Chapter – V

Analysis &
Interpretation of Data
CHAPTER – V

ANALYSIS AND INTERPRETATION OF DATA

In the preceding chapters, the theoretical framework of variables, review of related literature, objectives, hypotheses, description of tools, method of study were reported. The present chapter deals with the analysis and interpretation of the data. The main purpose of the study was to study the effect of Awareness Training Model on Life Skills and Personal Values of Secondary School Children in relation to their Psychological Hardiness.

During the process of experiment, each subject was administered a series of tests, which was then followed by scoring and analyses. The pre-test and post-test scores of students of both experimental and control group were tabulated and analyzed through various statistical techniques which have been reported in two sections under following headings:

Section I: Analyses on scores of selected Life Skills
Section II: Analyses on preferences of selected Personal Values

SECTION – I

ANALYSES ON SCORES OF SELECTED LIFE SKILLS

5.1: ANALYSIS ON SCORES OF SKILL OF ACQUIRING KNOWLEDGE

5.1.1: Descriptive Analysis of Criterion Gain Scores
» Frequency Polygons for scores on Skill of Acquiring Knowledge
» Inverted Ogives for scores on Skill of Acquiring Knowledge
» Comparative Means and S.D’s with Bar diagrams for scores on Skill of Acquiring Knowledge

5.1.2: Two-way Analysis of Variance (2 x 2 ANOVA) on gain scores for Skill of Acquiring Knowledge

5.2: ANALYSIS ON SCORES OF SELF AWARENESS SKILL

5.2.1: Descriptive Analysis of Criterion Gain Scores
» Frequency Polygons for scores on Self Awareness Skill
» Inverted Ogives for scores on Self Awareness Skill
Analysis and Interpretation of Data

5.2.2: Two-way Analysis of Variance (2 x 2 ANOVA) on gain scores of Self-Awareness Skill

5.3: ANALYSIS ON SCORES OF ASSERTIVENESS SKILL
5.3.1: Descriptive Analysis of Criterion Gain Scores
   » Frequency Polygons for scores on Assertiveness Skill
   » Inverted Ogives for scores on Assertiveness Skill
   » Comparative Means and S.D’s with Bar diagrams for scores on Assertiveness Skill
5.3.2: Two-way Analysis of Variance (2 x 2 ANOVA) on gain scores of Assertiveness Skill

5.4: ANALYSIS ON SCORES OF SOCIAL SKILLS
5.4.1: Descriptive Analysis of Criterion Gain Scores
   » Frequency Polygons for scores on Social Skills
   » Inverted Ogives for scores on Social Skills
   » Comparative Means and S.D’s with Bar diagrams for scores on Social Skills
5.4.2: Two-way Analysis of Variance (2 x 2 ANOVA) on gain scores of Social Skills

5.5: DISCUSSION OF RESULTS RELATED TO LIFE SKILLS

SECTION – II

ANALYSES ON PREFERENCES OF SELECTED PERSONAL VALUES

5.6: PREFERENTIAL NORMALIZED MASTER RANKS
5.7: TREND ANALYSIS ON PREFERENCES OF PERSONAL VALUES
5.8: DISCUSSION OF RESULTS RELATED TO PERSONAL VALUES
SECTION – I

ANALYSES ON SCORES OF SELECTED LIFE SKILLS

Data was tabulated and then subjected to be analyzed with the application of suitable statistical techniques. This part deals with the analyses on the scores of selected life skills. Four life skills were taken in the study viz.

- Skill of Acquiring Knowledge
- Self Awareness Skill
- Assertiveness Skill
- Social Skills.

5.1. ANALYSIS ON SCORES OF SKILL OF ACQUIRING KNOWLEDGE

The skill of acquiring knowledge in the subject of Economics was taken into consideration as discussed in previous chapters also. The gains were calculated and studied through differences in pre and post test scores.

5.1.1. DESCRIPTIVE ANALYSIS OF CRITERION GAIN SCORES

Descriptive analysis provides a general depiction of a data organization method and includes a variety of statistical procedures for describing a group of subjects. It not only limits the generalizations to the particular group of individuals observed but also provides valuable information about the nature of a particular group of individuals. It prepares the investigator for inferential statistics to draw his conclusions. (Best and Khan, 2000)

The techniques of classification and tabulation helps in summarizing the data and presenting them in a systematic manner leading to bird’s eye-view of the entire data. Diagrams and graphs provide a chance to have a look on them. They facilitate comparison of data. Data collected from tests and experiments may have little meaning to the investigator until they have been arranged or classified in some systematic way. The first task for an investigator, therefore, is to organize the data in the form of frequency distribution. (Gupta, 1997).
Frequency distribution limits the range of classifying scores into class intervals. The scores grouped within a given interval in a frequency distribution are considered to be spread evenly over the entire interval. The assumption that the midpoint is the most representative value within an interval holds best when the intervals are not too broad.

There are four methods of representing a frequency distribution graphically:

- Histogram
- Frequency Polygon
- Cumulative Frequency Graph
- Cumulative Percentage Curve or Ogive

In the present study, the data has been represented by means of frequency polygons and ogives. The Frequency Polygon is the most widely used type of statistical graph of the frequency distribution. It is particularly effective in comparing two or more frequency distributions. By constructing a frequency polygon the value of mode can be easily ascertained.

**FREQUENCY POLYGONS FOR SCORES ON SKILL OF ACQUIRING KNOWLEDGE**

The criterion gain scores of Skill of Acquiring Knowledge (Achievement) of the experimental group (ATM) and the control group (CGL) in relation to High and Low Psychological Hardiness were depicted through frequency polygons in order to compare the nature of distributions. The frequencies were converted into percentages as shown in Table 5.1. Inverted cumulative frequencies (Inv. Cum. f.) and their cumulative percentages (Inv. Cum. Per. f.) were also obtained and depicted simultaneously in Table 5.1.
### Table 5.1
Frequency Distribution of Criterion Gain Scores of Two Treatment Groups for Skill of Acquiring Knowledge for Psychologically High Hardy and Low Hardy students

<table>
<thead>
<tr>
<th>Class Interval</th>
<th>Upper Limit</th>
<th>Mid Point</th>
<th>Awareness Training Model (ATM)</th>
<th></th>
<th>Conventional Group Learning (CGL)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Psychologically High Hardy</td>
<td>Psychologically Low Hardy</td>
<td>Psychologically High Hardy</td>
<td>Psychologically Low Hardy</td>
</tr>
<tr>
<td>70 – 79</td>
<td>79.5</td>
<td>74.5</td>
<td>2</td>
<td>5.41</td>
<td>2</td>
<td>5.41</td>
</tr>
<tr>
<td>60 – 69</td>
<td>69.5</td>
<td>64.5</td>
<td>6</td>
<td>16.21</td>
<td>8</td>
<td>21.62</td>
</tr>
<tr>
<td>50 – 59</td>
<td>59.5</td>
<td>54.5</td>
<td>12</td>
<td>32.43</td>
<td>20</td>
<td>54.05</td>
</tr>
<tr>
<td>40 – 49</td>
<td>49.5</td>
<td>44.5</td>
<td>11</td>
<td>29.73</td>
<td>31</td>
<td>83.78</td>
</tr>
<tr>
<td>30 – 39</td>
<td>39.5</td>
<td>34.5</td>
<td>5</td>
<td>13.51</td>
<td>36</td>
<td>97.29</td>
</tr>
<tr>
<td>20 – 29</td>
<td>29.5</td>
<td>24.5</td>
<td>1</td>
<td>2.71</td>
<td>37</td>
<td>100</td>
</tr>
<tr>
<td>10 – 19</td>
<td>19.5</td>
<td>14.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>00 – 09</td>
<td>9.5</td>
<td>4.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

N=37 N=71 N=41 N=65
Frequency Polygons were plotted with exact mid points of class intervals on the ‘x-axis’ and the corresponding percentage frequencies on the ‘y-axis’ as presented in Figure 5.1 F. It may be observed from the Figure 5.1 F that:

**For Experimental Group:**

- **For ATM with Psychological High Hardiness: ATM (PHH):**

  The frequency polygon drawn on the criterion gain scores for Skill of Acquiring Knowledge with Psychological High Hardiness for the experimental group taught through Awareness training Model (ATM) was a unimodal curve. The modal value of the distribution falls on the scores of 54.5. The skewness value of this group was – 0.636, indicating that the curve was negatively skewed having scores bunched up on the right hand side of the score scale.

- **For ATM with Psychological Low Hardiness: ATM (PLH):**

  The frequency polygon drawn on the criterion gain scores for Skill of Acquiring Knowledge with Psychological Low Hardiness for the experimental group taught through Awareness training Model (ATM) was also a unimodal
curve. The modal value of the distribution falls on the scores of 54.5. The skewness value of this group was – 0.457, indicating that the curve was negatively skewed having more number of students scored higher than the group mean.

For Control Group:

- For CGL with Psychological High Hardiness: CGL (PHH):
  
The frequency polygon drawn on the criterion gain scores for Skill of Acquiring Knowledge with Psychological High Hardiness for the control group taught through Conventional Group Learning (CGL) was a unimodal curve and skewed towards the left hand side, indicating the accumulation of the distribution of the group towards lower end of the score scale. The modal value of the distribution falls on the scores of 24.5. The coefficient of skewness of this group was 0.298.

- For CGL with Psychological Low Hardiness: CGL (PLH):
  
The frequency polygon drawn on the criterion gain scores for Skill of Acquiring Knowledge with Psychological Low Hardiness for the control group taught through Conventional Group Learning (CGL) was also a unimodal and positively skewed curve towards the left hand side, indicating the accumulation of the distribution of the group towards lower end of the score scale. The modal value of the distribution falls on the scores of 14.5. The coefficient of skewness of this group was 0.103

- INVERTED OGIVES FOR SCORES ON SKILL OF ACQUIRING KNOWLEDGE
  
Inverted percentage cumulative curves were drawn with the upper limits of class intervals on the ‘x - axis’ and the corresponding cumulative percentage frequencies on the ‘y - axis’. The inverted ogives thus prepared have been shown on the graph in Figure 5.2 F.
It may be observed from the Figure 5.2 F that:

**For Experimental Group:**

- **For ATM with Psychological High Hardiness: ATM (PHH):**
  
  In ATM group with Psychological High Hardiness under the Skill of Acquiring Knowledge, 75% of the students attained equal or more than 51% of scores. About 50% of the students attained equal or more than 60% of scores and 25% of the students attained equal or more than 67% of scores.

- **For ATM with Psychological Low Hardiness: ATM (PLH):**
  
  In ATM group with Psychological Low Hardiness under the Skill of Acquiring Knowledge, 75% of the students attained equal or more than 54.5% of scores. About 50% of the students attained equal or more than 61.5% of scores and 25% of the students attained equal or more than 68.5% of scores.
For Control Group:

- **For CGL with Psychological High Hardiness: CGL (PHH):**

  In CGL group with Psychological High Hardiness under the Skill of Acquiring Knowledge, 75% of the students attained equal or more than 28% of scores. About 50% of the students attained equal or more than 32% of scores and 25% of the students attained equal or more than 38.5% of scores.

- **For CGL with Psychological Low Hardiness: CGL (PLH):**

  In CGL group with Psychological Low Hardiness under the Skill of Acquiring Knowledge, 75% of the students attained equal or more than 25% of scores. About 50% of the students attained equal or more than 32.5% of scores and 25% of the students attained equal or more than 40.5% of scores.

The values of skewness and kurtosis for criterion gain scores for Skill of Acquiring Knowledge of two treatment groups in relation to their psychological hardness were computed and have been presented in the following Table 5.2.

### Table 5.2

<table>
<thead>
<tr>
<th>Skewness and Kurtosis for Skill of Acquiring Knowledge</th>
<th>Experimental Group (ATM)</th>
<th>Control Group (CGL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Psychologically High Hardy (PHH)</td>
<td>Psychologically Low Hardy (PLH)</td>
</tr>
<tr>
<td>Skewness</td>
<td>-0.336</td>
<td>-0.503</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>-0.462</td>
<td>-0.147</td>
</tr>
</tbody>
</table>

Table 5.1 shows the Skewness values for scores on Skill of Acquiring Knowledge of the four groups viz.: ATM (PHH), ATM (PLH), CGL (PHH) and CGL (PLH) were -0.336, -0.503, -0.257 and 0.298 respectively, which indicated that the distribution for score of the groups ATM (PHH), ATM (PLH) and CGL (PHH) was negatively skewed and for CGL (PLH), it was positively skewed. The values were within the acceptable limits of normality of distribution (±1) and hence the distribution of the measure may be considered as moderately normal. Kurtosis values for the four groups viz.: ATM (PHH), ATM (PLH), CGL (PHH)
and CGL (PLH) were -0.462, -0.147, -0.098 and -0.658 respectively, which indicated the distributions were *platykurtic* for all the groups.

**COMPARATIVE MEANS AND S.D’S FOR SCORES ON SKILL OF ACQUIRING KNOWLEDGE**

The criterion test was used to evaluate the impact of both instructional strategies i.e. Awareness training Model (ATM) and Conventional Group Learning (CGL) on Skill of Acquiring Knowledge. The gain means and S.D’s for the four combination groups were computed and have been recorded in the following Table 5.3 along with a bar diagram on gain mean scores for Skill of Acquiring Knowledge.

### Table 5.3  
Comparative Gain Means and SD’s for Skill of Acquiring Knowledge

<table>
<thead>
<tr>
<th></th>
<th>Psychologically High Hardy (PHH)</th>
<th>Psychologically Low Hardy (PLH)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Experimental Group (ATM)</strong></td>
<td>Gain Mean = 50.05 S.D. = 6.10 N = 37</td>
<td>Gain Mean = 61.93 S.D. = 8.61 N = 71</td>
<td>Gain Mean = 57.86 S.D. = 7.26 N = 108</td>
</tr>
<tr>
<td><strong>Control Group (CGL)</strong></td>
<td>Gain Mean = 29.19 S.D. = 6.68 N = 41</td>
<td>Gain Mean = 20.91 S.D. = 7.16 N = 65</td>
<td>Gain Mean = 24.11 S.D. = 6.94 N = 106</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>Gain Mean = 39.08 S.D. = 12.26 N = 78</td>
<td>Gain Mean = 42.32 S.D. = 19.81 N = 136</td>
<td>Gain Mean = 41.14 S.D. = 17.66 N = 214</td>
</tr>
</tbody>
</table>
The Table 5.3 and Fig. 5.3 F reveals that out of gain mean scores for Skill of Acquiring Knowledge; the gains were reportedly higher on total Scores for students with Awareness training Model (ATM) treatment as compared to their counterparts of conventional Group of Learning (CGL) in relation to their Psychological Hardiness.

Table 5.3 revealed that the gain means on Skill of Acquiring Knowledge were invariably higher for students of experimental group (ATM) with both the levels of hardiness (PHH and PLH). Although Psychologically High Hardy students of control group i.e. CGL (PHH) scored higher than their counterparts with Psychologically Low Hardy students, yet gain means of Psychologically Low Hardy students of experimental group was higher than that of control group students with PHH or PLH. But it was interesting to note that Psychologically High Hardy students of control group (PHH) achieved higher gain mean scores than those with Psychologically Low Hardy students. It implies that Conventional Group Learning may be considered better for Psychologically High Hardy students for Skill of Acquiring Knowledge.
From the comparisons of experimental and control groups in respect of frequency distribution, frequency polygons and ogives, it was inferred that gain means of students on Skill of Acquiring Knowledge were not equal. To ascertain further whether these differences were significant or not, a Two-way (2 x 2) ANOVA was employed.

5.1.2. TWO-WAY ANALYSIS OF VARIANCE (2 X 2 ANOVA) ON GAIN SCORES FOR SKILL OF ACQUIRING KNOWLEDGE

The pre-post test scores of each individual were tabulated and ANOVA on gain scores of Life Skills was applied to study the effect of Awareness Training Model (ATM) on Life Skills of secondary school children in relation to their Psychological Hardiness.

For the analysis of data, scores of the Skill of Acquiring Knowledge and other selected Life Skills under two instructional strategies namely; Awareness Training Model (ATM) and Conventional Group Learning (CGL) were transformed to common base of percentage gain scores to ensure their comparability with the help of following formula:

\[
\text{Actual Gain} = \left( \frac{(\text{Post-test scores} - \text{Pre-test scores})}{\text{Total Scores}} \right) \times 100
\]

These scores were calculated separately for all the selected Life Skills. Each set of scores was then subjected to separate 2 x 2 ANOVA. The gain scores of students on Skill of Acquiring Knowledge were subjected to Two-way ANOVA. This analysis was done to test the following hypotheses:

- **Hypotheses:**
  - **Ho.1:** There will be no significant difference in Skill of Acquiring Knowledge among students of experimental group (ATM) and control group (CGL).
  - **Ho.2:** There will be no significant difference in Skill of Acquiring Knowledge of Psychologically High Hardy and Psychologically Low Hardy (PHH/PLH) students.

250
**Ho.3:** There will be no significant difference in Skill of Acquiring Knowledge among students due to the interaction of instructional modes (ATM/CGL) and psychological hardiness (PHH/PLH).

» **Ho.3 (a):** There will be no significant difference in Skill of Acquiring Knowledge among students of experimental group (ATM) who are Psychologically High Hardy (PHH) or Psychologically Low Hardy (PLH).

» **Ho.3 (b):** There will be no significant difference in Skill of Acquiring Knowledge among students of control group (CGL) who are Psychologically High Hardy (PHH) or Psychologically Low Hardy (PLH).

» **Ho.3 (c):** There will be no significant difference in Skill of Acquiring Knowledge among students of experimental group (ATM) and control group (CGL) who are Psychologically High Hardy (PHH).

» **Ho.3 (d):** There will be no significant difference in Skill of Acquiring Knowledge among students of experimental group (ATM) and control group (CGL) who are Psychologically Low Hardy (PLH).

» **Ho.3 (e):** There will be no significant difference in Skill of Acquiring Knowledge among students of ATM/PHH and CGL/PLH.

» **Ho.3 (f):** There will be no significant difference in Skill of Acquiring Knowledge among students of ATM/PLH and CGL/PHH.

Summary table of ANOVA with the sum of squares, mean sum of squares and degrees of freedom and F-ratios for main effects and interaction effect of the two variables have been presented in the Table 5.4
Table 5.4

Summary of Two-way Analysis of Variation on Gain Mean Scores for Skill of Acquiring Knowledge

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares (SS)</th>
<th>df</th>
<th>Mean Sum of Squares (MSS)</th>
<th>F-ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main Effects:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A: Treatments (ATM/CGL)</td>
<td>47347.644</td>
<td>1</td>
<td>47347.644</td>
<td>611.385**</td>
</tr>
<tr>
<td>B: Psychological Hardiness</td>
<td>946.023</td>
<td>1</td>
<td>946.023</td>
<td>12.215**</td>
</tr>
<tr>
<td>(PHH/PLH)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interaction Effect: (A x B)</td>
<td>424.312</td>
<td>1</td>
<td>424.312</td>
<td>5.479*</td>
</tr>
<tr>
<td>Error Term (Within Groups)</td>
<td>16263.093</td>
<td>210</td>
<td>77.443</td>
<td>--</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>64981.072</td>
<td>213</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

*Significant at the 0.05 level of confidence

**Significant at the 0.01 level of confidence

Main Effect: A

- **Instructional Treatments (ATM and CGL):**

It may be observed from the Table 5.4 that the F-ratio for the differences in gain means of two groups viz. ATM and CGL was found to be significant at the 0.01 level of confidence, indicating that the gain mean scores for students of the two groups for Skill of Acquiring Knowledge were different beyond the contribution of chance.

This suggests that the two groups were significantly different on their total gain mean scores for Skill of Acquiring Knowledge. A comparison of the gain means of the two groups reveals that the experimental group, which was exposed to ATM, achieved higher mean (M=57.86) as compared to their counterparts of the control group (M=24.11). It also indicated that the students who received experimental treatment of Awareness Training Model were having a positive impact on scores for Skill of Acquiring Knowledge beyond chance, as compared to those
students who comprised the control group. Hence the hypothesis Ho.1 that there will be no significant difference in Skill of Acquiring Knowledge among students of experimental group (ATM) and control group (CGL) was rejected at the specified level. It led to a conclusion that students studying through ATM achieved higher gain means on Skill of Acquiring Knowledge than those who were studying in a Conventional Group Learning situation.

Main Effect: B

- Psychological Hardiness: High and Low Hardiness (PHH/PLH):
  
The Table 5.4 shows that the F-ratio for the difference in gain means of the groups with psychological High and Low Hardiness (PHH/PLH) was also found to be significant at the 0.01 level of confidence. This suggests that the two groups of students having different level of psychological hardiness were significantly different on the total gain mean scores. A comparison of the gain means of the two groups shows that psychologically low hardy students achieved higher mean (M=42.32) as compared to high hardy students (M=39.08). Hence the hypothesis Ho.2 that there will be no significant difference in Skill of Acquiring Knowledge of psychologically High Hardy and psychologically Low Hardy (PHH/PLH) students, was also rejected at the specified level of confidence. It may be concluded that the Psychologically Low Hardy students scored higher levels of gain means than Psychologically High Hardy students for Skill of Acquiring Knowledge.

Two Order Interaction Effect: (A x B)

- Instructional Treatments (A) and Psychological Hardiness (B):
  
  It may be seen from the Table 5.4 that the F-ratio for the difference in gain mean scores for skill of Acquiring Knowledge for the interaction effect between Instructional Modes (ATM and CGL) and Psychological Hardiness (PHH and PLH) was found to be significant at the 0.05 level of confidence. The present study provided sufficient evidence to reject the hypothesis Ho.3 that there will be no significant difference in Skill of Acquiring Knowledge among students due to the interaction of instructional modes (ATM/CGL) and psychological hardiness (PHH/PLH). It may be concluded that the Instructional Modes and
Psychological Hardiness did not operate independently with regard to scores for Skill of Acquiring Knowledge.

A highly significant F-ratio (611.385) for the main effect A (instructional modes) and the line diagram drawn to depict interaction effect (Fig. 5.4 F) led to decision to follow up, F-ratio for interaction effect, by the T-test. The F-ratio for the interaction effect was found to be (5.479) significant at the 0.05 level of confidence. Hence T-test was employed to know the exact location of significance among the possible groups of interaction.

**Fig. 5.4 F: Interaction Graph between Instructional Treatments (ATM/CGL) and Psychological Hardiness (PHH/PLH) for Skill of Acquiring Knowledge**

The differences in the gain mean scores of students for two instructional modes viz. Awareness Training Model (ATM) and Conventional Group Learning (CGL) with Psychological Hardiness (PHH and PLH) was investigated separately with the help of T-ratios. The Mean, S.D.’s and T-ratios for the differences in means of gain scores have been recorded in Table 5.5 to test the alternative hypotheses: Ho.3 (a); Ho.3 (b); Ho.3 (c); Ho.3 (d); Ho.3 (e) and Ho.3 (f).
Table 5.5

T-ratios for Different Combination Groups of Instructional Treatments and Psychological Hardiness for Skill of Acquiring Knowledge

<table>
<thead>
<tr>
<th>Combination Groups</th>
<th>ATM (PHH) Mean = 50.05 S.D. = 6.10 N = 37</th>
<th>ATM (PLH) Mean = 61.93 S.D. = 8.61 N = 71</th>
<th>CGL (PHH) Mean = 29.19 S.D. = 6.68 N = 41</th>
<th>CGL (PLH) Mean = 20.91 S.D. = 7.16 N = 65</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATM/PHH</td>
<td>--</td>
<td>2.074*</td>
<td>14.342**</td>
<td>20.800**</td>
</tr>
<tr>
<td>ATM/PLH</td>
<td>--</td>
<td>--</td>
<td>16.230**</td>
<td>24.138**</td>
</tr>
<tr>
<td>CGL/PHH</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>1.612</td>
</tr>
<tr>
<td>CGL/PLH</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

* Significant at the 0.05 level of confidence  
** Significant at the 0.01 level of confidence

The result recorded in Table 5.5 reveals that:

For Instructional treatment:

- For ATM with PHH and PLH:

  The T-ratio for the difference in gain means of Psychologically High Hardy and Low Hardy students who were studying through ATM was found to be significant at 0.05 level of confidence, suggesting that the means of the two groups were different beyond the contribution of chance. Thus, the hypothesis Ho.3 (a) that there will be no significant difference in Skill of Acquiring Knowledge among students of experimental group (ATM) who are Psychologically High Hardy (PHH) or Psychologically Low Hardy (PLH), stands rejected at the specified level. An examination of the gain means of the two groups suggested that ATM with Psychologically Low Hardy (PLH) students yielded higher gain means (M=61.93) than the ATM with Psychologically High Hardy (PHH) students (M=50.05). It led to the conclusion that for Skill of Acquiring Knowledge, the Psychologically Low Hardy students achieved higher gain means than the Psychologically High Hardy students when studying through ATM instructional mode.
For CGL with PHH and PLH:

It may be observed from the Table 5.5 that while going through Conventional Group Learning (CGL), the T-ratio for the difference in gain means of students with two levels of psychological hardiness was not found to be significant even at the 0.05 level of confidence, suggesting that the differences were only due to chance. Thus, the hypothesis Ho.3 (b) that there will be no significant difference in Skill of Acquiring Knowledge among students of control group (CGL) who are Psychologically High Hardy (PHH) or Psychologically Low Hardy (PLH), stands accepted at the specified level. It led to the conclusion that the CGL failed to yield significant differences in gain mean scores of Psychologically High Hardy (PHH) and Low Hardy (PLH) students for Skill of Acquiring Knowledge.

For Psychological Hardiness:

• For PHH through ATM and CGL:

Table 5.5 reveals that the T-ratio for the difference in gain means of Psychologically High Hardy students studying under ATM and CGL, was found to be significant at the 0.01 level of confidence suggesting that the means of the two groups were different beyond the contribution of chance. Thus, the hypothesis Ho.3 (c) that there will be no significant difference in Skill of Acquiring Knowledge among students of experimental group (ATM) and control group (CGL) who are Psychologically High Hardy (PHH), stands rejected at the specified level. An examination of their respective gain means suggested that for Psychologically High Hardy students studying through ATM yielded higher gain means (M=50.05) than studying through CGL (M=29.19). It led to conclude that the Psychologically High Hardy students achieved higher gain means when studying through ATM instructional mode as compared to CGL, for Skill of Acquiring Knowledge.

• For PLH through ATM and CGL:

Table 5.5 also reveals that the T-ratio for the difference in gain means of Psychologically Low Hardy students studying under ATM and CGL, was also
found to be significant at the 0.01 level of confidence suggesting that the means of the two groups were different beyond the contribution of chance. Thus, the hypothesis Ho.3 (d) that there will be no significant difference in Skill of Acquiring Knowledge among students of experimental group (ATM) and control group (CGL) who are Psychologically Low Hardy (PLH), stands rejected at the specified level. An examination of their respective gain means suggested that for Psychologically Low Hardy students, ATM mode yielded higher gain means (M=61.93) than CGL (M=20.91). It led to conclude that the Psychologically Low Hardy students achieved higher gain means when studying through ATM instructional mode as compared to CGL, for Skill of Acquiring Knowledge.

For Instructional Treatments and Psychological hardiness:

- For ATM/PHH and CGL/PLH:
  
  The Table 5.5 reveals that the T-ratio for the difference in gain means on Skill of Acquiring Knowledge of students in Awareness Training Model (ATM) group with Psychologically High Hardy students (PHH) and Conventional Group Learning (CGL) with Psychologically Low Hardy students (PLH) was found significant at the 0.01 level of confidence. This suggested that the means of the two groups were different beyond the contribution of chance. Hence, the hypothesis Ho.3 (e) that there will be no significant difference in Skill of Acquiring Knowledge among students of ATM/PHH and CGL/PLH stands rejected at the specified level. An examination of the gain means of the two groups suggested that ATM with PHH students yielded higher gain means (M=50.05) than CGL with PLH students (M=20.91). It may be concluded that ATM with PHH group yielded higher gain means for Skill of Acquiring Knowledge than CGL with PLH.

- For ATM/PLH and CGL/PHH:

  Similarly T-ratio for the difference in gain means on Skill of Acquiring Knowledge of students in Awareness Training Model (ATM) group with Psychologically Low Hardy students (PLH) and Conventional Group Learning
Analysis and Interpretation of Data

(CGL) with Psychologically High Hardy students (PHH) was also found significant at the 0.01 level of confidence. This suggested that for Skill of Acquiring Knowledge, these two groups were not equal, which led to the rejection of the hypothesis Ho.3 (f) that there will be no significant difference in Skill of Acquiring Knowledge among students of ATM/PLH and CGL/PHH. An examination of the gain means of the two groups suggested that ATM with PLH students achieved much higher gain means (M=61.93) than CGL with PHH students (M=29.19). This led to the conclusion that ATM group with PLH group achieved higher gain means for Skill of Acquiring Knowledge than CGL with PHH.

- CONCLUSIONS:

Following conclusions were drawn from the Analysis of Part-A.1 (Skill of Acquiring Knowledge):

- In Experimental Group with Psychological High Hardiness (ATM/PHH):
  - 75% students attained 51% scores
  - 50% students attained 60% scores
  - 25% students attained 67% scores

- In Experimental Group with Psychological Low Hardiness (ATM/PLH):
  - 75% students attained 54.5% scores
  - 50% students attained 61.5% scores
  - 25% students attained 68.5% scores

- In Control Group with Psychological High Hardiness (CGL/PHH):
  - 75% students attained 28% scores
  - 50% students attained 32% scores
  - 25% students attained 38.5% scores
► In Control Group with Psychological Low Hardiness (CGL/PLH):
  » 75 % students attained 25 % scores
  » 50 % students attained 32.5 % scores
  » 25 % students attained 40.5 % scores

► Students studying through ATM achieved higher gain means on Skill of Acquiring Knowledge than those who were studying in a Conventional Group Learning situation.

► Psychologically Low Hardy students scored higher levels of gain means than Psychologically High Hardy students for Skill of Acquiring Knowledge.

► Psychologically Low Hardy students achieved higher gain means than the Psychologically High Hardy students for Skill of Acquiring Knowledge, when studying through ATM instructional mode.

► CGL failed to yield significant differences in gain mean scores of Psychologically High Hardy (PHH) and Low Hardy (PLH) students for Skill of Acquiring Knowledge.

► Psychologically High Hardy students scored higher gain means on Skill of Acquiring Knowledge when studying through ATM instructional mode as compared to Psychologically High Hardy students of CGL.

► Psychologically Low Hardy students scored higher gain means when studying through ATM instructional mode as compared to CGL, for Skill of Acquiring Knowledge.

► For Psychologically High Hardy students of ATM group, gain means were higher for Skill of Acquiring Knowledge as compared to that of CGL group with Psychologically Low Hardy students.

► Psychologically Low Hardy students of ATM group achieved higher gain means for Skill of Acquiring Knowledge than Psychologically High Hardy students of CGL.
5.2. ANALYSIS ON SCORES OF SELF AWARENESS SKILL

Another dependent variable of the present study was Self Awareness Skill. The gain scores for Self Awareness Skill were computed from the pre-test and post-test scores and were subjected to statistical analysis. The analysis and interpretation of gain scores for Self Awareness Skill have been presented as under:

5.2.1. DESCRIPTIVE ANALYSIS OF CRITERION GAIN SCORES

FREQUENCY POLYGONS FOR SCORES ON SELF AWARENESS SKILL

The criterion gain scores of Self Awareness Skill of the experimental group (ATM) and the control group (CGL) in relation to High and Low Psychological Hardiness were depicted through frequency polygons in order to compare the nature of distributions. The frequencies were converted into percentages as shown in Table 5.6. Inverted cumulative frequencies (Inv. Cum. f.) and their cumulative percentages (Inv. Cum. Per. f.) were also obtained and depicted simultaneously in Table 5.6.

Fig. 5.5
Frequency Polygons Showing Distribution of Criterion Gain Scores of Two Treatment Groups (ATM & CGL) for Self Awareness Skill for Psychologically High Hardy and Low Hardy students
### Analysis and Interpretation of Data

#### Table 5.6

Frequency Distribution of Criterion Gain Scores of Two Treatment Groups for Self awareness Skill for Psychologically High Hardy and Low Hardy students

<table>
<thead>
<tr>
<th>Class Interval</th>
<th>Upper Limit</th>
<th>Mid Point</th>
<th>Awareness Training Model (ATM)</th>
<th>Conventional Group Learning (CGL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Psychologically High Hardy</td>
<td>Psychologically Low Hardy</td>
</tr>
<tr>
<td>21 – 23</td>
<td>23.5</td>
<td>22</td>
<td>1</td>
<td>2.71</td>
</tr>
<tr>
<td>18 – 20</td>
<td>20.5</td>
<td>19</td>
<td>5</td>
<td>13.51</td>
</tr>
<tr>
<td>15 – 17</td>
<td>17.5</td>
<td>16</td>
<td>2</td>
<td>5.41</td>
</tr>
<tr>
<td>12 – 14</td>
<td>14.5</td>
<td>13</td>
<td>8</td>
<td>21.62</td>
</tr>
<tr>
<td>09 – 11</td>
<td>11.5</td>
<td>10</td>
<td>10</td>
<td>27.02</td>
</tr>
<tr>
<td>06 – 08</td>
<td>8.5</td>
<td>7</td>
<td>7</td>
<td>18.92</td>
</tr>
<tr>
<td>03 – 05</td>
<td>5.5</td>
<td>4</td>
<td>4</td>
<td>10.81</td>
</tr>
<tr>
<td>00 – 02</td>
<td>2.5</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>35</td>
<td>85.37</td>
</tr>
</tbody>
</table>

N=37 N=71 N=41 N=65
Frequency Polygons were plotted with exact mid points of class intervals on the ‘x-axis’ and the corresponding percentage frequencies on the ‘y-axis’ as presented in Figure 5.5 F. It may be observed from the Figure 5.5 F that:

**For Experimental Group:**

- **For ATM with Psychological High Hardiness: ATM (PIH):**
  
  The frequency polygon drawn on the criterion gain scores for Self Awareness Skill with Psychological High Hardiness for the experimental group taught through Awareness training Model (ATM) was a bimodal curve. The modal value of the distribution falls on the scores of 10. The skewness value of this group was – 0.037, indicating that the curve was negatively skewed having higher values on right side.

- **For ATM with Psychological Low Hardiness: ATM (PLH):**
  
  The frequency polygon drawn on the criterion gain scores for Self Awareness Skill with Psychological Low Hardiness for the experimental group taught through Awareness training Model (ATM) was a unimodal curve and skewed towards the right hand side. The modal value of the distribution falls on the scores of 10. The skewness value of this group was – 0.119, indicating the accumulation of the distribution of the group towards higher end of the score scale.

**For Control Group:**

- **For CGL with Psychological High Hardiness: CGL (PHH):**
  
  The frequency polygon drawn on the criterion gain scores for Self Awareness Skill with Psychological High Hardiness for the control group taught through Conventional Group Learning (CGL) was a unimodal curve and positively skewed having more number of students scored lower than the group mean. The modal value of the distribution was 1. The coefficient of skewness of this group was 0.501.

- **For CGL with Psychological Low Hardiness: CGL (PLH):**
  
  The frequency polygon drawn on the criterion gain scores for Self Awareness Skill with Psychological Low Hardiness for the control group taught
through Conventional Group Learning (CGL) was also a unimodal and positively skewed curve towards the left hand side, showing the scores bunched up on the left hand side of score scale. The modal value of the distribution falls on the score of 1. The coefficient of skewness of this group was 0.582

**INVERTED OGIVES FOR SCORES ON SELF AWARENESS SKILL**

Inverted percentage cumulative curves were drawn with the upper limits of class intervals on the ‘x - axis’ and the corresponding cumulative percentage frequencies on the ‘y - axis’. The inverted ogives thus prepared have been shown on the graph in Figure 5.6 F.

![Inverted Ogives Showing Distribution of Criterion Gain Scores of Two Treatment Groups (ATM & CGL) for Self Awareness Skill for Psychologically High Hardy and Low Hardy students](image)

It may be observed from the Figure 5.6 F that:

**For Experimental group:**

- **For ATM with Psychological High Hardiness: ATM (PHH):**

  In ATM group with Psychological High Hardiness under the Self Awareness Skill, about 75% of the students attained equal or more than 11% of
scores. About 50% of the students attained equal or more than 14% of scores and 25% of the students attained more than 17% of scores.

- **For ATM with Psychological Low Hardiness: ATM (PLH):**

  In ATM group with Psychological Low Hardiness under the Self Awareness Skill, about 75% of the students attained more than 12% of scores. About 50% of the students attained equal or more than 15.5% of scores and 25% of the students attained equal or more than 19.5% of scores.

**For Control Group:**

- **For CGL with Psychological High Hardiness: CGL (PHH):**

  In CGL group with Psychological High Hardiness under the Self Awareness Skill, 75% of the students attained equal or more than 3% of scores. About 50% of the students attained equal or more than 4% of scores and 25% of the students attained equal or more than 5.5% of scores.

- **For CGL with Psychological Low Hardiness: CGL (PLH):**

  In CGL group with Psychological Low Hardiness under the Self Awareness Skill, about 75% of the students attained equal or more than 1.5% of scores. About 50% of the students attained equal or more than 2% of scores and 25% of the students attained more than 2.5% of scores.

The values of **skewness and kurtosis** for criterion gain scores for Self Awareness Skill of two treatment groups in relation to their Psychological Hardiness were computed and have been presented in the following Table 5.7.

**Table 5.7**

<table>
<thead>
<tr>
<th>Skewness and Kurtosis for Self Awareness Skill</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expression</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Skewness</td>
</tr>
<tr>
<td>Kurtosis</td>
</tr>
</tbody>
</table>

The values of skewness and kurtosis for criterion gain scores for Self Awareness Skill of two treatment groups in relation to their Psychological Hardiness were computed and have been presented in the following Table 5.7.
Table 5.7 shows the **Skewness** values for scores on Self Awareness Skill of the four groups viz.: ATM (PHH), ATM (PLH), CGL (PHH) and CGL (PLH) were -0.037, -0.119, 0.501 and 0.582 respectively, which indicated that the distribution for score of the groups ATM (PHH) and ATM (PLH) was negatively skewed and for CGL (PHH) and CGL (PLH), it was positively skewed. The values were within the acceptable limits of normality of distribution (+1) and hence the distribution of the measure may be considered as moderately normal. **Kurtosis** values for the four groups viz.: ATM (PHH), ATM (PLH), CGL (PHH) and CGL (PLH) were -0.192, -0.221, 0.523 and 1.019 respectively, which indicated the distributions were **platykurtic** for Psychologically High Hardy and Low Hardy of experimental group (ATM) and **leptokurtic** for Psychologically High Hardy and Low Hardy of control group (CGL).

**COMPARATIVE MEANS AND S.D’S FOR SCORES ON SELF AWARENESS SKILL**

The gain means and S.D’s for the four combination groups were computed and have been recorded in the following Table 5.8 along with a bar diagram on gain mean scores for Self Awareness Skill.

<table>
<thead>
<tr>
<th></th>
<th>Psychologically High Hardy (PHH)</th>
<th>Psychologically Low Hardy (PLH)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Control Group (CGL)</strong></td>
<td>Gain Mean = 0.90 S.D. = 0.26 N = 41</td>
<td>Gain Mean = 0.43 S.D. = 0.19 N = 65</td>
<td>Gain Mean = 0.61 S.D. = 0.23 N = 106</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>Gain Mean = 4.48 S.D. = 4.83 N = 78</td>
<td>Gain Mean = 6.05 S.D. = 7.37 N = 136</td>
<td>Gain Mean = 5.54 S.D. = 6.06 N = 214</td>
</tr>
</tbody>
</table>

265
The Table 5.8 and Fig. 5.7 F reveals that out of gain mean scores for Self Awareness Skill; the gains were reportedly higher on total Scores for students with Awareness training Model (ATM) treatment as compared to their counterparts of conventional Group of Learning (CGL) in relation to their Psychological Hardiness.

The gain means on Self awareness Skill were invariably higher for students of experimental group (ATM) with both the levels of hardiness (PHH and PLH). The gain scores of Self Awareness Skill of Psychologically High Hardy students were close to that of Psychologically Low Hardy students. Although Psychologically High Hardy students of control group i.e. CGL (PHH) scored higher than their counterparts with Psychologically Low Hardiness, yet the difference seemed to be of marginal significance. Overall comparison of the two groups revealed that the gain scores of students on self awareness skill of control group were much lower compared to their counterparts in the experimental group.

From the comparisons of experimental and control groups in respect of frequency distribution, frequency polygons and ogives, it was inferred that gain
means of students on Self Awareness Skill were not equal. To ascertain further whether these differences were significant or not, a Two-way (2 x 2) ANOVA was employed.

5.2.2. TWO-WAY ANALYSIS OF VARIANCE (2 X 2 ANOVA) ON GAIN SCORES OF SELF AWARENESS SKILL

The gain scores of students on Self Awareness Skill were subjected to 2 x2 ANOVA. Following hypotheses were tested through this analysis:

**Ho.4:** There will be no significant difference in Self Awareness Skill among students of experimental group (ATM) and control group (CGL).

**Ho.5:** There will be no significant difference in Self Awareness Skill of Psychologically High Hardy and Psychologically Low Hardy (PHH/PLH) students.

**Ho.6:** There will be no significant difference in Self Awareness Skill among students due to the interaction of instructional modes (ATM/CGL) and psychological hardness (PHH/PLH).

- **Ho.6 (a):** There will be no significant difference in Self Awareness Skill among students of experimental group (ATM) who are Psychologically High Hardy (PHH) or Psychologically Low Hardy (PLH).
- **Ho.6 (b):** There will be no significant difference in Self Awareness Skill among students of control group (CGL) who are Psychologically High Hardy (PHH) or Psychologically Low Hardy (PLH).
- **Ho.6 (c):** There will be no significant difference in Self Awareness Skill among students of experimental group (ATM) and control group (CGL) who are Psychologically High Hardy (PHH).
- **Ho.6 (d):** There will be no significant difference in Self Awareness Skill among students of experimental group (ATM) and control group (CGL) who are Psychologically Low Hardy (PLH).
- **Ho.6 (e):** There will be no significant difference in Self Awareness Skill among students of ATM/PHH and CGL/PLH.
Analysis and Interpretation of Data

Ho. 6 (j): There will be no significant difference in Self Awareness Skill among students of ATM/PLH and CGL/PHH.

The sum of squares, mean sum of squares and degrees of freedom and F-ratios for main effects and interaction effect of the two variables have been presented in the summary Table 5.9

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares (SS)</th>
<th>df</th>
<th>Mean Sum of Squares (MSS)</th>
<th>F-ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main Effects:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A: Treatments (ATM/CGL)</td>
<td>4331.183</td>
<td>1</td>
<td>4331.183</td>
<td>238.783**</td>
</tr>
<tr>
<td>B: Psychological Hardiness (PHH/PLH)</td>
<td>87.774</td>
<td>1</td>
<td>87.774</td>
<td>4.839*</td>
</tr>
<tr>
<td><strong>Interaction Effect:</strong></td>
<td>(A x B)</td>
<td>1</td>
<td>45.166</td>
<td>2.49</td>
</tr>
<tr>
<td>Error Term (Within Groups)</td>
<td>3809.106</td>
<td>210</td>
<td>18.139</td>
<td>--</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>8273.229</td>
<td>213</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

*Significant at the 0.05 level of confidence
**Significant at the 0.01 level of confidence

Main Effect: A
- Instructional Treatments (ATM and CGL):

It may be observed from the Table 5.9 that the F-ratio for the differences in gain means of two groups viz. ATM and CGL was found to be significant at the 0.01 level of confidence, indicating that the gain mean scores for students of the two groups for Self Awareness Skill were different beyond the contribution of chance.

This suggests that the two groups were significantly different on their total gain mean scores for Self awareness Skill. A comparison of the gain means of the two groups reveals that the experimental group, which was exposed to ATM,
Analysis and Interpretation of Data

achieved higher mean (M=9.51) as compared to their counterparts of the control group (M=0.61). It also indicated that the students who received experimental treatment of Awareness Training Model were having a positive impact on scores for Self Awareness Skill beyond chance, as compared to those students who comprised the control group. Hence the hypothesis Ho.4 that there will be no significant difference in Self Awareness Skill among students of experimental group (ATM) and control group (CGL) was rejected at the specified level. It led to a conclusion that students studying through ATM achieved higher gain means on Self awareness Skill than those who were studying in a Conventional Group Learning situation.

Main Effect: B

• Psychological Hardiness: High and Low Hardiness (PHH/PLH):

The Table 5.9 shows that the F-ratio for the difference in gain means of the groups with psychological High and Low Hardiness (PHH/PLH) was found to be significant at the 0.05 level of confidence. This suggests that the two groups of students having different level of psychological hardiness were significantly different on the total gain mean scores. A comparison of the gain means of the two groups shows that psychologically low hardy students achieved higher mean (M=6.05) as compared to high hardy students (M=4.48). Hence the hypothesis Ho.5 that there will be no significant difference in Self Awareness Skill of psychologically High Hardy and psychologically Low Hardy (PHH/PLH) students was also rejected. It may be concluded that the Psychologically Low Hardy students scored higher levels of gain mean scores than Psychologically High Hardy students for Self Awareness Skill.

Two Order Interaction Effect: (A x B)

• Instructional Treatments (A) and Psychological Hardiness (B):

It may be seen from the Table 5.9 that the F-ratio for the difference in gain mean scores for Self Awareness Skill for the interaction effect between Instructional Modes (ATM and CGL) and Psychological Hardiness (PHH and PLH) was not found to be significant even at the 0.05 level of confidence. The difference, if any,
was due to chance factors. The present study could not provide sufficient evidence to reject the hypothesis $H_0.6$ that there will be no significant difference in Self Awareness Skill among students due to the interaction of instructional modes (ATM/CGL) and psychological hardiness (PHH/PLH). It may be concluded that the Instructional Modes and Psychological Hardiness operated independent of each other with regard to scores for Self Awareness Skill.

A highly significant F-ratio (238.783) for the main effect A (instructional modes) and the line diagram drawn to depict interaction effect (Fig. 5.8 F) led to the decision to follow up F-ratio for interaction effect by the T-test. The F-ratio for the interaction effect was found to be 2.49 (not significant at the 0.05 level of confidence) but the figure indicated that interaction lines were crossed over. Hence, T-test was employed to probe deeply into the observed results.

**Fig. 5.8 F: Interaction Graph between Instructional Treatments (ATM/CGL) and Psychological Hardiness (PHH/PLH) for Self Awareness Skill**

The differences in the gain mean scores of students for two instructional modes viz. Awareness Training Model (ATM) and Conventional Group Learning
(CGL) with Psychological Hardiness (PHH and PLH) was investigated separately with the help of T-ratios. The Mean, S.D.’s and T-ratios for the differences in means of gain scores for Self awareness Skill have been recorded in Table 5.10 to test the alternative hypotheses: Ho.6 (a); Ho.6 (b); Ho.6 (c); Ho.6 (d); Ho.6 (e) and Ho.6 (f).

Table 5.10

<table>
<thead>
<tr>
<th>Combination Groups</th>
<th>ATM (PHH) Mean = 8.46</th>
<th>ATM (PLH) Mean = 10.59</th>
<th>CGL (PHH) Mean = 0.90</th>
<th>CGL (PLH) Mean = 0.43</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S.D. = 4.35</td>
<td>S.D. = 6.67</td>
<td>S.D. = 0.26</td>
<td>S.D. = 0.19</td>
</tr>
<tr>
<td></td>
<td>N = 37</td>
<td>N = 71</td>
<td>N = 41</td>
<td>N = 65</td>
</tr>
<tr>
<td>ATM/PHH</td>
<td>--</td>
<td>1.431</td>
<td>11.086**</td>
<td>14.874**</td>
</tr>
<tr>
<td>ATM/PLH</td>
<td>--</td>
<td>--</td>
<td>10.230**</td>
<td>13.463**</td>
</tr>
<tr>
<td>CGL/PHH</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>1.318</td>
</tr>
<tr>
<td>CGL/PLH</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

**Significant at the 0.01 level of confidence

The result recorded in Table 5.10 reveals that:

For Instructional Treatments:
- For ATM with PHH and PLH:
  The T-ratio for the difference in gain means of Psychologically High Hardy and Low Hardy students who were studying through ATM was not found to be significant at 0.05 level of confidence, suggesting that the differences were only due to chance. Thus, the hypothesis Ho.6 (a) that there will be no significant difference in Self Awareness Skill among students of experimental group (ATM) who are Psychologically High Hardy (PHH) or Psychologically Low Hardy (PLH), was not rejected at the specified level. This led to the conclusion that for Self Awareness Skill, the Psychologically High Hardy and Low Hardy students achieved equal gain means when studying through ATM instructional mode.
• For CGL with PHH and PLH:

It may be again observed from the Table 5.10 that while going through Conventional Group Learning (CGL), the T-ratio for the difference in gain means of students with two levels of psychological hardiness was not found to be significant even at the 0.05 level of confidence, suggesting that the differences were only due to chance. Thus, the hypothesis Ho.6 (b) that there will be no significant difference in Self Awareness Skill among students of control group (CGL) who are Psychologically High Hardy (PHH) or Psychologically Low Hardy (PLH), stands accepted at the specified level. It led to the conclusion that the CGL did not yield significant differences in gain mean scores of Psychologically High Hardy (PHH) and Low Hardy (PLH) students for Self Awareness Skill.

For Psychological Hardiness:

• For PHH through ATM and CGL:

Table 5.10 reveals that the T-ratio for the difference in gain means of Psychologically High Hardy students studying under ATM and CGL, was found to be significant at the 0.01 level of confidence suggesting that the means of the two groups were different beyond the contribution of chance. Thus, the hypothesis Ho.6 (c) that there will be no significant difference in Self Awareness Skill among students of experimental group (ATM) and control group (CGL) who are Psychologically High Hardy (PHH), stands rejected at the specified level. An examination of their respective gain means suggested that for Psychologically High Hardy students studying through ATM yielded higher gain means (M=8.46) than studying through CGL (M=0.90). It led to conclude that the Psychologically High Hardy students achieved higher gain means on self awareness skill when studying through ATM instructional mode as compared to CGL.

• For PLH through ATM and CGL:

Table 5.10 also reveals that the T-ratio for the difference in gain means of Psychologically Low Hardy students studying under ATM and CGL, was also found to be significant at the 0.01 level of confidence suggesting that the means of the two groups were different beyond the contribution of chance. Thus, the
hypothesis Ho.6 (d) that there will be no significant difference in Self Awareness Skill among students of experimental group (ATM) and control group (CGL) who are Psychologically Low Hardy (PLH), stands rejected at the specified level. An examination of their respective gain means suggested that for Psychologically Low Hardy students, ATM mode yielded higher gain means ($M=10.59$) than CGL ($M=0.43$). It led to conclude that the Psychologically Low Hardy students achieved higher gain means when studying through ATM instructional mode as compared to CGL, for Self Awareness Skill.

For Instructional Treatments and Psychological Hardiness:

- For ATM/PHH and CGL/PLH:
  
  The Table 5.10 reveals that the T-ratio for the difference in gain means on Self Awareness Skill of students in Awareness Training Model (ATM) group with Psychologically High Hardy students (PHH) and Conventional Group Learning (CGL) with Psychologically Low Hardy students (PLH) was found to be significant at the 0.01 level of confidence. This suggested that the means of the two groups were different beyond the contribution of chance. Hence, the hypothesis Ho.6 (e) that there will be no significant difference in Self Awareness Skill among students of ATM/PHH and CGL/PLH stands rejected at the specified level. An examination of the gain means of the two groups suggested that ATM with PHH students yielded higher gain means ($M=8.46$) than CGL with PLH students ($M=0.43$). It may be concluded that ATM with PHH group yielded higher gain means for Self Awareness Skill than CGL with PLH.

- For ATM/PLH and CGL/PHH:
  
  Similarly T-ratio for the difference in gain means on Self Awareness Skill of students in Awareness Training Model (ATM) group with Psychologically Low Hardy students (PLH) and Conventional Group Learning (CGL) with Psychologically High Hardy students (PHH) was also found to be significant at the 0.01 level of confidence. This suggested that for Self Awareness Skill, these two groups were not equal, which led to the rejection of the hypothesis Ho.6 (f) that there will be no significant difference in Self Awareness Skill among students of ATM/PLH and CGL/PHH. An examination of the gain means of the two groups.
suggested that ATM with PLH students achieved much higher gain means (M=10.59) than CGL with PHH students (M=0.90). This led to the conclusion that ATM group with PLH group achieved higher gain means for Self Awareness Skill than CGL with PHH.

- **CONCLUSIONS:**

  Following conclusions were drawn from the Analysis of Part-A.2 (Self Awareness Skill):

  ► In **Experimental Group with Psychological High Hardiness** (ATM/PHH):
    » 75 % students attained 11 % scores
    » 50 % students attained 14 % scores
    » 25 % students attained 17 % scores

  ► In **Experimental Group with Psychological Low Hardiness** (ATM/PLH):
    » 75 % students attained 12 % scores
    » 50 % students attained 12.5 % scores
    » 25 % students attained 19.5 % scores

  ► In **Control Group with Psychological High Hardiness** (CGL/PHH):
    » 75 % students attained 3 % scores
    » 50 % students attained 4 % scores
    » 25 % students attained 5.5 % scores

  ► In **Control Group with Psychological Low Hardiness** (CGL/PLH):
    » 75 % students attained 1.5 % scores
    » 50 % students attained 2 % scores
    » 25 % students attained 2.5 % scores

  ► Students studying through ATM achieved higher gain means on Self Awareness Skill than those who were studying in a Conventional Group Learning situation.
Analysis and Interpretation of Data

► Psychologically Low Hardy students scored higher levels of gain mean scores than Psychologically High Hardy students for Self Awareness Skill.
► Psychologically High Hardy and Low Hardy students achieved equal gain means for Self Awareness Skill, when studying through ATM instructional mode.
► For Self Awareness Skill, CGL did not yield significant differences in gain mean scores of Psychologically High Hardy (PHH) and Low Hardy (PLH) students.
► Psychologically High Hardy students achieved higher gain means on Self awareness Skill when studying through ATM instructional mode as compared to CGL.
► Psychologically Low Hardy students achieved higher gain means when studying through ATM instructional mode as compared to CGL, for Self Awareness Skill.
► For Psychologically High Hardy students of ATM group, gain means were higher for Self Awareness Skill as compared to that of CGL group with Psychologically Low Hardy students.
► Psychologically Low Hardy students of ATM group achieved higher gain means for Self Awareness Skill than Psychologically High Hardy students of CGL.
5.3. ANALYSIS ON SCORES OF ASSERTIVENESS SKILL

Assertiveness Skill was another dependent variable of the present study. The gain scores for Assertiveness Skill were computed from the pre-test and post-test scores and were subjected to statistical analysis. The analysis and interpretation of gain scores for Assertiveness Skill have been presented as sunder:

5.3.1. DESCRIPTIVE ANALYSIS OF CRITERION GAIN SCORES

FREQUENCY POLYGONS FOR SCORES ON ASSERTIVENESS SKILL

The criterion gain scores of Assertiveness Skill of the experimental group (ATM) and the control group (CGL) in relation to High and Low Psychological Hardiness were depicted through frequency polygons in order to compare the nature of distributions. The frequencies were converted into percentages as shown in Table 5.11. Inverted cumulative frequencies (Inv. Cum. f.) and their cumulative percentages (Inv. Cum. Per. f.) were also obtained and depicted simultaneously in Table 5.11.

![Figure 5.9 F](image)

**Fig. 5.9 F**

Frequency Polygons Showing Distribution of Criterion Gain Scores of Two Treatment Groups (ATM & CGL) for Assertiveness Skill for Psychologically High Hardy and Low Hardy students
### Table 5.11

Frequency Distribution of Criterion Gain Scores of Two Treatment Groups for Assertiveness Skill for Psychologically High Hardy and Low Hardy students

<table>
<thead>
<tr>
<th>Class Interval</th>
<th>Upper Limit</th>
<th>Mid Point</th>
<th>Awareness Training Model (ATM)</th>
<th>Conventional Group Learning (CGL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Psychologically High Hardy</td>
<td>Psychologically Low Hardy</td>
</tr>
<tr>
<td>21 – 23</td>
<td>23.5</td>
<td>22</td>
<td>4</td>
<td>10.81</td>
</tr>
<tr>
<td>18 – 20</td>
<td>20.5</td>
<td>19</td>
<td>3</td>
<td>8.11</td>
</tr>
<tr>
<td>15 – 17</td>
<td>17.5</td>
<td>16</td>
<td>5</td>
<td>13.53</td>
</tr>
<tr>
<td>12 – 14</td>
<td>14.5</td>
<td>13</td>
<td>7</td>
<td>18.91</td>
</tr>
<tr>
<td>09 – 11</td>
<td>11.5</td>
<td>10</td>
<td>11</td>
<td>29.73</td>
</tr>
<tr>
<td>06 – 08</td>
<td>8.5</td>
<td>7</td>
<td>4</td>
<td>10.81</td>
</tr>
<tr>
<td>03 – 05</td>
<td>5.5</td>
<td>4</td>
<td>2</td>
<td>5.40</td>
</tr>
<tr>
<td>00 – 02</td>
<td>2.5</td>
<td>1</td>
<td>1</td>
<td>2.70</td>
</tr>
</tbody>
</table>

N=37 \hspace{1cm} N=71 \hspace{1cm} N=41 \hspace{1cm} N=65
Frequency Polygons were plotted with exact mid points on the ‘x–axis’ and the corresponding percentage frequencies on presented in Figure 5.9 F. It may be observed from the Figure 5.9 F

For Experimental Group:

• For ATM with Psychological High Hardiness: ATM (PHH):
  The frequency polygon drawn on the criterion gain scores for Skill with Psychological High Hardiness for the experimenta through Awareness training Model (ATM) was a unimodal curve. The distribution falls on the scores of 10. The skewness value was – 0.416, indicating that the curve was negatively skewed bunched up on the right hand side of the score scale.

• For ATM with Psychological Low Hardiness: ATM (PLH):
  The frequency polygon drawn on the criterion gain scores for Skill with Psychological Low Hardiness for the experimental group Awareness training Model (ATM) was also a unimodal curve. The distribution falls on the scores of 7. The skewness value of the 0.243, indicating that the curve was negatively skewed having a higher than the group mean.

For Control Group:

• For CGL with Psychological High Hardiness: CGL (PHH):
  The frequency polygon drawn on the criterion gain scores for Skill with Psychological High Hardiness for the control group Conventional Group Learning (CGL) was a unimodal curve and s the left hand side, indicating the accumulation of the distribution towards lower end of the score scale. The modal value of the distribution is the score of 1. The coefficient of skewness of this group was - 0.11.

• For CGL with Psychological Low Hardiness: CGL (PLH):
  The frequency polygon drawn on the criterion gain scores for Skill with Psychological Low Hardiness for the control group Conventional Group Learning (CGL) was also a unimodal and po:
Analysis and Interpretation of Data

curve towards the left hand side, indicating the accumulation of the distribution of the group towards lower end of the score scale. The modal value of the distribution was 1. The coefficient of skewness of this group was 0.264

**INVERTED OGIVES FOR SCORES ON ASSERTIVENESS SKILL**

Inverted percentage cumulative curves were drawn with the upper limits of class intervals on the ‘x - axis’ and the corresponding cumulative percentage frequencies on the ‘y - axis’. The inverted ogives thus prepared have been shown on the graph in Figure 5.10 F.

**Fig. 5.10 F**

*Inverted Ogives Showing Distribution of Criterion Gain Scores of Two Treatment Groups (ATM & CGL) for Assertiveness Skill for Psychologically High Hardy and Low Hardy students*

It may be observed from the Figure 5.10 F that:

**For Experimental Group:**

- **For ATM with Psychological High Hardiness: ATM (PHH):**

  In ATM group with Psychological High Hardiness under the Assertiveness Skill, about 75% of the students attained equal or more than 12% of scores.
About 50% of the students attained equal or more than 14.5% of scores and 25% of the students attained equal or more than 19% of scores.

- **For ATM with Psychological Low Hardiness: ATM (PLH):**
  
  In ATM group with Psychological Low Hardiness under the Assertiveness Skill, 75% of the students attained equal or more than 9% of scores. About 50% of the students attained equal or more than 12% of scores and 25% of the students attained equal or more than 17% of scores.

**For Control Group:**

- **For CGL with Psychological High Hardiness: CGL (PHH):**
  
  In CGL group with Psychological High Hardiness under the Assertiveness Skill, 75% of the students attained equal or more than 3.5% of scores. About 50% of the students attained equal or more than 5% of scores and 25% of the students attained equal or more than 6% of scores.

- **For CGL with Psychological Low Hardiness: CGL (PLH):**
  
  In CGL group with Psychological Low Hardiness under the Assertiveness Skill, 75% of the students attained equal or more than 3% of scores. About 50% of the students attained equal or more than 4.5% of scores and 25% of the students attained equal or more than 5% of scores.

The values of skewness and kurtosis for criterion gain scores for Assertiveness Skill of two treatment groups in relation to their Psychological Hardiness were computed and have been presented in the following Table 5.12

<table>
<thead>
<tr>
<th></th>
<th><strong>Experimental Group (ATM)</strong></th>
<th><strong>Control Group (CGL)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Psychologically High Hardy (PHH)</td>
<td>Psychologically Low Hardy (PLH)</td>
</tr>
<tr>
<td>Skewness</td>
<td>-0.416</td>
<td>-0.243</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>-0.182</td>
<td>-0.278</td>
</tr>
</tbody>
</table>
Table 5.12 shows the **skewness** values for scores on Assertiveness Skill of the four groups viz.: ATM (PHH), ATM (PLH), CGL (PHH) and CGL (PLH) were -0.416, -0.243, -0.113 and 0.264 respectively, which indicated the distribution for score of the groups ATM (PHH), ATM (PLH) and CGL (PHH) was negatively skewed and for CGL (PLH), it was positively skewed. The values were within the acceptable limits of normality of distribution (±1) and hence the distribution of the measure may be considered as moderately normal. **Kurtosis** values for the four groups viz.: ATM (PHH), ATM (PLH), CGL (PHH) and CGL (PLH) were -0.182, -0.278, -0.098 and 0.061 respectively, which indicated the distributions were *platykurtic* for experimental group - Psychologically High Hardy and Low Hardy (ATM-PHH & PLH) and control group - Psychologically High Hardy (CGL-PHH). It was *leptokurtic* for control group - Psychologically Low Hardy (CGL-PLH).

**COMPARATIVE MEANS AND S.D’S FOR SCORES ON ASSERTIVENESS SKILL**

The gain means and S.D’s for the four groups were computed and have been recorded in the following Table 5.13 along with a bar diagram on gain mean scores for Assertiveness Skill.

<table>
<thead>
<tr>
<th></th>
<th>Psychologically High Hardy (PHH)</th>
<th>Psychologically Low Hardy (PLH)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group (ATM)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Control Group</strong></td>
<td>Gain Mean = 0.49 S.D. = 0.13 N = 41</td>
<td>Gain Mean = 0.20 S.D. = 0.06 N = 65</td>
<td>Gain Mean = 0.31 S.D. = 0.10 N = 106</td>
</tr>
<tr>
<td>(CGL)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>Gain Mean = 4.93 S.D. = 5.94 N = 78</td>
<td>Gain Mean = 3.87 S.D. = 4.66 N = 136</td>
<td>Gain Mean = 4.25 S.D. = 5.08 N = 214</td>
</tr>
</tbody>
</table>
The Table 5.13 and Fig. 5.11 F reveals that out of gain mean scores for Assertiveness Skill; the gains were reportedly higher on total Scores for students with Awareness Training Model (ATM) treatment as compared to their counterparts of Conventional Group of Learning (CGL) in relation to their Psychological Hardiness.

Table 5.13 revealed that the gain means on Assertiveness Skill were invariably higher for students of experimental group (ATM) with both the levels of hardiness (PHH and PLH). Psychologically High Hardy students of both the groups i.e. ATM and CGL scored higher than their counterparts with Psychologically Low Hardy students. Although Psychologically High Hardy students of experimental group i.e. ATM (PHH) scored higher than their counterparts with Psychologically Low Hardy students, yet gain means of Psychologically Low Hardy students of experimental group was higher than that of control group students with PHH or PLH. But it was interesting to note that Psychologically High Hardy students of control group (PHH) achieved higher gain mean scores than those with Psychologically Low Hardy students. It implies that
Conventional Group Learning may be considered better for Psychologically High Hardy students for Assertiveness Skill.

From the comparisons of experimental and control groups in respect of frequency distribution, frequency polygons and ogives, it was inferred that gain means of students on Assertiveness Skill were not equal. To ascertain further whether these differences were significant or not, a Two-way (2 x 2) ANOVA was employed.

5.3.2. TWO-WAY ANALYSIS OF VARIANCE (2 X 2 ANOVA) ON GAIN SCORES OF ASSERTIVENESS SKILL

The gain scores of students on Assertiveness Skill were subjected to Two-way ANOVA. A 2 x2 ANOVA was used to analyze gain scores on Assertiveness Skill. Following hypotheses were tested through this analysis:

*Ho*.7: There will be no significant difference in Assertiveness Skill among students of experimental group (ATM) and control group (CGL).

*Ho*.8: There will be no significant difference in Assertiveness Skill of Psychologically High Hardy and Psychologically Low Hardy (PHH/PLH) students.

*Ho*.9: There will be no significant difference in Assertiveness Skill among students due to the interaction of instructional modes (ATM/CGL) and psychological hardiness (PHH/PLH).

> *Ho*.9 (a): There will be no significant difference in Assertiveness Skill among students of experimental group (ATM) who are Psychologically High Hardy (PHH) or Psychologically Low Hardy (PLH).

> *Ho*.9 (b): There will be no significant difference in Assertiveness Skill among students of control group (CGL) who are Psychologically High Hardy (PHH) or Psychologically Low Hardy (PLH).

> *Ho*.9 (c): There will be no significant difference in Assertiveness Skill among students of experimental group (ATM) and control group (CGL) who are Psychologically High Hardy (PHH).
Analysis and Interpretation of Data

Ho.9 (d): There will be no significant difference in Assertiveness Skill among students of experimental group (ATM) and control group (CGL) who are Psychologically Low Hardy (PLH).

Ho.9 (e): There will be no significant difference in Assertiveness Skill among students of ATM/PHH and CGL/PLH.

Ho.9 (f): There will be no significant difference in Assertiveness Skill among students of ATM/PLH and CGL/PHH.

Summary of ANOVA along with the sum of squares, mean sum of squares, degrees of freedom and F-ratios for main effects and interaction effect of the two variables have been presented in the Table 5.14

Table 5.14
Summary of Two-way Analysis of Variation on Gain Mean Scores for Assertiveness Skill

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares (SS)</th>
<th>df</th>
<th>Mean Sum of Squares (MSS)</th>
<th>F-ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main Effects:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A: Treatments (ATM/CGL)</td>
<td>3326.616</td>
<td>1</td>
<td>3326.616</td>
<td>306.116**</td>
</tr>
<tr>
<td>B: Psychological Hardiness (PHH/PLH)</td>
<td>105.789</td>
<td>1</td>
<td>105.789</td>
<td>9.735**</td>
</tr>
<tr>
<td><strong>Interaction Effect:</strong> (A x B)</td>
<td>32.743</td>
<td>1</td>
<td>32.743</td>
<td>3.013*</td>
</tr>
<tr>
<td>Error Term (Within Groups)</td>
<td>2282.108</td>
<td>210</td>
<td>10.867</td>
<td>--</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>5747.256</td>
<td>213</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

*Significant at the 0.05 level of confidence  
**Significant at the 0.01 level of confidence

Main Effect: A

- Instructional Treatments (ATM and CGL):

  It may be observed from the Table 5.14 that the F-ratio for the differences in gain means of two groups viz. ATM and CGL was found to be significant at the
0.01 level of confidence, indicating that the gain mean scores for students of the two groups for Assertiveness Self were different beyond the contribution of chance.

This suggests that the two groups were significantly different on their total gain mean scores for Assertiveness Skill. A comparison of the gain means of the two groups reveals that the experimental group, which was exposed to ATM, achieved higher mean (M=8.13) as compared to their counterparts of the control group (M=0.31). It also indicated that the students who received experimental treatment of Awareness Training Model were having a positive impact on scores for Assertiveness Skill beyond chance, as compared to those students who comprised the control group. Hence the hypothesis Ho.7 that there will be no significant difference in Assertiveness Skill among students of experimental group (ATM) and control group (CGL) was rejected at the specified level. It led to a conclusion that students studying through ATM achieved higher gain means on Assertiveness Skill than those who were studying in a Conventional Group Learning situation.

Main Effect: B

- Psychological Hardiness: High and Low Hardiness (PHH/PLH):

  The Table 5.14 shows that the F-ratio for the difference in gain means for Assertiveness Skill of the groups with psychological High and Low Hardiness (PHH/PLH) was also found to be significant at the 0.01 level of confidence. This suggests that the two groups of students having different level of psychological hardness were significantly different on the total gain mean scores for Assertiveness Skill. A comparison of the gain means of the two groups shows that psychologically high hardy students achieved higher mean (M=4.93) as compared to low hardy students (M=3.87). Hence the hypothesis Ho.8 that there will be no significant difference in Assertiveness Skill of psychologically High Hardy and psychologically Low Hardy (PHH/PLH) students was also rejected. It may be concluded that the Psychologically High Hardy students scored higher levels of gain mean scores than Psychologically Low Hardy students for Assertiveness Skill.
Two Order Interaction Effect: (A x B)

- Instructional Treatments (A) and Psychological Hardiness (B):

It may be seen from the Table 5.14 that the F-ratio for the difference in gain mean scores for Assertiveness Skill for the interaction effect between Instructional Modes (ATM and CGL) and Psychological Hardiness (PHH and PLH) was found to be significant at the 0.05 level of confidence. The present study provided sufficient evidence to reject the hypothesis $H_0$ that there will be no significant difference in Assertiveness Skill among students due to the interaction of instructional modes (ATM/CGL) and psychological hardness (PHH/PLH). It may be concluded that the Instructional Modes and Psychological Hardiness did not operate independent of each other with regard to scores for Assertiveness Skill.

A highly significant F-ratio (306.116) for the main effect A (instructional modes) and the line diagram drawn to depict interaction effect (Fig. 5.12 F) led to decision to follow up, F-ratio for interaction effect, by the T-test. The F-ratio for the interaction effect was found to be 3.013 (significant at the 0.05 level of confidence) but the figure indicated that there was a possibility of crossing of interaction lines at infinity. Hence T-test was employed to know the exact location of significance among the possible groups of interaction.
The differences in the gain mean scores of students for two instructional modes viz. Awareness Training Model (ATM) and Conventional Group Learning (CGL) with Psychological Hardiness (PHH and PLH) was investigated separately with the help of T-ratios. The Mean, S.D.'s and T-ratios for the differences in means of gain scores for Assertiveness Skill have been recorded in Table 5.15 to test the alternative hypotheses: Ho.9 (a); Ho.9 (b); Ho.9 (c); Ho.9 (d); Ho.9 (e) and Ho.9 (f)
Table 5.15
T-ratios for Different Combination Groups of Instructional Treatments and Psychological Hardiness for Assertiveness Skill

<table>
<thead>
<tr>
<th>Combination Groups</th>
<th>ATM (PHH)</th>
<th>ATM (PLH)</th>
<th>CGL (PHH)</th>
<th>CGL (PLH)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean = 9.86</td>
<td>Mean = 7.22</td>
<td>Mean = 0.49</td>
<td>Mean = 0.20</td>
</tr>
<tr>
<td></td>
<td>S.D. = 5.30</td>
<td>S.D. = 4.25</td>
<td>S.D. = 0.13</td>
<td>S.D. = 0.06</td>
</tr>
<tr>
<td></td>
<td>N = 37</td>
<td>N = 71</td>
<td>N = 41</td>
<td>N = 65</td>
</tr>
<tr>
<td>ATM/PHH</td>
<td>--</td>
<td>1.802</td>
<td>11.313**</td>
<td>14.733**</td>
</tr>
<tr>
<td>ATM/PLH</td>
<td>--</td>
<td>--</td>
<td>10.121**</td>
<td>13.316**</td>
</tr>
<tr>
<td>CGL/PHH</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>1.545</td>
</tr>
<tr>
<td>CGL/PLH</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

**Significant at the 0.01 level of confidence

The result recorded in Table 5.15 reveals that:

**For Instructional Treatments:**

- For ATM with PHH and PLH:
  
  The T-ratio for the difference in gain means of Psychologically High Hardy and Low Hardy students who were studying through ATM was not found to be significant at 0.05 level of confidence, suggesting that the differences were only due to chance. Thus, the hypothesis Ho.9 (a) that there will be no significant difference in Assertiveness Skill among students of experimental group (ATM) who are Psychologically High Hardy (PHH) or Psychologically Low Hardy (PLH), was not rejected at the specified level. **This led to the conclusion that for Assertiveness Skill, the Psychologically High Hardy and Low Hardy students achieved equal gain means when studying through ATM instructional mode.**

- For CGL with PHH and PLH:
  
  It may be observed from the Table 5.15 that while going through Conventional Group Learning (CGL), the T-ratio for the difference in gain means of students with two levels of psychological hardiness was not found to be significant even at the 0.05 level of confidence, suggesting that the differences
were only due to chance. Thus, the hypothesis Ho.9 (b) that there will be no significant difference in Assertiveness Skill among students of control group (CGL) who are Psychologically High Hardy (PHH) or Psychologically Low Hardy (PLH), stands accepted at the specified level. \textbf{It led to the conclusion that the CGL did not yield significant differences in gain mean scores of Psychologically High Hardy (PHH) and Low Hardy (PLH) students for Assertiveness Skill.}

\textbf{For Psychological Hardiness}

- \textbf{For PHH through ATM and CGL:}

  Table 5.15 reveals that the T-ratio for the difference in gain means of Psychologically High Hardy students studying under ATM and CGL, was found to be significant at the 0.01 level of confidence suggesting that the means of the two groups were different beyond the contribution of chance. Thus, the hypothesis Ho.9 (c) that there will be no significant difference in Assertiveness Skill among students of experimental group (ATM) and control group (CGL) who are Psychologically High Hardy (PHH), stands rejected at the specified level. An examination of their respective gain means suggested that Psychologically High Hardy students studying through ATM achieved higher gain means (M=9.86) than those studying through CGL (M=0.49). \textbf{It led to conclude that the Psychologically High Hardy students achieved higher gain means on Assertiveness Skill when studying through ATM instructional mode as compared to their counter parts studying through CGL.}

- \textbf{For PLH through ATM and CGL:}

  Table 5.15 also reveals that the T-ratio for the difference in gain means of Psychologically Low Hardy students studying under ATM and CGL, was also found to be significant at the 0.01 level of confidence suggesting that the means of the two groups were different beyond the contribution of chance. Thus, the hypothesis Ho.9 (d) that there will be no significant difference in Assertiveness Skill among students of experimental group (ATM) and control group (CGL) who are Psychologically Low Hardy (PLH), stands rejected at the specified level. An
examination of their respective gain means suggested that for Psychologically Low Hardy students, ATM mode yielded higher gain means (M=7.22) than for students in CGL (M=0.20). It led to conclude that the Psychologically Low Hardy students achieved higher gain means on Skill of Assertiveness when studying through ATM instructional mode as compared to CGL.

For Instructional Treatments and Psychological Hardiness:

- **For ATM/PHH and CGL/PLH:**

  The Table 5.15 reveals that the T-ratio for the difference in gain means on Assertiveness Skill of students in Awareness Training Model (ATM) group with Psychologically High Hardy students (PHH) and Conventional Group Learning (CGL) with Psychologically Low Hardy students (PLH) was found to be significant at the 0.01 level of confidence. This suggested that the means of the two groups were different beyond the contribution of chance. Hence, the hypothesis Ho.9 (e) that there will be no significant difference in Assertiveness Skill among students of ATM/PHH and CGL/PLH stands rejected at the specified level. An examination of the gain means of the two groups suggested that ATM with PHH students yielded higher gain means (M=9.86) than CGL with PLH students (M=0.20). It may be concluded that ATM with PHH group yielded higher gain means for Assertiveness Skill than for CGL group with PLH.

- **For ATM/PLH and CGL/PHH:**

  Similarly T-ratio for the difference in gain means on Assertiveness Skill of students with Psychological Low Hardiness (PLH) who were getting instructions through Awareness Training Model (ATM) and their counterparts (PHH) in Conventional Group Learning (CGL) was also found to be significant at the 0.01 level of confidence. This suggested that for Assertiveness Skill, these two groups were not equal. This led to the rejection of the hypothesis Ho.9 (f) that there will be no significant difference in Assertiveness Skill among students of ATM/PLH and CGL/PHH. An examination of the gain means of the two groups suggested that group of students in ATM with PLH achieved much higher gain means (M=7.22) than CGL with PHH students (M=0.49). This led to the conclusion
that ATM group with PLH group achieved higher gain means for Assertiveness Skill than CGL with PHH.

- **CONCLUSIONS:**

  Following conclusions were drawn from the Analysis of Part-A.3 (Assertiveness Skill):
  
  - **In Experimental Group with Psychological High Hardiness (ATM/PHH):**
    - 75% students attained 12% scores
    - 50% students attained 14.5% scores
    - 25% students attained 19% scores
  
  - **In Experimental Group with Psychological Low Hardiness (ATM/PLH):**
    - 75% students attained 9% scores
    - 50% students attained 12% scores
    - 25% students attained 17% scores
  
  - **In Control Group with Psychological High Hardiness (CGL/PHH):**
    - 75% students attained 3.5% scores
    - 50% students attained 5% scores
    - 25% students attained 6% scores
  
  - **In Control Group with Psychological Low Hardiness (CGL/PLH):**
    - 75% students attained 3% scores
    - 50% students attained 4.5% scores
    - 25% students attained 5% scores

  - Students studying through ATM achieved higher gain means on Assertiveness Skill than those who were studying in a Conventional Group Learning situation.
  
  - Psychologically High Hardy students scored higher levels of gain mean scores than Psychologically Low Hardy students for Assertiveness Skill.
Psychologically High Hardy and Low Hardy students achieved equal gain means for Assertiveness Skill, when studying through ATM instructional mode.

CGL did not yield significant differences in gain mean scores of Psychologically High Hardy (PHH) and Low Hardy (PLH) students for Assertiveness Skill.

Psychologically High Hardy students achieved higher gain means on Assertiveness Skill when studying through ATM instructional mode as compared to their counter parts studying through CGL.

Psychologically Low Hardy students achieved higher gain means on Skill of Assertiveness when studying through ATM instructional mode as compared to CGL.

For Psychologically High Hardy students of ATM group, gain means were higher for Assertiveness Skill as compared to that of CGL group with Psychologically Low Hardy students.

Psychologically Low Hardy students of ATM group achieved higher gain means for Assertiveness Skill than Psychologically High Hardy students of CGL.
5.4. ANALYSIS ON SCORES OF SOCIAL SKILLS

Social Skills was another learning outcome which was studied in the present investigation. The gain scores for Social Skills were computed from the pre-test and post-test scores from social skills scale and were subjected to statistical analysis. The rating scale for Social Skills was used for this purpose. The analysis and interpretation of gain scores for Social Skills have been presented as sunder:

5.4.1. DESCRIPTIVE ANALYSIS OF CRITERION GAIN SCORES

➢ FREQUENCY POLYGONS FOR SCORES ON SOCIAL SKILLS

The criterion gain scores of Social Skills of the experimental group (ATM) and the control group (CGL) in relation to High and Low Psychological Hardiness were depicted through frequency polygons in order to compare the nature of distributions. The frequencies were converted into percentages as shown in Table 5.16. Inverted cumulative frequencies (Inv. Cum. f.) and their cumulative percentages (Inv. Cum. Per. f.) were also obtained and depicted simultaneously in Table 5.16.

Fig. 5.13 F
Frequency Polygons Showing Distribution of Criterion Gain Scores of Two Treatment Groups (ATM & CGL) for Social Skills for Psychologically High Hardy and Low Hardy students
## Analysis and Interpretation of Data

Table 5.16

Frequency Distribution of Criterion Gain Scores of Two Treatment Groups for Social Skills for Psychologically High Hardy and Low Hardy students

<table>
<thead>
<tr>
<th>Class Interval</th>
<th>Upper Limit</th>
<th>Mid Point</th>
<th>Awareness Training Model (ATM)</th>
<th>Conventional Group Learning (CGL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Psychologically High Hardy</td>
<td>Psychologically Low Hardy</td>
</tr>
<tr>
<td>21 – 23</td>
<td>23.5</td>
<td>22</td>
<td>2</td>
<td>5.41</td>
</tr>
<tr>
<td>18 – 20</td>
<td>20.5</td>
<td>19</td>
<td>5</td>
<td>13.51</td>
</tr>
<tr>
<td>15 – 17</td>
<td>17.5</td>
<td>16</td>
<td>6</td>
<td>16.22</td>
</tr>
<tr>
<td>12 – 14</td>
<td>14.5</td>
<td>13</td>
<td>10</td>
<td>27.02</td>
</tr>
<tr>
<td>09 – 11</td>
<td>11.5</td>
<td>10</td>
<td>6</td>
<td>16.22</td>
</tr>
<tr>
<td>06 – 08</td>
<td>8.5</td>
<td>7</td>
<td>4</td>
<td>10.81</td>
</tr>
<tr>
<td>03 – 05</td>
<td>5.5</td>
<td>4</td>
<td>3</td>
<td>8.11</td>
</tr>
<tr>
<td>00 – 02</td>
<td>2.5</td>
<td>1</td>
<td>1</td>
<td>2.70</td>
</tr>
</tbody>
</table>

N=37 N=71 N=41 N=65
Frequency Polygons were plotted with exact mid points on the ‘x-axis’ and the corresponding percentage frequencies are presented in Figure 5.13 F. It may be observed from the Figure 5

For Experimental Group:

- **For ATM with Psychological High Hardiness: ATM (PHH)**
  The frequency polygon drawn on the criterion gain score with Psychological High Hardiness for the experimental group Awareness training Model (ATM) was a unimodal curve. The normal distribution falls on the scores of 13. The skewness value of 0.443, indicating that the curve was negatively skewed having right side.

- **For ATM with Psychological Low Hardiness: ATM (PLH)**
  The frequency polygon drawn on the criterion gain scores with Psychological Low Hardiness for the experimental group Awareness training Model (ATM) was a bimodal curve and skewed right hand side. The modal value of the distribution falls on the skewness value of this group was – 0.398, indicating the accumulation distribution of the group towards higher end of the score scale.

For Control Group:

- **For CGL with Psychological High Hardiness: CGL (PHH)**
  The frequency polygon drawn on the criterion gain scores with Psychological High Hardiness for the control group Conventional Group Learning (CGL) was a unimodal curve and skewed left side having more number of students scored lower than the modal value of the distribution was 4. The coefficient of skewness was – 0.285.

- **For CGL with Psychological Low Hardiness: CGL (PLH)**
  The frequency polygon drawn on the criterion gain scores with Psychological Low Hardiness for the control group Conventional Group Learning (CGL) was also a unimodal curve.
skewed curve towards the left hand side, showing the scores bunched up on the left hand side of score scale. The modal value of the distribution falls on the score of 1. The coefficient of skewness of this group was 0.674.

**INVERTED OGIVES FOR SCORES ON SOCIAL SKILLS**

Inverted percentage cumulative curves were drawn with the upper limits of class intervals on the ‘x - axis’ and the corresponding cumulative percentage frequencies on the ‘y - axis’. The inverted ogives thus prepared have been shown on the graph in Figure 5.14 F.

It may be observed from the Figure 5.14 F that:

**For Experimental Group:**

- **For ATM with Psychological High Hardiness: ATM (PHH):**

  In ATM group with Psychological High Hardiness under the Social Skills, about 75% of the students attained equal or more than 12% of scores. About 50
% of the students attained equal or more than 15.5 % of scores and 25 % of the students attained more than 19.5 % of scores.

- For ATM with Psychological Low Hardiness: ATM (PLH):
  In ATM group with Psychological Low Hardiness under the Social Skills, about 75 % of the students attained more than 9.5 % of scores. About 50 % of the students attained equal or more than 13 % of scores and 25 % of the students attained equal or more than 17.5 % of scores.

For Control Group:
- For CGL with Psychological High Hardiness: CGL (PHH):
  In CGL group with Psychological High Hardiness under the Social Skills, 75 % of the students attained equal or more than 5 % of scores. About 50 % of the students attained equal or more than 6.5 % of scores and 25 % of the students attained equal or more than 8 % of scores.
- For CGL with Psychological Low Hardiness: CGL (PLH):
  In CGL group with Psychological Low Hardiness under the Social Skills, about 75 % of the students attained equal or more than 3.5 % of scores. About 50 % of the students attained equal or more than 4.5 % of scores and 25 % of the students attained more than 5 % of scores.

The values of skewness and kurtosis for criterion gain scores for Social Skills of two treatment groups in relation to their Psychological Hardiness were computed and have been presented in the following Table 5.17

Table 5.17
Skewness and Kurtosis for Social Skills

<table>
<thead>
<tr>
<th></th>
<th>Experimental Group (ATM)</th>
<th>Control Group (CGL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Psychologically High Hardy (PHH)</td>
<td>Psychologically Low Hardy (PLH)</td>
</tr>
<tr>
<td>Skewness</td>
<td>- 0.443</td>
<td>- 0.398</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>- 0.399</td>
<td>- 0.541</td>
</tr>
</tbody>
</table>
Table 5.17 shows the **Skewness** values for scores on Social Skills of the four groups viz.: ATM (PHH), ATM (PLH), CGL (PHH) and CGL (PLH) were 0.443, -0.398, -0.285 and 0.674 respectively, which indicated the distribution for score of the groups ATM (PHH), ATM (PLH) and CGL (PHH) was negatively skewed and for CGL (PLH), it was positively skewed. The values were within the acceptable limits of normality of distribution (±1) and hence the distribution of the measure may be considered as moderately normal. **Kurtosis** values for the four groups viz.: ATM (PHH), ATM (PLH), CGL (PHH) and CGL (PLH) were -0.399, -0.541, -0.184 and 0.256 respectively, which indicated the distributions were **platykurtic** for experimental group (ATM) with Psychologically High Hardy and Low Hardy students and control group (CGL) with Psychologically High Hardy students. It was **leptokurtic** for control group (CGL) with Low Hardy students.

**COMPARATIVE MEANS AND S.D’S FOR SCORES ON SOCIAL SKILLS**

The gain means and S.D’s for the four combination groups were computed and have been recorded in the following Table 5.18 along with a bar diagram on gain mean scores for Social Skills.

**Table 5.18**

<table>
<thead>
<tr>
<th></th>
<th>Psychologically High Hardy (PHH)</th>
<th>Psychologically Low Hardy (PLH)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Control Group (CGL)</strong></td>
<td>Gain Mean = 2.23 S.D. = 0.31 N = 41</td>
<td>Gain Mean = 1.37 S.D. = 1.25 N = 65</td>
<td>Gain Mean = 1.70 S.D. = 1.08 N = 106</td>
</tr>
</tbody>
</table>
The Table 5.18 and Fig. 5.15 F reveals that out of gain mean scores for Social Skills; the gains were reportedly higher on total Scores for students with Awareness Training Model (ATM) treatment as compared to their counterparts of Conventional Group of Learning (CGL) in relation to their Psychological Hardiness.

The gain means on Social Skills were invariably higher for students of experimental group (ATM) with both the levels of hardiness (PHH and PLH). The gain scores of Social Skills of Psychologically High Hardy students were very close to that of Psychologically Low Hardy students. Although Psychologically High Hardy students of control group i.e. CGL (PHH) scored higher than their counterparts with Psychologically Low Hardy students, yet gain means of Psychologically High Hardy students of experimental group was higher than that of control group students with PHH or PLH. Overall comparison of the two groups revealed that the scores of students of control group were much lower compared to their counterparts in the experimental group and conventional group learning may be considered better for Psychologically High Hardy students for Social Skills.
From the comparisons of experimental and control groups in respect of frequency distribution, frequency polygons and ogives, it was inferred that gain means of students on Social Skills were not equal. To ascertain further whether these differences were significant or not, a Two-way (2 x 2) ANOVA was employed.

5.4.2. TWO-WAY ANALYSIS OF VARIANCE (2 X 2 ANOVA) ON GAIN SCORES OF SOCIAL SKILLS

The gain scores of students on Social Skills were subjected to Two-way ANOVA. A 2 x2 ANOVA was used to analyze gain scores on Social Skills. Following hypotheses were tested through this analysis:

- **Ho.10:** There will be no significant difference in Social Skills among students of experimental group (ATM) and control group (CGL).
- **Ho.11:** There will be no significant difference in Social Skills of Psychologically High Hardy and Psychologically Low Hardy (PHH/PLH) students.
- **Ho.12:** There will be no significant difference in Social Skills among students due to the interaction of instructional modes (ATM/CGL) and psychological hardiness (PHH/PLH).

The sum of squares, mean sum of squares and degrees of freedom and F-ratios for main effects and interaction effect of the two variables have been presented in the summary Table 5.19.
Table 5.19
Summary of Two-way Analysis of Variation on Gain Mean Scores for Social Skills

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares (SS)</th>
<th>df</th>
<th>Mean Sum of Squares (MSS)</th>
<th>F-ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main Effects:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A: Treatments (ATM/CGL)</td>
<td>4465.397</td>
<td>1</td>
<td>4465.397</td>
<td>223.309**</td>
</tr>
<tr>
<td>B: Psychological Hardiness (PHH/PLH)</td>
<td>32.399</td>
<td>1</td>
<td>32.399</td>
<td>1.620</td>
</tr>
<tr>
<td><strong>Interaction Effect:</strong> (A x B)</td>
<td>0.139</td>
<td>1</td>
<td>0.139</td>
<td>0.007</td>
</tr>
<tr>
<td>Error Term (Within Groups)</td>
<td>4199.266</td>
<td>210</td>
<td>19.997</td>
<td>--</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>8697.201</td>
<td>213</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

**Significant at the 0.01 level of confidence

**Main Effect: A**
- **Instructional Treatments (ATM and CGL):**

   It may be observed from the Table 5.19 that the F-ratio for the differences in gain means of two groups viz. ATM and CGL was found to be significant at the 0.01 level of confidence, indicating that the gain mean scores for students of the two groups for Social Skills were different beyond the contribution of chance.

   This suggests that the two groups were significantly different on their total gain mean scores for Social Skills. A comparison of the gain means of the two groups reveals that the experimental group, which was exposed to ATM, achieved higher mean (M=11.19) as compared to their counterparts of the control group (M=1.70). It also indicated that the students who received experimental treatment of Awareness Training Model showed a positive effect on scores for Social Skills. These differences may not be ascribed to chance factors only. Hence the hypothesis Ho.10 which stated that there will be no significant difference in Social Skills among students of experimental group (ATM) and control group (CGL) was
rejected at the specified level. It led to a conclusion that students studying through ATM achieved higher gain means on Social Skills than those who were studying in a Conventional Group Learning situation.

Main Effect: B

• Psychological Hardiness: High and Low Hardiness (PHH/PLH):

  The Table 5.19 shows that the F-ratio for the difference in gain means of the groups with psychological High and Low Hardiness (PHH/PLH) was not found to be significant at the 0.05 level of confidence. This suggests that the two groups of students having different level of psychological hardiness were not significantly different on the total gain mean scores of Social Skills. The present study could not provide sufficient evidence to reject the hypothesis Ho.11 which stated that there will be no significant difference in Social Skills of psychologically High Hardy and psychologically Low Hardy (PHH/PLH) students. It may be concluded that the Psychologically High Hardy and low hardy students scored equal levels of gain mean scores for Social Skills.

Two Order Interaction Effect: (A x B)

• Instructional Treatments (A) and Psychological Hardiness (B):

  It may be seen from the Table 5.19 that the F-ratio for the difference in gain mean scores on Social Skills for the interaction effect between Instructional Modes (ATM and CGL) and Psychological Hardiness (PHH and PLH) was also not found to be significant even at the 0.05 level of confidence. The difference, if any, was due to chance factors. The present study could not provide sufficient evidence to reject the hypothesis Ho.12 that there will be no significant difference in Social Skills among students due to the interaction of instructional modes (ATM/CGL) and psychological hardiness (PHH/PLH). The results were further followed up by line diagram (Fig. 5.16 F) to study interaction effect between the two variables, which indicated no interaction between the two variables. It may be concluded that the Instructional Modes and Psychological Hardiness operated independent of each other with regard to scores for Social Skills.
Fig. 5.16 F: Interaction Graph between Instructional Treatments (ATM/CGL) and Psychological Hardiness (PHH/PLH) for Social Skills

- CONCLUSIONS:

Following conclusions were drawn from the Analysis of Part-A.4 (Social Skills):

► In Experimental Group with Psychological High Hardiness (ATM/PHH):
  » 75 % students attained 12 % scores
  » 50 % students attained 15.5 % scores
  » 25 % students attained 19.5 % scores

► In Experimental Group with Psychological Low Hardiness (ATM/PLH):
  » 75 % students attained 9.5 % scores
  » 50 % students attained 13 % scores
  » 25 % students attained 17.5 % scores
Analysis and Interpretation of Data

► In Control Group with Psychological High Hardiness (CGL/PHH):
  » 75 % students attained 5 % scores
  » 50 % students attained 6.5 % scores
  » 25 % students attained 8 % scores

► In Control Group with Psychological Low Hardiness (CGL/PLH):
  » 75 % students attained 3.5 % scores
  » 50 % students attained 4.5 % scores
  » 25 % students attained 5 % scores

► Students studying through ATM achieved higher gain means on Social Skills than those who were studying in a Conventional Group Learning situation.

► Psychologically High Hardy and Low Hardy students scored equal levels of gain mean scores for Social Skills.

► The Instructional Modes and Psychological Hardiness operated independent of each other with regard to scores for Social Skills.
5.5: DISCUSSION OF RESULTS RELATED TO LIFE SKILLS

The discussion of the results based on analysis of data related to Life Skills has been reported under the following headings:

- Instructional Treatments (ATM/CGL)
- Psychological Hardiness (PHH/PLH)
- Interaction Effect (Instructional Treatments and Psychological Hardiness)

Discussion of results based on findings of Instructional Treatments (ATM/CGL):

- The result based on quantitative analysis of the present investigation revealed that the two instructional treatments viz. Awareness Training Model (ATM) and Conventional Group Learning (CGL) were not found equal in respect of gain means yielded by them. Instructional treatment imparted by Awareness Training Model resulted into higher gain means as compared to Conventional Group Learning on Skill of Acquiring Knowledge. The analysis of data led to the rejection of null hypothesis Ho.1 which stated that there will be no significant difference in Skill of Acquiring Knowledge among students of experimental group (ATM) and control group (CGL). The results were supported by the findings of the studies conducted by Nayaam & Kareem (1985), Imelda & Lowell (1985), Crease (1986), Jyoti (1990), Ahmed (1989), Mellin & William (1992) and Christane (2008) that cognitive domain or achievement skill was increased due to the application of awareness training model. It was directly related to the increased use of training of self awareness.

The results of some of the studies indirectly supported and reflected the positive effect of model based instruction in developing and increasing achievement skill. Halter & Lang (1994) found personal development family models were beneficial for skills development especially achievement, communication and time management. Johnston & Susanne (2004) correlated the application of inquiry training model and increased achievement in the subject of science. Jackman & Swan (1996) found that the use of instructional models resulted into the effective distance education. Passi et al. (1997) reported on the
effectiveness of various strategies of training in models of teaching using different models enhanced understanding of the theoretical aspects. Sivakumar & prema (1999), Aruna & Smitha (2009) and Pany (2008) supported the view that model based teaching in the subject of Biology led to the improvement in the achievement skill of the learners. Meena (2006) also reported a positive impact of model based instruction on various life skills in favour of experimental group as compare to conventional teaching style.

Gafoor & Shemi (2007) found positive impact of study skills training on achievement in Biology. Zollinger & Cummings (2007) investigated the impact of life skills training curriculum on the middle school students’ knowledge and ability. They found that achievement was increased with the help of life skills training curriculum.

A study conducted by Emeka (2009) reported that instructional curriculum strategy was helpful in developing positive attitude, active participation, encourage good behavior and increased academic achievement of emotional disabled children. The explanation to such results is embedded into the rationale of the model. The procedural steps and syntax of the model enhance daily activities and strong participation of students which could further enhance level of acquiring knowledge.

• In the present study an analysis of group profile of the experiment revealed that Life Skills viz. Skill of Acquiring Knowledge, Self Awareness Skill, Assertiveness Skill and Social Skills seemed to be affected by ATM mode to yield positive results compared to conventional group.

The data of the present study provided sufficient evidence to reject the hypothesis Ho.4 which stated that there will be no significant difference in Self Awareness Skill among students of experimental group (ATM) and control group (CGL). Studies that favoured the findings were like; awareness approach was effective in increasing self awareness by Mellin & William (1992); model based instruction was directly associated with specific self awareness of academic ability by Royal & Van (1986); training modules helped in recognizing feelings and
behavior pattern with respect to social integration to increase self awareness and to understand self concept by Nayal (1995); awareness training based learning promoted self awareness skills, an open and discovery oriented awareness training strengthened the links between teaching and research by Stolter & Walker (2010); resistance was developed through self awareness skills with the help of model based instructions by Tamara & Foldy (2010). All these studies justified that specific instructional strategies based on awareness training and self awareness can maximize the students’ success in the workplace.

Since, acquiring self awareness is generally a long-term task, some researches like Buhs (2000); Rowland (2002); Davis (2004) and Moeller (2005) have suggested employing teaching strategies which can cultivate and induce students’ self awareness, increase their self confidence and build their self concept.

- The present study provided sufficient evidence to reject the hypothesis Ho.7 which stated that there will be no significant difference in Assertiveness Skill among students of experimental group (ATM) and control group (CGL). Many studies confirm this result were like: development of assertiveness skill and other life skills with life skill training program by Botvin (1985); special training strategy helped in development of assertion and self management skills by Henke (1997); personal life skills including assertiveness skill for self perception by Nava (1998); improvement in assertiveness skill through training program by Davis (2004); positive effect of assertiveness training program on teaching skills of teachers by Kaur (2006). All these studies have suggested that students must be provided assertiveness training which is very important to cope up in difficult situations of life through self awareness.

The data of the present investigation also provided sufficient evidence to reject the hypothesis Ho.10 which stated that there will be no significant difference in Social Skills among students of experimental group (ATM) and control group (CGL). Perumal (2002) concluded a positive change in social awareness and skills by model based teaching strategies. Chaudhari, Vaidya &
Mahapatra (2007) found development of social skills among students when taught through models of teaching. Roylew (1983) examined the effect of social and behaviour factors on academic difficulties and found that life skills including social skill were need to be refocused in order to achieve better academically. Greene (1988) found that awareness models brought positive changes in the social skills of students. Studies by Davis & Cohen (1995); Shangold (2004); Kulikov (2005); Grover (2006) showed a significant development in life skills including social skills through specially designed instructional programs.

The present study therefore leads us to an inference that ATM is an effective and better instructional strategy as compared to Conventional Group Learning. Improvement in all life skills viz. Skill of Acquiring Knowledge, Self Awareness Skill, Assertiveness Skill and Social Skills was witnessed, however it was slow and gradual, but it still establishes the superiority and effectiveness of ATM instructional mode. The reason behind its success was the application of activity based teaching and learning, which was the core element of the model. Students who shied away or hesitate to interact earlier were able to develop some qualities like leadership, self expression, freedom and honesty due to the conducive environment and activities of the model. Special exploratory games like good and new activity, gaming activity, hot seat activity etc provided them with the self concept and awareness of self. This in turn, led to more participation of students who forwarded not only their doubts rather enjoyed the classroom teaching. By this, they were able to speak and perform well in classroom interaction. The theories and methods of this model were aimed at achieving fulfillment of one’s potential. It helps in bringing in an individual the following:

- **Feeling** that one can cope with his environment,
- **Sense of confidence** as a significant, competent and lovable person who was capable of handling situations and free to express his feelings.

Self awareness and awareness of others in a group was the motivational force behind the active participation and success of the students. Such type of provision was not available in Conventional Group Learning (CGL) which led to better results of ATM instructional mode and it emerged as a new instructional
strategy which can be either complemented or replaced by the traditional ways of teaching.

➢ Discussion of results based on findings due to effects of Psychological Hardiness (PHH/PLH):

In the present study, the data provided sufficient evidence to reject the hypothesis Ho.2 which stated that there will be no significant difference in Skill of Acquiring Knowledge of Psychologically High Hardy and Psychologically Low Hardy (PHH/PLH) students. Studies which supported the result were conducted by smith (1990); Lifton & Seay (2000); Sthart (2005); Benishek (2009); and Bonanno & Jim (2010). Variation was found in all these studies regarding academic performance or knowledge among high hardy and low hardy students or persons.

Some studies indirectly supported the result by showing a difference in various other dependent variables among high and low hardy individuals like: stress and coping strategies (Laura & Hammond, 1985); strain, illness and health (Tang & Hammontree, 1989); hopelessness, hardiness and strain (Samuel & Kevin, 1990); health status and hardiness (Greene & Nowack, 1991); physical health and somatic problems correlated with hardiness (Sheppered & Kashani, 1991); social attitude and repression (Colins, 1992); mental satisfaction and stress (Rush, 1995); leadership and performance in stressful circumstances (Khoshaba & Maddi, 2001); psychological health, extraversion, openness and consciousness (Maddi, 2002); and in the area of teaching and facilitation of students (Cohen, 2009).

The above results were consistent with the findings of some researches conducted by Cole & Field (2009) and Andrew (2000) which reflected that psychological hardiness can increase understanding of the learning experiences and its impact on learning outcomes. Morrow & Benishek’s (1995) study however reflected that hardy persons thought to be withstand difficult life situations using a combination of three cognitive appraisal viz. control, commitment and challenge.
A similar trend was observed for the Self Awareness Skill and Assertiveness Skill, which led to the rejection of the hypotheses Ho.5 and Ho.8 at a specified level. Chandra (2004) found high hardy individuals to handle the change with self determination and assertiveness. Michael & Golby (2006) concluded in their study that outdoor adventure education showed positive psychological development in psychological hardiness, leadership, self awareness and self efficacy. Sansone (1999) found that hardiness reflected a productive approach for self regulatory efforts. The exception being only the Social Skill where the present study led to acceptance of null hypothesis Ho.11 which stated that there will be no significant difference in Social Skills of Psychologically High Hardy and Psychologically Low Hardy (PHH/PLH) students. There was no direct study to support this result as number of reviewed studies indicated that psychological hardiness do support the dependent variables like social support and self esteem (Kosaka & Yoshida, 1992); family support (Habit, 1993); social situations and skills (Collins, 1992); life satisfaction and health concerns (Smith, 1990); leadership and performance (Khoshaba & Maddi, 2001). Carter & Campbell (1988) showed that subjects’ received low levels of social support resulted in increase work stress.

Awareness Training Model was based on group activities to enhance teaching and learning. With the application of activity based teaching and learning students enjoyed their routine classroom learning and felt freedom in self expression. Self Awareness Skill and Assertiveness Skill were developed among students of experimental group with the help of specific activities of the model viz. Hot Seat activity, Extempore, Open Question activity, Closed Question activity etc. Social Skills of the students of experimental group were also enhanced due to interaction in groups, but this skill can also be developed in general classroom settings as in the case of control group.
Discussion of results related with findings of Interaction Effect (Instructional Treatments and Psychological Hardiness):

The data of the present investigation provided sufficient evidence to reject the null hypotheses Ho.3 and Ho.9 which stated that there will be no significant difference among students due to the interaction of instructional modes (ATM/CGL) and psychological hardiness (PHH/PLH) regarding Skill of Acquiring Knowledge and Assertiveness Skill respectively. The gain means for the instructional modes (ATM/CGL) for the psychological hardiness; high hardy and low hardy (PHH/PLH) were not found different for two life skills in the present study viz. Self Awareness Skill and Social Skill. Therefore hypotheses Ho.6 and Ho.12 were accepted at specified level of confidence.

No direct studies were found to be sufficient for the support of the above mentioned hypotheses, some studies like William & Phillip (1997) and Davis (2000) supported the results indirectly by putting emphasis on stress free learning through model approach and instructional strategies. Gerson (1998) reported that hardiness along with cognitive avoidance and logical analysis of different instructional strategies emerged as significant predictor of stress among students.

Collins (1992) in his research work presented a rationale to use hardiness as stress resistance resource and understanding of how some individuals emerge from a period of instability and change with the life skills that help them adopt in a variety of social situations.

Chang & Lee (2000) provided a means to discuss stress free and independent learning with the application of awareness training model approach. It focused on the model approach as an effective means of:

- Motivating students for learning in freedom
- Making teaching-learning process challenging, especially if the educational system does not accommodate creative teaching practices.
- Presenting a novel team teaching model that was based on mutual collaborations between two teachers of different subjects
- Enjoyable learning with activity based teaching
• Developing strategies to increase harmony and productivity when working in teams.

The differences in the gain mean scores of psychologically high hardy and low hardy students (PHH/PLH) for different instructional modes (ATM/CGL) were investigated further and the conclusions were drawn focusing Ho.3, Ho.6, Ho.9 and Ho.12.

The present study shows that ATM and CGL had no positive effect on the gain means of psychologically high hardy and low hardy students (PHH/PLH) in their own groups except for the experimental group regarding Skill of Acquiring Knowledge. The results of the present investigation provided sufficient evidence for the acceptance of hypotheses Ho.3 (b); Ho.6 (a); Ho.6 (b); Ho.9 (a) and Ho.9 (b) at a specified level. Smith’s study (1995) supported the above results that instructional strategies were related neither to hardiness scores nor to physical or psychological outcomes. The only exception to the above results was related to Ho.3 (a) which was rejected in the present investigation. It suggests that there was a significant difference in Skill of Acquiring Knowledge among students of experimental group who were psychologically high hardy or low hardy. Cole & Field (2009) concluded that psychological hardiness can increase understanding of the learning experiences and its impact on important learning outcomes. Bonanno & Jim (2010) also reported variation in academic performance in favour of high hardy students.

It is interesting to note that Psychological Hardiness (PHH/PLH) made a significant difference on the gain means of students for selected Life Skills viz. Skill of Acquiring Knowledge, Self awareness Skill and Assertiveness Skill, under ATM and CGL instructional modes. Hence the analysis of the data of the present study led to the rejection of hypotheses Ho.3 (c); Ho.3 (d); Ho.6 (c); Ho.6 (d); Ho.9 (c) and Ho.9 (d) at the specified level. The results were supported by the findings of Castillo (1993) who found that high hardy subjects exposed to failure condition reported significantly more confused than the high hardy subjects exposed to success condition due to the intervention of specific strategies for success. Similar trend was observed in a study conducted by Parsons (1994) in
which low hardy students who were taught through specific instructional strategies reported high achievement and low level of stress as compared to low hardy students exposed to traditional teaching styles.

The analysis of data of the present investigation led to the rejection of hypotheses Ho.3 (e); Ho.3 (f); Ho.6 (e); Ho.6 (f); Ho.9 (e) and Ho.9 (f) at the specified level. The findings of the results of the hypotheses revealed that the following groups were showed remarkable difference in respect of the gain means for selected Life Skills viz. Skill of Acquiring Knowledge, Self awareness Skill and Assertiveness Skill:

- ATM group with Psychologically High Hardy students (PHH) and CGL group with Psychologically Low Hardy students (PLH); and
- ATM group with Psychologically Low Hardy students (PLH) and CGL group with Psychologically High Hardy students (PHH).

This was attributed to the facts that ATM and CGL yielded significant differences on the gain mean scores for Life Skills. Thus, the present study along with its findings brought a very convincing array of evidences testifying it for improved performance of students in classrooms.
SECTION – II
ANALYSES ON PREFERENCES OF SELECTED PERSONAL VALUES OF TREATMENT GROUP AND CONTROL GROUP

This part deals with the analysis on the preferences of Personal Values of students under study. Sixteen Personal Values were taken in this investigation to study the effect of instructional programme on the preferences of selected personal values of secondary school children. (This has been explained in chapter-III under the heading Description of Tools).

The preferences of Personal Values were obtained at both pre-test and post-test stages in order to study the effect of instructional programme on them. Some qualitative statistical techniques were used to analyze data pertaining to Personal Values. The analysis and interpretation on preferences of Personal Values was studied through:

5.6: Preferential Normalized Master Ranks
5.7: Trend Analysis on preferences of Personal Values

5.6: PREFERENTIAL NORMALIZED MASTER RANKS

The preferences of all the students of ATM and CGL, who participated in the study, were collected for each Personal Value for pre and post test stages. As already discussed the following Personal Values were considered:

- Concern for others
- Cleanliness
- Devotion to Duty
- Emotional Balance
- Endurance
- Efficiency
- Freedom
- Honesty
- Kindness
- Leadership
- Obedience
- Purity
- Punctuality
- Quest for Knowledge
- Self Control
- Self Help
These preferences were converted onto preferential matrices for master ranks. A separate matrix was prepared for each one of the following groups of students’ i.e.

- Experimental Group with Psychologically High Hardy students (ATM-PHH) for Pre-Test Stage
- Experimental Group with Psychologically High Hardy students (ATM-PHH) for Post-Test Stage
- Experimental Group with Psychologically Low Hardy students (ATM-PLH) for Pre-Test Stage
- Experimental Group with Psychologically Low Hardy students (ATM-PLH) for Post-Test Stage
- Control Group with Psychologically High Hardy students (CGL-PHH) for Pre-Test Stage
- Control Group with Psychologically High Hardy students (ATM-PHH) for Post-Test Stage
- Control Group with Psychologically Low Hardy students (ATM-PLH) for Pre-Test Stage
- Control Group with Psychologically Low Hardy students (ATM-PLH) for Post-Test Stage

The preference ranks of each group were then pooled onto a matrix and then normalized master ranks for Personal Values were computed with the help of C-Scale value chart (Guilford, 1954). Thus, eight groups were formed showing pre-test and post-test normalized master ranks for Personal Values of treatment and control group. These normalized master ranks of eight groups of students have been shown in the table 5.20
### Table 5.20
Normalized Master Ranks for Personal Values of Psychologically High and Low Hardy students of Experimental and Control Groups

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Personal Values</th>
<th>Experimental Group (ATM)</th>
<th>Control Group (CGL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Psychologically High</td>
<td>Psychologically Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hardy (PHH)</td>
<td>Hardy (PLH)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pre-Test</td>
<td>Post-Test</td>
</tr>
<tr>
<td>1</td>
<td>Concern for others</td>
<td>16</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Cleanliness</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>Devotion to Duty</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>4</td>
<td>Emotional Balance</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>5</td>
<td>Endurance</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>6</td>
<td>Efficiency</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>7</td>
<td>Freedom</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>Honesty</td>
<td>13</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>Kindness</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>10</td>
<td>Leadership</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>Obedience</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>12</td>
<td>Purity</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>13</td>
<td>Punctuality</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>14</td>
<td>Quest for knowledge</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>15</td>
<td>Self Control</td>
<td>15</td>
<td>5</td>
</tr>
</tbody>
</table>
To study the spectrum of preferences of Personal Values of all the groups, five most preferred (Top Five) and five least preferred (Bottom Five) Personal Values were identified. The Table 5.21 shows the top five and bottom five preferences on Personal Values as revealed by normalized master ranks of the experimental group at both pre as well as post-test stages.

**Table 5.21**  
**Top Five and Bottom Five Preferences of Personal Values of Psychologically High & Low Hardy students of Experimental group**

<table>
<thead>
<tr>
<th>Type of Group</th>
<th>Preferences</th>
<th>Pre-Test Stage</th>
<th>Post-Test Stage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Psychologically High Hardy ATM - (PHH)</strong></td>
<td>T1</td>
<td>Cleanliness</td>
<td>Leadership</td>
</tr>
<tr>
<td></td>
<td>T2</td>
<td>Punctuality</td>
<td>Concern for others</td>
</tr>
<tr>
<td></td>
<td>T3</td>
<td>Devotion to Duty</td>
<td>Honesty</td>
</tr>
<tr>
<td></td>
<td>T4</td>
<td>Freedom</td>
<td>Freedom</td>
</tr>
<tr>
<td></td>
<td>T5</td>
<td>Kindness</td>
<td>Self Control</td>
</tr>
<tr>
<td><strong>Bottom Five Values</strong></td>
<td>B5</td>
<td>Endurance</td>
<td>Endurance</td>
</tr>
<tr>
<td></td>
<td>B4</td>
<td>Honesty</td>
<td>Self Help</td>
</tr>
<tr>
<td></td>
<td>B3</td>
<td>Leadership</td>
<td>Devotion to Duty</td>
</tr>
<tr>
<td></td>
<td>B2</td>
<td>Self Control</td>
<td>Obedience</td>
</tr>
<tr>
<td></td>
<td>B1</td>
<td>Concern for others</td>
<td>Efficiency</td>
</tr>
</tbody>
</table>

| **Psychologically Low Hardy ATM - (PLH)** | T1 | Emotional Balance | Self Control |
| | T2 | Devotion to Duty | Freedom |
| | T3 | Kindness | Concern for others |
| | T4 | Punctuality | Emotional Balance |
| | T5 | Concern for others | Devotion to Duty |
| **Bottom Five Values** | B5 | Honesty | Self Help |
| | B4 | Quest for Knowledge | Quest for Knowledge |
| | B3 | Self Control | Obedience |
| | B2 | Leadership | Punctuality |
| | B1 | Freedom | Cleanliness |

It may be observed from the table 5.21 that the values Freedom and Endurance do not seem to be sensitive to the experimental treatment (in respect of psychologically high hardy students of experimental group). The two values in the preference of psychologically high hardy students were found least affected in respect of their normalized master ranks. The value Devotion to Duty appeared among five top values at pre-test stage and among bottom five preferences at post-test stage. It may be noticed that the values Leadership, Self Control, Concern for others and Honesty which were bottom preferences at pre-test stage assumed...
Analysis and Interpretation of Data

more and more importance after the experimental treatment and appeared in the list of top five values at post-test stage.

The values which did not seem to be sensitive to the treatment and the ones which were found to be highly sensitive have been depicted through Fig. 5.17 F.

Fig. 5.17 F
Line Graph showing Top Five and Bottom Five Preferences of Personal Values of Experimental Group for Psychologically High Hardy Students (ATM-PHH) at Pre and Post-Test Stages

For psychologically low hardy students of experimental group, the values Emotional Balance, Devotion to Duty, Concern for others, Quest for Knowledge and Kindness were not found to be sensitive to the experimental treatment.
Punctuality is one value, which appeared among top five preferences, of psychologically low hardy students of experimental group and then declined to bottom five after treatment. On the other hand Freedom is one value which was among bottom five values and assumed more and more importance and appeared among top five values after the treatment. These effects have been depicted in Fig. 5.18 F

Fig. 5.18 F
Line Graph showing Top Five and Bottom Five Preferences of Personal Values of Experimental Group for Psychologically Low Hardy Students (ATM-PLH) at Pre and Post-Test Stages

Similarly master ranks of preferences on Personal Values of control group were computed separately for psychologically high hardy and psychologically low
hardy students and have been presented in Table 5.22 and graphically in Figure 5.19 F and 5.20 F in the following paragraphs.

Table 5.22 shows the top five and bottom five preferences on Personal Values as revealed by normalized master ranks of control group at both pre as well as post-test stages.

<table>
<thead>
<tr>
<th>Type of Group</th>
<th>Preferences</th>
<th>Pre-Test Level</th>
<th>Post-Test Level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Psychologically High Hardy CGL - (PHH)</strong></td>
<td>T1 Efficiency</td>
<td>Obedience</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T2 Emotional Balance</td>
<td>Efficiency</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T3 Obedience</td>
<td>Emotional Balance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T4 Honesty</td>
<td>Concern for others</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T5 Self Help</td>
<td>Honesty</td>
<td></td>
</tr>
<tr>
<td><strong>Control Group (CGL)</strong></td>
<td>B5 Leadership</td>
<td>Devotion to duty</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B4 Endurance</td>
<td>Freedom</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B3 Quest for Knowledge</td>
<td>Kindness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B2 Purity</td>
<td>Purity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B1 Kindness</td>
<td>Endurance</td>
<td></td>
</tr>
<tr>
<td><strong>Psychologically Low Hardy CGL - (PLH)</strong></td>
<td>T1 Cleanliness</td>
<td>Self Help</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T2 Honesty</td>
<td>Honesty</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T3 Self Help</td>
<td>Cleanliness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T4 Emotional balance</td>
<td>Leadership</td>
<td></td>
</tr>
<tr>
<td></td>
<td>T5 Punctuality</td>
<td>Emotional Balance</td>
<td></td>
</tr>
<tr>
<td><strong>Bottom Five Values</strong></td>
<td>B5 Devotion to Duty</td>
<td>Endurance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B4 Purity</td>
<td>Kindness</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B3 Endurance</td>
<td>Self Control</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B2 Kindness</td>
<td>Devotion to Duty</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B1 Self Control</td>
<td>Freedom</td>
<td></td>
</tr>
</tbody>
</table>

It may be observed from the table 5.22 that the top five preferred values of psychologically high hardy students of control group showed very marginal change in their master ranks at post-test stage. Only marginal shifts in the preference ranks were seen. Four out of these five values viz. Obedience, Efficiency, Emotional Balance and Honesty remained as such among top five preference ranks at pre-test and post-test stages. Value Self Help dropped down in the middle slot of ranks. A similar trend was witnessed for the bottom five values.
also. Values *Kindness, Purity and Endurance* remained in bottom five preferences at post-test stage also. *Leadership* and *Quest for Knowledge* moved slightly upward and appeared in middle slot of ranks.

The values which showed marginal or no change at post-test stage have been depicted through Fig. 5.19 F.

**Fig. 5.19 F**
Line Graph showing Top Five and Bottom Five Preferences of Personal Values of Control Group for Psychologically High Hardy Students (CGL-PHH) at Pre and Post-Test Stages

For psychologically low hardy students of control group, the only value *Punctuality* dropped from the top five ranked value slot. Others remained as such in the top five preferred ranks at post-test stage. These values were *Self Help,*
**Honesty, Cleanliness and Emotional Balance.** No value shifted from bottom to top preference ranks. Bottom five values also remained as such at post-test stage with slight change in rank ordering. These effects have been depicted in Fig. 5.20 F

**Fig. 5.20 F**

Line Graph showing Top Five and Bottom Five Preferences of Personal Values of Control Group for Psychologically Low Hardy Students (CGL-PLH) at Pre and Post-Test Stages
5.7: TREND ANALYSIS ON PREFERENCES OF PERSONAL VALUES

In order to dig deeper into the shifts of normalized master ranks affected by the treatment under study, the trend of preferences of personal values was further analyzed for psychologically high hardy and low hardy students separately. These shifts in value preference for psychologically high hardy students have been presented in table 5.23.

Table: 5.23
Normalized Master Ranks for Top Five and Bottom Five Preferences of Personal Values of Psychologically High Hardy Students of Experimental Group & corresponding Preferences on these Values by Control Group

<table>
<thead>
<tr>
<th>Values</th>
<th>Pre-Test</th>
<th>Post-Test</th>
<th>Values</th>
<th>Pre-Test</th>
<th>Post-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychologically High Hardy (PHH)</td>
<td></td>
<td></td>
<td>Control Group (CGL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experimental Group (ATM)</td>
<td></td>
<td></td>
<td>Control Group (CGL)</td>
<td></td>
</tr>
<tr>
<td>Top Five Values</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleanliness</td>
<td>(1 – 6)</td>
<td>Cleanliness</td>
<td>(8 – 8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Punctuality</td>
<td>(2 – 9)</td>
<td>Punctuality</td>
<td>(7 – 6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Devotion to Duty</td>
<td>(3 – 14)</td>
<td>Devotion to Duty</td>
<td>(11 – 12)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freedom</td>
<td>(4 – 4)</td>
<td>Freedom</td>
<td>(10 – 13)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kindness</td>
<td>(5 – 11)</td>
<td>Kindness</td>
<td>(16 – 14)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottom Five Values</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Endurance</td>
<td>(12 – 12)</td>
<td>Endurance</td>
<td>(13 – 13)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Honesty</td>
<td>(13 – 3)</td>
<td>Honesty</td>
<td>(4 – 5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leadership</td>
<td>(14 – 1)</td>
<td>Leadership</td>
<td>(12 – 9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self Control</td>
<td>(15 – 5)</td>
<td>Self Control</td>
<td>(9 – 10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concern for Others</td>
<td>(16 – 2)</td>
<td>Concern for Others</td>
<td>(6 – 4)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A shift of five ranks from pre-test stage to post-test stage was considered to be a change caused by the experimental treatment. A shift of less than five ranks was not considered to be a change in value preference orders.

The control group showed that there was little or no shift in master ranks of values Cleanliness, Punctuality, Devotion to Duty, Freedom and Kindness. On the other hand the experimental group showed the shift of five or more ranks from pre to post-test stage in four of the above mentioned values except Freedom. It
makes it further clear that the treatment precisely declined the normalized master ranks of values *Cleanliness, Punctuality, Devotion to Duty and Kindness*.

In the control group the values *Endurance, Honesty, Leadership and Concern for others* showed little or no variation in their preferences during the period of experimentation. Comparing the same values in the experimental group, all these values, but for the value *Endurance*, assumed significantly high master ranks after the treatment. It may be inferred that the experimental treatment affected master ranks of the four bottom ranking values and raised preferences to top five ranking values.

<table>
<thead>
<tr>
<th>Values</th>
<th>Psychologically Low Hardy (PLH)</th>
<th>Control Group (CGL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Experimental Group (ATM)</td>
<td>Control Group (CGL)</td>
</tr>
<tr>
<td></td>
<td>Pre-Test</td>
<td>Post-Test</td>
</tr>
<tr>
<td>Emotional Balance</td>
<td>(1–4)</td>
<td>(4–5)</td>
</tr>
<tr>
<td>Devotion to Duty</td>
<td>(2–5)</td>
<td>(12–15)</td>
</tr>
<tr>
<td>Kindness</td>
<td>(3–8)</td>
<td>(15–13)</td>
</tr>
<tr>
<td>Punctuality</td>
<td>(4–15)</td>
<td>(5–7)</td>
</tr>
<tr>
<td>Concern for Others</td>
<td>(5–3)</td>
<td>(9–10)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bottom Five Values</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Honesty</td>
<td>(12–6)</td>
<td>(2–2)</td>
</tr>
<tr>
<td>Quest for Knowledge</td>
<td>(13–13)</td>
<td>(10–9)</td>
</tr>
<tr>
<td>Self Control</td>
<td>(14–11)</td>
<td>(16–14)</td>
</tr>
<tr>
<td>Leadership</td>
<td>(15–7)</td>
<td>(6–4)</td>
</tr>
<tr>
<td>Freedom</td>
<td>(16–2)</td>
<td>(11–6)</td>
</tr>
</tbody>
</table>

It may be observed from the table 5.24 that the top five ranking values of experimental group viz. *Emotional Balance, Concern for others, Devotion to Duty, Kindness and Punctuality* showed little effect during the experimentation period as is clear from the variation in master ranks of control group.

It may be further observed that *Kindness and Punctuality* are two values which showed marked decline in master ranks from pre to post test stage in
contrast to the control group. It tends to suggest that psychologically low hardy students (comparing experimental and control groups) the master ranks in respect of Kindness and Punctuality may be considered as influenced by experimental treatment and all others may be ascribed to factors other than experiment.

The master ranks of Honesty, Quest for Knowledge, Self Control, Leadership and Freedom in the control group showed very little shift whereas in experimental group the values Honesty, Self Control and Leadership showed remarkable rise in their master ranks from pre to post-test stage. Thus the master ranks of values Honesty, Self Control, Leadership showed that these were highly affected by experimental treatment and their importance were raised.

> CONCLUSIONS:

It may be concluded that:

> For Psychologically High Hardy students of experimental group

- Value Freedom (among top five ranks at pre-test stage) did not seem to be sensitive to experimental treatment and retained its preference rank at post-test stage. Similarly value Endurance (bottom five at pre-test stage) remained at the same rank after treatment.
- Value Devotion to Duty was among top five preferred values at pre-test stage and dropped to bottom five values after treatment.
- Leadership, Self Control, Honesty and Concern for others seemed to be sensitive to experimental treatment and appeared among top five after shift from bottom five preference ranks.

> For Psychologically Low Hardy students of experimental group

- Quest for Knowledge (among bottom five at pre-test stage) seemed to be insensitive to experimental treatment as remained at the same rank at post-test stage.
- Value Punctuality was among top five preferred values and dropped to bottom five values at post-test stage.
- Self Control and Freedom seemed to be sensitive to experimental treatment and appeared among top five after shift from bottom five preference ranks.
5.8: DISCUSSION OF RESULTS RELATED TO PERSONAL VALUES

The present study was undertaken to determine the effect of awareness training model on life skills and personal values of secondary school children in relation to their psychological hardiness. Awareness training model was implemented for experimental group. The main focus of the awareness training model is to increase human awareness with special reference to self and society. It helps in increasing understanding of self and of others. It laid special emphasis on activity based learning.

Sixteen personal values were identified to study the effect of awareness training model (ATM) on personal values of secondary school children in relation to their psychological hardiness. Due to large span of time of experimentation, there was a possibility of change in the preferences of personal values. The result based on qualitative analysis on preferences of selected personal values revealed that shifts in priorities of personal values were more in the experimental group as compared to control group. Control group showed very marginal change in the preference ranks of two or three personal values. The most affected personal values with the application of ATM were leadership, freedom, concern for others, self control and honesty.

Concern for others was the most preferred personal value of the experimental group for both psychologically high hardy and low hardy students at post-test stage. At pre-test stage it was found in the bottom three preference ranks for experimental group. This marked shift in ranks of this value may be justified with an argument that experimentation involved activities performed in groups, cooperation and concern for others were required at each step. Mutual understanding and mutual concern were the pre-requisites of each activity to perform better. Activities like snowballing, gaming, project work, worksheet activity, structuring etc required utmost cooperation in the form of concern for others in order to attain set targets. As reported by Yuhwa, Dane and Gellman (2005) that the students were able to experience a different kind of human connectedness and concern with the other with the application of awareness training model. William and Phillip (1997) found in their pilot study that models
of teaching are able to bring desired change in the behavior of students with reference to personal values and their academic achievement.

**Leadership** which was the third preference from the bottom at pre-test stage for the experimental group with psychologically high hardy students becomes number one preference at post-test stage. Positive influence of activities was seen for personal values in the instructional programme. Leadership was strongly focused in the model through various activities. Students acted as group leaders by rotation almost in each activity viz. assignment activity, gaming activity, prepared sheet activity, open quiz activity etc. A great enthusiasm was witnessed in students to become group leader who were earlier hesitant to become the same at initial stages of treatment. A change in the preference rank of leadership from bottom to top most preference after the instructional programme, may have been resultant of treatment. Seaberg and Ramirez (2001) in their study reported that awareness training programme led to inculcate good interpersonal and leadership behaviour due to expression of inclusion in the group.

For experimental group with psychologically high hardy students; **Honesty** showed an extreme upward trend and found in the top three preference ranks at post-test stage. The Awareness Training Model promotes honesty and openness. It is characterized by norms of mutuality, trust and faith in the counterparts. Honesty is the inbuilt component of the model. Almost all the activities were performed in teams or groups. Honesty was the most important requirement in each activity. Classroom environment was so created which inculcate honesty and openness through the participation in various activities. Honesty was also the basic requirement of developing interpersonal skills among individuals. **Good and new activity, hot seat activity** etc. are some examples which were used in such classroom environment during the experiment. As also reported by David (2009) that the values, equality and honesty were the main outcomes of team work performed to examine the relationship of personal values and performance in teams, the results of the present investigation are justified.

Psychologically low hardy students of experimental group also showed a total change in the preferences of personal values after the instructional programme. Their inclination was towards the **Self Control, Freedom and**
Concern for others. Self Control shifted from fourteenth preference rank to top most preference after the instructional programme. The personal value Self Control was found in top five values of high hardy students of experimental group also. It showed that this value has gained importance by the instructional programme based on Awareness Training Model for both type of students viz. high hardy and low hardy. Awareness of self and of others was focused in the instructional model. According to the model’s syntax, self control is the most important requirement for bringing success in life. It brings self discipline and positive direction in life. Some activities were also arranged in the modules to develop this personal value in the students. No chairperson activity was the most suitable activity in this direction. In this activity students were allowed to discuss a topic without any leader or chairperson. They were not allowed to take direction from the investigator also. They initially make huge noise and created indiscipline but after some time they realized and tried to overcome this situation themselves and followed a structured discussion. Silent gazing and rogerian listening were some other examples of activities which also focused on self discipline and self control. In these activities, students were not supposed to interfere during the explanation made by the members of other group. These activities developed a value of patient listening and ultimately self control. Ferrari and Sternberg (2002) found in their study that teaching through models was very effective in developing self awareness and self control in the students.

Freedom was found at sixteenth preference rank i.e. last preference at pre-test stage for the experimental group with psychologically low hardy students. It also showed an upward trend at post-test stage and rose to second preference rank after the instructional programme was over. This value was also favoured by high hardy students of experimental group. Activities performed in the instructional programme based on ATM need independent and congenial atmosphere in order to achieve desired outcomes. Principle of reaction of the model also focused on maintaining openness and freedom both with respect to his own acceptance of feelings and ideas from others and the other group member’s acceptance of feelings and ideas from their fellows. It is clearly mentioned in the social system also that in some activities investigator should not interfere at all and just watches
Analysis and Interpretation of Data

the students only. Some examples of such activities are No Chairperson activity, fishbowl activity, journal activity etc. Chang and Lee (2000) conducted a study on team teaching model and their results showed that Awareness Training Model was highly effective means of motivating students to learn independently which led to development of freedom as a good personal value. Hiroyuki (2010) in his study concluded that freedom as a personal value played a very important role in solving the mutual conflicts between parents and children. Japanese children were most likely to reject parental authority and interference which led to conflicts between them. Freedom and independent or relaxed atmosphere when given to these children by their parents showed a positive change in their behaviour which ultimately led to good relations between them.

**Concern for others** was also the most preferred personal value for psychologically low hardy students of experimental group at post-test stage. As discussed in above paragraphs concern for others in the form of mutual cooperation and understanding was the main concern of the model.

**Devotion to Duty** and **Emotional Balance** were given lesser importance at pre-test stage by the psychologically low hardy students of experimental group. After the treatment, these values gained a rapid upward trend and found in the top five preferences of values. Through project and summarizing activities, devotion to duty and responsibility was developed in the students. Emotional balance was needed in daily routine group discussions. Group activities require emotional stability in the participant to deal practically with the general problems like choice of group leader, listen carefully, control over emotions and understanding with the members of the group.

Personal values which were found at the bottom five preference ranks at post-test stage for the experimental group were **Cleanliness, Devotion to Duty, Obedience, Punctuality, Endurance, Self Help, Quest for Knowledge and Efficiency**. These values were not focused in the instructional model. The main focus of the model was to develop self and social awareness. It gives due importance to inculcation of interpersonal skills. It gives students the opportunity to enjoy full freedom with activity based learning. Assertive behaviour in the form of leadership quality was much imbibed in the students through the model.
Honesty and Concern for others were also developed with the help of activities of the model.

Control group showed very marginal change in the preferences of personal values. Most of the preferences remained at same place as at pre-test stage. Control group was not administered with the instructional programme. It followed the conventional group learning situation. Top five preferences of personal values for the control group with psychologically high hardy students at pre-test stage were **Efficiency, Emotional Balance, Self Help, Honesty and Obedience**. Out of these, four values remained at top five preference ranks at post-test level also. Only value Self Help dropped down in the middle slot of ranks. Only a slight change in rank orders was seen for the other four values. It may be due to chance factor, environment or time gap. Generally the same pattern was observed for bottom five preferences also for the students of control group.

Psychologically low hardy students of control group also showed very slight change in their preferences for personal values. The top five preferences of personal values which were found at pre-test stage were **Cleanliness, Honesty, Self Help, Emotional Balance and Punctuality**. Four values out of these were found in top five preferences at post-test stage also. It indicates that control group did not show inclination towards those personal values which were the stressed areas of the model and on which preferences and rank ordering changed for experimental group. A similar trend was witnessed for the bottom five values of the low hardy students of control group.

**Overview:**

An overview of these values suggests that a high fluctuation in the preference ranks of personal values for experimental group was observed because of treatment given to them. In control group marginal change in the preferences of values was seen. It may be due to chance factor, environmental factors or time gap. It confirms the superiority of Awareness Training Model towards personal values of secondary school children. It may be summarized that:
For Psychologically High Hardy Students of experimental group: (PHH/ATM):

✓ The values which seemed to be sensitive to experimental treatment were: (initially at bottom five ranks and attained top five ranks after the treatment):
  ▪ Leadership
  ▪ Concern for others
  ▪ Honesty
  ▪ Self Control

✓ The value which appeared to be sensitive to experimental treatment was: (initially at top five ranks and attained bottom five ranks after the treatment):
  ▪ Devotion to Duty

✓ The values which were found to be insensitive to experimental treatment: (remained at same preference rank at post-test stage):
  ▪ Freedom
  ▪ Endurance

For Psychologically Low Hardy Students of experimental group: (PLH/ATM):

✓ The values which appeared to be sensitive to experimental treatment were: (initially at bottom five ranks and attained top five ranks after the treatment):
  ▪ Self Control
  ▪ Freedom

✓ The value which seemed to be sensitive to experimental treatment was: (initially at top five ranks and attained bottom five ranks after the treatment):
  ▪ Punctuality

✓ The value which was found to be insensitive to experimental treatment (remained at same preference rank at post-test stage):
  ▪ Quest for Knowledge