significantly above that reported for the low-achievers, 10.87 (SD=3.87) compared to 9.56 (SD=3.55), $t=4.21$, $P<.05$.

With respect to DS, Table 6 reveals that the mean and standard deviation for the total sample were 10.45 and 3.33 respectively. Compared with the mean and standard deviation for the total sample, the mean score for the
high-achievers for DS was 9.89 (SD=3.34), t=2.09, P<.05, the mean score for the average-achievers for DS was 10.51 (SD=3.23), t= .29, P>.05, while that for the low-achievers was 10.90 (SD=3.44), t= 1.68, P>.05. This finding indicated that the mean score for the total sample for DS was significantly higher than that reported for the high-achievers. While the mean scores for the total sample and the average-achievers were highly comparable, the mean score for the total sample was significantly below that reported for the low-achievers, although this difference was not statistically significant.

As can be seen in the table, the mean score for the high-achievers for DS was significantly below those reported for the average- and low-achievers, 9.89 (SD=3.34) compared to 10.51 (SD=3.23), t= 2.13, P<.05, and 10.90 (SD=3.44), t= 2.97, P<.05 respectively. The mean score for the average-achievers for DS was lower than that reported for the low-achievers, although the difference was not statistically significant.

Concerning the strategic approach (ST), Table 6 reveals results for the total sample, high-, average-, and low-achievers, indicating that significant mean difference was observed only between the high-achievers and the low-achievers, with the high-achievers achieving significantly lower than the low-achievers, as seen in the table, 11.64 (SD=3.17) compared with 12.25 (SD=3.06), t=
1.97, P<.05. This alluded to the use by high-achievers of better styles of learning than low-achievers. The mean scores for the rest of the groups (TS-HA, TS-AA, TS-LA, HA-AA, & AA-LA) were either highly comparable or did not reach the acceptable level of significance.

Regarding NA, Table 6 shows that the mean and standard deviation for the total sample were 8.92 and 4.20 respectively. Compared with the mean and standard deviation for the total sample, the mean NA score for high-achievers was 7.70 (SD=4.11), t=3.64, P<.05, and the mean NA score for low-achievers was 10.27 (SD=4.16), t=4.04, P<.05, while the mean scores for the total sample and the average-achievers were highly comparable. This finding indicated that the mean NA score for total sample was significantly greater than that reported for high-achievers, but significantly lower than that reported for low-achievers, alluding to the cultivation by high-achievers of more desirable approaches to studying than did the total sample and the low-achievers.

The superiority of the high-achievers in the use of more desirable approaches to studying was confirmed while examining the interrelationship among high-, average-, and low-achievers. As can be seen in Table 6, the mean score for the high-achievers for NA was significantly lower than those reported for average- and low-achievers, 7.70 (SD=4.11) compared to 8.84 (SD=4.05), t=3.12, P<.05, and
10.27 (SD=4.16), t= 6.19, P<.05 respectively. The mean NA score for the average-achievers was significantly lower than that reported for the low-achievers.

With reference to "comprehension learning (CL) ", Table 6 shows that the mean and standard deviation for the total sample were 10.47 and 3.24 respectively. Compared with the mean and standard deviation for the total sample, the mean CL score for high-achievers was 10.91 (SD=3.37), t= 1.71 , P>.05, and the mean CL score for low-achievers was 10.17 (SD=3.29), t=1.15, P>.05, while the mean scores for the total sample and the average-achievers were highly comparable. This finding indicated that the mean comprehension learning score for the total sample was lower than that reported for the high-achievers but greater than that reported for the low-achievers, alluding to the superiority of the high-achievers in better styles. However, neither difference was statistically significant.

Comparing the high-, average-, and low-achievers on CL, significant mean difference was observed only between high- and low-achievers, high-achievers achieving significantly higher than the low-achievers, as is seen in the table, 10.91 (SD=3.37) compared with 10.17 (SD=3.29), t=2.23, P<.05.

Regarding MO, Table 6 shows the mean and standard deviation for the total sample to be 46.43 ± 9.39
respectively. Compared with the mean and standard deviation for the total sample, the mean score for MO for high-achievers was 47.62 (SD=9.45), t= 1.58, P>.05, the mean score for average-achievers was 46.20 (SD=9.78), t=.36, P>.05, and the mean score for low-achievers was 45.63 (SD=8.55), t=1.08, P>.05. This finding suggested that the mean score for MO for the total sample was less than that reported for high-achievers but greater than that reported for low-achievers, although the mean differences were not statistically significant. The mean scores for the total sample and the average-achievers were highly comparable.

Comparing high-, average-, and low-achievers on MO, significant mean difference was observed only between high- and low-achievers, high-achievers achieving significantly higher than the low-achievers, as is evident from Table 6, 47.62 (SD=9.45) compared with 45.63 (SD=8.55), t=2.20, P<.05.

With respect to AO, Table 6 shows that the mean and standard deviation for the total sample were 43.84 and 8.52 respectively. Compared with the mean and standard deviation for the total sample, the mean AO score for high-achievers was 41.70 (SD=7.83), t=3.20, P<.05, and the mean AO score for low-achievers was 46.09 (SD=8.84), t=3.27, P<.05, while the mean AO scores for the average-achievers and the total sample were highly comparable.
This finding indicated that the mean AO score for total sample was significantly greater than that reported for high-achievers, but significantly lower than that reported for low-achievers.

Comparing the high-, average-, and low-achievers on AO, significant mean differences were observed between high- and average-achievers, high- and low-achievers as well as between average- and low-achievers. High-achievers scored significantly lower than did the average- and low-achievers on this variable, while average-achievers scored significantly lower than did the low-achievers. Their respective mean scores were 41.70 (SD=7.83) compared to 43.78 (SD=8.41), t=2.84, P<.05 for average-achievers, and 41.70 (SD=7.83) compared to 46.09 (SD=8.84), t=5.24, P<.05 for low-achievers. The mean score for the average-achievers was 43.78 (SD=8.41), while that for the low-achievers was 46.09 (SD=8.84), t=3.02, P<.05.

The statistically significant differences observed between high- and low-achievers are consistent with findings from previous studies. It was indicated that a number of studies have revealed a positive and significant relationship between styles of learning and academic achievement. High-achievers have been found to use better study methods (Entwistle, & Brennan, 1971; Verbeek, 1974; Pask, 1976; Svensson, 1977). That high-achievers usually employ better "strategy" has been supported by
Locus of Control

Table 6 presents the means, standard deviations, and t values of locus of control for total sample, high, average-, and low-achievers. As is evident from this table, no significant mean differences were observed between any groups. The mean scores of the various groups were highly comparable in all respects.

Achievement Motivation

Table 6 presents the means, standard deviations, and t values of achievement motivation for the total sample, high-, average-, and low-achievers. As can be seen in the table, significant mean differences were observed only between the total sample and the high-achievers, and also between the high-achievers and the average-achievers. The mean and standard deviation for the total sample for n-ACH were 51.16 and 5.74 respectively. Compared with the mean and standard deviation for the total sample, the mean n-ACH score for high-achievers was 52.12 (SD=5.37), t= 2.10, P<.05, the mean n-ACH score for average-achievers was 50.68 (SD=5.62), t=1.31, P>.05, while that for low-achievers was 51.05 (SD=6.20), t=.24, P>.05. This indicated that the mean n-ACH score for the total sample was significantly lower than that reported for the high-
achievers, and highly comparable to the mean n-ACH score for low-achievers. Although the mean n-ACH score for the total sample was greater than that reported for average-achievers, yet this difference was not statistically significant.

Comparing the high-, average-, and low-achievers on n-ACH, Table 6 shows that the mean and standard deviation for the high-achievers were 52.12 and 5.37 respectively. Compared with the mean and standard deviation for the high-achievers, the mean n-ACH score for average-achievers was 50.68 (SD=5.62), t=2.91, P<.05, while that for low-achievers was 51.05 (SD=6.20), t=1.83, P>.05. The mean n-ACH score for the average-achievers was highly comparable to that reported for the low-achievers, as there was no statistically significant mean difference between the two groups. This indicated that the mean n-ACH score for high-achievers was greater than those reported for average- and low-achievers. However, only the mean difference between high- and average-achievers was statistically significant. The direction of these results is in accord with the findings of Rosen (1955) who found a positively significant relationship between achievement motivation and academic performance, and Atkinson and Reitman (1956) who found that in the achievement-orientation conditions, the level of performance of high-achievement motivation group was significantly higher than
Intelligence

Table 6 also presents the means, standard deviations, and t values of verbal intelligence and its subvariables, nonverbal intelligence, deviation intelligence quotient-1, deviation intelligence quotient-2, and deviation intelligence quotient-combined for the total sample, high-, average-, and low-achievers.

As is evident from the table, significant mean differences have been observed between the total sample and the high-achievers for all the verbal intelligence subvariables, with the high-achievers achieving significantly greater scores than did the total sample. The t values for NS, MI, FI, VS, VO, CF, AN, BA, RS were 3.79, 5.05, 5.45, 3.00, 3.64, 4.28, 3.77, 5.05, and 5.80 respectively. The mean scores for the total sample and the average-achievers for all the nine verbal intelligence subvariables were highly comparable as there were no statistically significant mean differences between these two groups. Again, significant mean differences were observed between the total sample and the low-achievers for eight of the nine verbal intelligence subvariables including NS (t = 4.48, p < .05), MI (t = 3.67, p < .05), FI (t = 4.01, p < .05), VO (t = 2.69, p < .05), CF (t = 3.69, p < .05), AN (t = 4.19, p < .05), BA (t = 3.66, p < .05), and RS (t = 3.66, p < .05).
The above-stated results indicated that the mean scores for the total sample for eight subvariables were significantly greater than those reported for the low-achievers. The \( t \) value of 1.76 for \( V \) was nonsignificant.

The same trend was observed when comparing the high-, average-, and low-achievers among their groups. Table 6 shows significant mean differences between high- and average-achievers, as also between high- and low-achievers for all nine verbal intelligence subvariables, indicating that the high-achievers seemed to have higher mental ability than the average- and the low-achievers. The \( t \) values between the high- and the average-achievers for NS, MI, FI, VS, VO, CF, AN, BA, and RS were 3.09, 5.35, 5.76, 3.33, 3.72, 4.20, 3.13, 4.17, and 6.03 respectively, and 6.77, 7.21, 7.88, 3.87, 5.26, 6.54, 6.67, 4.88 and 7.01 respectively between the high- and the low-achievers. \( t \)-test comparison between the average- and low-achievers for the verbal intelligence subvariables revealed that out of the nine subvariables, significant mean differences were observed for only five subvariables, namely NS, MI, FI, CF, and AN (NS, \( t = 4.46, P < .05 \); AN, \( t = 3.99, P < .05 \); FI, \( t = 2.88, P < .05 \); CF, \( t = 3.84, P < .05 \); AN, \( t = 3.99, P < .05 \)).

However, \( t \) values for the rest of the variables (though nonsignificant) showed the same trend of superiority of the average-achievers in mental ability.

Regarding verbal intelligence, Table 6 shows that
the mean and standard deviation for the total sample were 52.23 and 13.35 respectively. Compared with the mean and standard deviation for the total sample, the mean Vint score for high-achievers was 58.45 (SD=12.14), t=5.92, P<.05, the mean Vint score for low-achievers was 47.05 (SD=12.93), t=4.88, P<.05. The mean scores for the total sample and the average-achievers were highly comparable as there was no statistically significant mean difference reported between the two groups. This finding indicated that the mean Vint score for the total sample was significantly lower than that reported for high-achievers but significantly higher than that reported for low-achievers.

Comparing the high-, average-, and-, low-achievers on Vint, significant mean differences were observed between high- and average-achievers as well as between high- and low-achievers as seen in the table, 58.45 (SD=12.14) compared with 51.63 (SD=12.86), t=6.05, P<.05 for average-achievers, and 58.45 (SD=12.14) compared with 47.05 (SD=12.93), t=9.04, P<.05 for low-achievers. A significant mean difference was observed between the average- and the low-achievers, 51.63 (SD=12.86) compared with 47.05 (SD=12.93), t=3.98, P<.05. This finding suggested that the mean Vint score for the total sample was significantly greater than those reported for average- and low-achievers, alluding to the superiority of
the high-achievers in mental ability. Similar results have been reported by Hollingworth and Comb (1923), Carroll (1930), Srivastava (1987), and Okafor (1989) who found that superior intelligence was associated with high academic achievement.

Regarding NVint, Table 6 shows that the mean and standard deviation for the total sample were 37.93 and 11.05 respectively. Compared with the mean and standard deviation for the total sample, the mean NVint score for high-achievers was 43.84 (SD=8.58), t= 6.98, P<.05, the mean NVint score for average-achievers was 36.96 (SD=10.46), t=1.36, P=.05, while that for low-achievers was 33.69 (SD=11.78), t=4.73, P<.05. This finding indicated that the mean NVint score for the total sample was significantly lower than that reported for high-achievers but greater than those mean scores reported for average-and low-achievers, although the mean difference between the total sample and the average-achievers did not reach the acceptable level of significance.

Comparing the high-, average-, and low-achievers on NVint, significant mean differences were observed between high-and average-achievers as well as between high-and low-achievers, as seen in Table 6, 43.84 (SD=8.58) compared with 36.96 (SD=10.46), t=7.84, P<.05 for average-achievers, and 43.84 (SD=8.58) compared with 33.69 (SD=11.78), t=9.80, P<.05 for low-achievers. This is
similar to the finding in the case of verbal intelligence suggesting that generally high-achievers showed superiority in intellectual capacity. Again, a significant mean difference was observed between average-and low-achievers with the average-achievers achieving significantly higher than did the low-achievers, as seen in the table, 36.96 (SD=10.46) compared with 33.69 (SD=11.78), t=3.34, P<.05.

Concerning deviation intelligence quotient-1 (DIQ1) and deviation intelligence quotient-2 (DIQ2), the same trend of superiority of high-achievers as compared to low-achievers was observed. This could be expected as deviation intelligence quotient-1 and deviation intelligence quotient-2 were the standard scores of $V_{int}$ and $NV_{int}$ respectively. It follows naturally that equal t values were shown in Table 6 among all the groups as was the case for verbal and nonverbal intelligence. For deviation intelligence quotient-combined (DIQcomb), which was nothing short of the average of DIQ1 and DIQ2, similar trend was observed, although t value different from the t value of either DIQ1 or DIQ2 was noted. Table 6 shows that, for deviation intelligence quotient-combined, the mean and standard deviation for the total sample were 100.00 and 13.69 respectively. Compared with the mean and standard deviation for the total sample, the mean DIQcomb score for high-achievers was 107.50 (SD=11.19), t=7.10,
P<.05, while the mean DIQ\textsubscript{comb} score for low-achievers was 94.20 (SD=13.84), t=5.28, P<.05. The mean DIQ\textsubscript{comb} scores for the total sample and the average-achievers were highly comparable, the t value of 1.13 not reaching the acceptable level of significance. This finding indicated that the mean DIQ\textsubscript{comb} for the total sample was significantly below that reported for high-achievers, but significantly greater than that reported for low-achievers.

Comparing the high-, average-, and low-achievers on DIQ\textsubscript{comb}, significant mean differences were observed among all groups as is evident from Table 6, 107.50 (SD=11.19) compared with 99.00 (SD=12.98), t=7.70, P<.05 for average-achievers and 107.50 (SD=11.19) compared with 94.20 (SD=13.84), t=10.52, P<.05 for low-achievers. This finding indicated that the mean DIQ\textsubscript{comb} score for the high-achievers was significantly greater than those reported for average- and low-achievers, although the mean difference between high- and low-achievers was more highly significant than that between high- and average-achievers. Compared with average-achievers, the low-achievers were found to achieve significantly lower scores on DIQ\textsubscript{comb} than did the average-achievers, as seen in Table 6, 99.00 (SD=12.98) compared with 94.20 (SD=13.84), t=4.04, P<.05. These findings served to highlight the consistency of research findings for the relation between intelligence...
and academic achievement.

**Discussion of the Results**

**Hypothesis 1**

Differentials would exist with regard to the styles of learning for the total group, high-, average-, and low-achievers.

This hypothesis assumed that the total sample could be differentiated from the high-, average-, and low-achievers on the basis of their learning styles. They were measures of academic achievement which differentiated high-, average-, and low-achievers in the total sample. It was, in essence, an examination of some of the relationships between the criterion and the styles of learning. Table 6, which gives the t values among the total sample, high-, average-, and low-achieving groups for the 20 learning style dimensions being studied, indicated that this hypothesis is confirmed.

Learning style measures of DA, EM, DS, NA and AO differentiated significantly the total sample from the high-achievers. Although the t values of 1.03, 1.47, 1.71, 1.57, 1.58, 1.02, and 1.49 for RI, CL, IP, MO, PO, and HO respectively did not reach the acceptable level of significance, yet these values suggested some kind of differentiation.
Moreover, t-test comparison between the total sample and the low-achievers revealed that learning style measures including IM, NA, and AO (IM, t= 3.44, P<.05; NA, t=4.04, P<.05; AO, t=3.27,P<.05) differentiated significantly the total sample from the low-achievers.

High-achievers were differentiated from average-achievers by the following learning style measures: DA, EM, DS, NA and AO (DA, t=3.76; P<.05; EM, t=2.87, P<.05; DS, t=2.13, P<.05; NA, t=3.12, P<.05, AO, t=2.84, P<.05).

Now, t-test comparison between high-and low-achievers revealed that learning style variables including DA, IM, SB, DS, NA, CL, MO, AO and ST differentiated significantly between them (DA, t=3.23, P<.05; IM, T=3.38 P<.05; SB, t=2.21, P<.05; MO, t=2.20, P<.05; AO, t=5.24, P<.05; ST, t=1.97, P<.05). The magnitude and direction of these differentials demonstrated the superiority of high-achievers in better learning styles as compared to low-achievers. These results are in agreement with the findings of Entwistle and Brennan (1971) who reported that high-achievers tend to use better approaches to studying. However, there is a dearth of recent findings concerning the relation of styles of learning to academic achievement. From that point of view, therefore, the results of this study make a significant contribution to new knowledge about the relationship between styles of learning and academic achievement.
Furthermore, t-test comparison between average-and low-achievers revealed that learning style dimensions including IM, SA, FF, NA and AO (IM, t=4.21, P<.05; SA, t=2.06, P<.05; FF, t=2.02, P<.05; NA, t=3.92; P<.05; AO, t=3.02, P<.05) differentiated significantly between average-and low-achievers.

The above results showed that maximum mean difference was observed in the area of NA approach to studying.

Overall view of this discussion confirmed the hypothesis which avers that differentials would exist with regard to styles of learning for the total group, high-, average-, and low-achievers. High-, average-, and low-achievers could thus be differentiated on the basis of their learning styles. This finding is of major practical importance in the improvement of pupils' styles of learning.

Hypothesis 2

Differentials would exist with regard to the locus of control for the total group, high-, average-, and low-achievers.

This hypothesis assumed that the total sample could be differentiated from the high-, average-, and low-achievers on the basis of their locus of control. As measures of academic achievement had differentiated high-, average-, and low-achievers in the total sample, it was, in essence, an investigation into the relationship between the criterion
and the locus of control.

This hypothesis stands rejected with reference to the nonsignificant t values of .04, .37, .49, .30, .35 and .72 obtained when exploring the significance of difference between mean scores of TS and HAs, TS and AAs, TS and LAs, HAs and AAs, and HAs and LAs, and AAs and LAs respectively. Highly nonsignificant t values for LC implied that the mean scores of the various groups were highly comparable in all respects. Thus, locus of control might not be a factor directly influencing the school achievements of the Panjab University College sample.

It should be noted, however, that this finding is not consistent with other research findings concerning the relationship between locus of control and academic achievement. Fry and Coe (1980) found that internal subjects had significantly higher academic achievements than the externals (F=10.31, for 1-143 df, P>.01). Bar-Tal et al (1980), in their study, found that internal subjects had higher academic achievements.

Hypothesis 3

Differentials would exist with regard to the achievement motivation for the total group, high-, average-, and low-achievers.

Hypothesis 3 assumed that the total sample could be differentiated from the high-, average-, and low-achievers
or the basis of their achievement motivation. As these discrepant groups have been identified in the total sample on the basis of academic achievement, it was essentially an examination of the relationship between the criterion and achievement motivation.

This hypothesis could not be accepted as Table 6, presenting t values among the total sample, high-, average-, and low-achieving groups, indicated that out of the six t values calculated to test the hypothesis, only two t values were found to be statistically significant. Achievement motivation has only differentiated significantly the total sample from the high-achievers \((t=2.10, P<.05)\) as well as the high-achievers from the average-achievers \((t=2.91, P<.05)\). These results suggested that achievement motivation might also not be exercising a direct influence on academic achievement of the Panjab University College sample. Similar results were reported by Christian (1980) who found that high achievement motivation had no effect on students' performance. Deutsch (1982) also found that the relationship between achievement motive and achievement task performance was weak.

**Hypothesis 4**

**Differentials would exist with regard to the IQ for the total group, high-, average-, and low-achievers.**

This hypothesis assumed that the total sample could be
differentiated from the high-, average-, and low-achievers on the basis of their IQ. They were measures of \( ACH \) which differentiated high-, average-, and low-achievers in the total sample. It was, therefore, essentially an examination of some of the relationships between the criterion and intelligence.

This hypothesis stands accepted with reference to the results of t-test comparisons carried out among the total sample, high-, average-, and low-achieving groups, as seen in Table 6.

All nine verbal intelligence subvariables including NS, MI, FI, VS, VO, CF, AN, BA, and RS differentiated significantly the total sample from the high-achievers. (NS, \( t = 3.79, P<.05 \); MI, \( t = 5.05, P<.05 \); FI, \( t = 5.45, P<.05 \); VS, \( t = 3.00, P<.05 \); VO, \( t = 3.64, P<.05 \); CF, \( t = 4.28, P<.05 \); AN, \( t = 3.77, P<.05 \); BA, \( t = 3.75, P<.05 \); RS, \( t = 5.33, P<.05 \)). \( \text{Vint} \), \( \text{NVint} \), \( \text{DIQ}_1 \), \( \text{DIQ}_2 \), and \( \text{DIQ}_{\text{comb}} \) had also differentiated significantly between these two groups (\( \text{Vint}, \ t = 5.92, P<.05 \); \( \text{NVint}, \ t = 6.98, P<.05 \); \( \text{DIQ}_1, \ t = 5.92, P<.05 \); \( \text{DIQ}_2, \ t = 6.98, P<.05 \); \( \text{DIQ}_{\text{comb}}, \ t = 7.10, P<.05 \)).

Moreover, the total sample were differentiated from the low-achievers by all 14 dimensions of intelligence. High-achievers were also differentiated from low-achievers by all measures of intelligence. Significant t values for all measures of intelligence showed the superiority of high-achievers as compared to low-achievers. As has already been
pointed out in P.154, similar results have been reported by Hollingworth and Cobb (1923), Carroll (1930), Srivastava (1987), and Okafor (1989) who found that superior intelligence was associated with high academic achievement.

Furthermore, while high-achievers were differentiated significantly from average-achievers by all 14 measures of intelligence, the average-achievers were differentiated significantly from low-achievers by 10 measures of intelligence including NS (t=4.46, P<.05), MI (t=2.64, P<.05), FI (t=2.88, P<.05), CF (t=3.84, P<.05), AN (t=3.99, P<.05), V_int (t=3.98, P<.05), NV_int (t=3.34, P<.05), DIQ_1 (t=3.98, P<.05), DIQ_2 (t=3.34, P<.05) and DIQ_comb (t=4.04, P<.05). Significant t values for DIQ_comb showed the superiority of the average-achievers in mental ability as compared to low-achievers.

The above results showed that out of the 84 (14x6) t values calculated for testing of this hypothesis, 65 t values came out to be significant at .01 or .05 level. Overall view of this discussion confirmed Hypothesis 4 of this chapter which avers that "differentials exist with regard to the IQ for the total group, high-, average-, and low-achievers."