CHAPTER IV

RESULT AND DISCUSSION
Verification of the Hypothesis

The results yielded by analysing the data collected in order to test the hypothesis are presented and discussed in this chapter.

The variables for the study were analysed using one way analysis of variance ‘t’ test and Scheffe’s procedure. The important variables are Detection of conceptual information through representational gestures, Identification of gestures and usage of representational and beat gestures using Gestures Check list.

The results are shown in Table 4.1, 4.2 and 4.3.

From the 3 tables each variables is taken separately and the results are discussed for the testing of the hypothesis.

ANOVA is employed to test for differences among the means of the groups under study by examining the amount of variation in each sample, relative to the amount of variation between within sample items. In this study ANOVA is used to find out if there is any significant difference among the three groups (Hearing Impaired Children, Normal children and adults) in gesture recognition, gesture identification and Gesture usage. The sum of squares, df, mean squares and F values are presented in table 4.1.
Summary of the ANOVA for the status group (Hearing Impaired Children, Normal Children and Adults) in relation to Gestures recognition test Gestures Identification test, Gestures Check List R and Gestures Check List B.

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
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</thead>
<tbody>
<tr>
<td>GRT</td>
<td>Between Groups</td>
<td>320.562963</td>
<td>2</td>
<td>160.2814815</td>
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<tr>
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<tr>
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<td>Total</td>
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<tr>
<td>GCL R</td>
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</table>

** Significant at 1% level
Table 4.2

$t$ - values for Gestures Recognition, Gestures Identification & Gestures Check List

<table>
<thead>
<tr>
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<th>Mean</th>
<th>SD</th>
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<th>Mean</th>
<th>SD</th>
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<th>$t$ - value</th>
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<td>GIT</td>
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<td>36.8</td>
<td>6.46975</td>
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<td>7.98533</td>
<td>178</td>
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<td>GCL R</td>
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Hearing Impaired Adults

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<th>Mean</th>
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<th>$t$ - value</th>
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<td>5.40921</td>
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<td>3.411152</td>
<td>90</td>
<td>37.5009</td>
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<table>
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Scheffe's test is used to find the critical difference between the two sample
Table 4.3

Scheffe's Test, Multiple Comparisons

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<th>Dependent Variables</th>
<th>(I) STATUS</th>
<th>(J) STATUS</th>
<th>Mean Difference (I - J)</th>
<th>Std. Error</th>
<th>sig.</th>
<th>95% Confidence interval</th>
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<tbody>
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<td>.010</td>
<td>.5198</td>
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<tr>
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<td>.845</td>
<td>.655</td>
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<tr>
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<td>.010</td>
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<td>.000</td>
<td>-8.2962</td>
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<td>Impaired</td>
<td>Adults</td>
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</tr>
<tr>
<td></td>
<td>Adults</td>
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<td>.000</td>
<td>-9.7740</td>
</tr>
<tr>
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<td>-1.4778</td>
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<td>-3.8295</td>
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<td>.000</td>
<td>17.4266</td>
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<td>.001</td>
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<td>.000</td>
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<td>.5489</td>
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<td>.001</td>
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<td>.434</td>
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<td>-2.7354</td>
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</table>
Detection of conceptual information through representational gestures.

Table 4.4

Summary of ANOVA for the three groups (Hearing impaired children, Normal Children and adults) in relation to Gesture Recognition test (Representational gestures).

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
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</thead>
<tbody>
<tr>
<td>GRT</td>
<td>Between Groups</td>
<td>2</td>
<td>160.2814815</td>
<td>4.987244313</td>
<td>0.007474 **</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>267</td>
<td>32.13828548</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Total</td>
<td>269</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The result shows that there is significant difference (Significant at 1% level) with respective different groups (Hearing impaired children normal hearing children and normal hearing adults) $F = 4.987$, ($P<0.01$). This suggests that different group is a determining factor in gesture recognition.

Table 4.5

$t$ - test values for Gestures Recognition Test (Representational Gestures)

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<th>Mean</th>
<th>SD</th>
<th>No</th>
<th>t - value</th>
<th>df</th>
<th>sig level</th>
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<td>GRT</td>
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<tr>
<td>Hearing Impaired</td>
<td>37.1667</td>
<td>5.83529</td>
<td>90</td>
<td>35.34444</td>
<td>5.75367</td>
<td>90</td>
<td>2.09776</td>
<td>178</td>
<td>0.03883 *</td>
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<tr>
<td>Hearing Impaired</td>
<td>37.1667</td>
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<td>34.56867</td>
<td>5.40921</td>
<td>90</td>
<td>3.0827</td>
<td>178</td>
<td>0 **</td>
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<td>Adults</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
For the hearing impaired group the mean score for Gesture recognition test is 37.1671 and the standard deviation is 5.835. In normal children group the mean score is 35.344. The t-value is 2.098, which is significant at 0.05 level. This suggests that regarding the variable Gesture recognition hearing impaired children are superior than Normal children.

The mean scores obtained when Hearing impaired children were compared with Normal Adults in Gesture recognition is 37.167 and 34.567. The t-value is 3.0827, which is significant at 0.01 level. The higher mean score obtained by the hearing impaired children shows that hearing impaired children are superior than Normal adults in the recognition of Gestures.

Hearing impaired children were also found superior in the recognition of gestures conveyed through representational gestures than Adults (t = 3.08, P < 0.01)

Hearing impaired children cannot rely on their auditory system like normal children and adults. For understanding and communicating they rely heavily on observation. Hence they may be sensitive to Gestures and facial expression for their effective adaptation and survival in the hearing world. Not much studies are done on this side.

When normal children were compared to normal adults in recognition of gestures no significant differences was found. In a study by Kelly, (1998) it was found that children and adults recalled information conveyed through representational gestures. In addition “mis matching” gesture negatively
affected the precision of speech for adults. However, this negative effect on speech recall was absent in children. This is opposed by a study by (Thompson, 1998). He found that gestures recognition was poorer in Normal children than adults.

Scheffe's test was done to find out the significant difference among the three groups in gesture recognition. The mean difference between Hearing impaired and Normal Hearing Children was 1.82 which is significant at 0.01 level. The mean difference between Hearing Impaired Children and Adults is 2.600 which is significant at 0.05%. The mean difference between Normal Hearing Children and Adults is 0.7778 which is not significant. By analyzing the three test results the first hypothesis, that there would be significant difference among the Hearing impaired children and Adults in the Detection of conceptual Information Conveyed through Representational Gestures.

Identification of Gestures

Table 4.6

Summary of ANOVA for Gestures Identification among three groups (Hearing Impaired Children, Normal Hearing Children and Normal Hearing Adult)

<table>
<thead>
<tr>
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<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
</tr>
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<tr>
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<td>2778.2888886</td>
<td>2</td>
<td>1389.144444</td>
<td>33.81923538</td>
</tr>
<tr>
<td>Within Groups</td>
<td>10967.17777</td>
<td>267</td>
<td>41.0755722</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>13745.46667</td>
<td>269</td>
<td></td>
<td>**</td>
</tr>
</tbody>
</table>
The table shows that there is significant difference among the three
groups in identifying gestures. The F value is 33.819 which is significant at
0.05 level. (P<0.05).

Table 4.7
\[ t \text{- values for Gestures Identification Test} \]

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<th>Mean</th>
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<th>No</th>
<th>Mean</th>
<th>SD</th>
<th>No</th>
<th>t - value</th>
<th>df</th>
<th>sig level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hearing Impaired Children</td>
<td>Normal Children</td>
<td>GIT</td>
<td>42.7444</td>
<td>2.68396</td>
<td>90</td>
<td>36.8</td>
<td>6.48975</td>
<td>90</td>
</tr>
<tr>
<td>Hearing Impaired</td>
<td>Adults</td>
<td>GIT</td>
<td>42.7444</td>
<td>2.68396</td>
<td>90</td>
<td>35.3222</td>
<td>6.596874</td>
<td>90</td>
</tr>
<tr>
<td>Normal Children</td>
<td>Adults</td>
<td>GIT</td>
<td>36.8</td>
<td>6.48975</td>
<td>90</td>
<td>35.3222</td>
<td>6.596874</td>
<td>90</td>
</tr>
</tbody>
</table>

In the table three comparisons are made. In the first comparison
between Hearing Impaired Children and Normal Hearing Children for
Gestures Identification Test is done. The mean value for Hearing Impaired
Children is 42.7. The mean value for Normal Hearing Children is 36.8 and
standard deviation is 6.489. The t value is 7.985 is significant at 0.05 level.
This shows that between hearing impaired children and normal children
there is a significant difference for Identification of Gesture. This suggests
that Hearing impaired children are superior than normal children in
identifying gestures. Secondly, a comparison is made between Hearing
Impaired Children and Normal Hearing Adult. The mean score is 42.744 in
Hearing Impaired Children. The t-value is 7.774, which is significant at 0.05
level. This shows that there is significant difference between Hearing
Impaired Children and Normal Hearing Adult in gesture identification and
the higher mean score obtained by the Hearing Impaired Children suggest that Hearing Impaired Children are superior to Normal Hearing Adult in the identification of gestures. The third comparison is made between normal children and adults. The mean score for Normal Hearing Children is 36.8. The mean score for Normal Hearing Adult is 35.322. The t-test value is 1.294, which is not significant at 0.05 level. This suggests that there is no significant difference between Normal Hearing Children and Normal Hearing Adults in the identification of gestures.

Scheffe's test was done to compare the critical values. The mean difference between Hearing impaired children and normal children is 5.94 which is significant 0.05 level. The mean difference for hearing impaired children and normal hearing adults is 7.42 which significant at 0.05 level. The mean difference between Normal Hearing Children and Normal Hearing Adult is 1.47 which is not statistically significant. This confirms the above results.

Hearing impaired children may be sensitive in identifying gestures because that is the only way by which they can understand others communication. When normal children and adults were compared no significant difference was found. The result supports the second hypothesis that there is significant relationship among hearing impaired children normal children and adults in identifying gestures.
Gestures checklist

Gestures checklist was used to find out whether there is any significant relationship among hearing impaired children and adults in the usage of gestures. Gestures checklist had two parts Gestures Check List R (Gestures Check List (Representational Gestures)) and Gestures Check List B (Beat Gestures).

Table 4.8

Summary of ANOVA for gestures check list (R) and gestures check list (B) among three groups (Hearing Impaired Children, Normal Hearing Children, Normal Hearing Adult).

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>GCL R</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>22493.56296</td>
<td>2</td>
<td>11246.78148</td>
<td>1314.411827</td>
</tr>
<tr>
<td>Within Groups</td>
<td>2284.588689</td>
<td>267</td>
<td>8.556512692</td>
<td>0 **</td>
</tr>
<tr>
<td>Total</td>
<td>24778.15185</td>
<td>269</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GCL B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>22603.25185</td>
<td>2</td>
<td>11301.62593</td>
<td>1332.218504</td>
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<tr>
<td>Within Groups</td>
<td>2265.044444</td>
<td>267</td>
<td>8.483312526</td>
<td>0 **</td>
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<tr>
<td>Total</td>
<td>24868.2963</td>
<td>269</td>
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</table>

The results are shown in tables 4.8 and 4.9. The results show that there are significant differences ($F = 1314.41$ for Gestures Check List R and for Gestures Check List B, $F=1332.22$, both are significant at 1% level) in the gestures used by hearing impaired children and adults.
The table shows that there is significant difference among the three groups in Gestures Check List (R). The F value 1314.41 which is 0.01 significant. The table also shows that there is significant difference among the three groups in Gestures Check List (B). The F value is 1332.218 which is significant at 0.01 level.

Table 4.9

t – Test Values for Gestures Check List

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<th>SD</th>
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<th>Mean</th>
<th>SD</th>
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<tr>
<td>GCL R</td>
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<td>3.16601</td>
<td>90</td>
<td>4.11111</td>
<td>2.002495</td>
<td>90</td>
<td>50.6742</td>
<td>178</td>
<td>0 **</td>
</tr>
<tr>
<td>GCL B</td>
<td>5.8</td>
<td>3.16654</td>
<td>90</td>
<td>25.96889</td>
<td>1.940082</td>
<td>90</td>
<td>51.2875</td>
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</tr>
<tr>
<td>Hearing Impaired</td>
<td>Adults</td>
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<td></td>
</tr>
<tr>
<td>GCL R</td>
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<td>3.16601</td>
<td>90</td>
<td>5.733333</td>
<td>3.411152</td>
<td>90</td>
<td>37.5009</td>
<td>178</td>
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</tr>
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<td>GCL B</td>
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<td>3.16654</td>
<td>90</td>
<td>24.32222</td>
<td>3.414535</td>
<td>90</td>
<td>37.5231</td>
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</tr>
<tr>
<td>Normal</td>
<td>Adults</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>GCL R</td>
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<td>2.0025</td>
<td>90</td>
<td>5.733333</td>
<td>3.411152</td>
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<td>3.86905</td>
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<td>GCL B</td>
<td>25.9889</td>
<td>1.94008</td>
<td>90</td>
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<td>3.414535</td>
<td>90</td>
<td>4.00368</td>
<td>178</td>
<td>0 **</td>
</tr>
</tbody>
</table>

Table 4.9 shows that t-values for gestures check list (R) and gestures check list (B). Hearing Impaired Children is compared with Normal Hearing Children in Gestures Check List (R) score. The mean for Hearing Impaired Children is 24.233 and Normal Hearing Children in Gestures Check List (R) is 4.111. The t-value is 50.67, which is significant at 0.01 level. This shows that there is significant difference between Hearing Impaired Children and Normal Hearing Children in Gestures Check List (R). The higher mean scores are obtained by the hearing impaired children. This suggests that Hearing Impaired Children uses
more representational gestures than Normal Hearing Children. Scheffe's test is done to find the mean difference Hearing Impaired Children and Normal Hearing Children in Gestures Check List (R) is 5.945 which is significant at 0.05%

The mean score for Gestures Check List in Hearing Impaired Children group and Normal Hearing Children group was taken. The t-value between Hearing Impaired Children and Normal Hearing Children group was taken. For Hearing Impaired Children the mean score is 5.8 and for Normal Hearing Adult the mean score is 25.988. The t-value between Hearing Impaired Children and Normal Hearing Children group in Gestures Check List (B) is 51.28 which is significant at 0.01 level. This shows that there is significant difference in the usage of Beat gestures between Hearing Impaired Children group and Normal Hearing Children group. This suggests that Hearing Impaired Children uses Beat gestures lesser than Normal Hearing Children. The mean difference in scheffe's test between Hearing Impaired Children and Normal Hearing Children is 20.12 which is 0.05% significant.

Hearing Impaired Children group was compared with Normal Hearing Adult group in Gestures Check List (R). The mean value for Hearing Impaired Children group is 24.23. For the Normal Hearing Adult group the mean value is 5.73. The t-value is 37.50 which is significant at 0.01 level. This shows that there is significant difference among Hearing Impaired Children and Normal Hearing Children is gesture recognition and suggests
that Hearing Impaired Children uses more representational gestures than Normal Hearing Adult group. The mean difference in the scheffe’s test is 18.50 which is significant at 0.05% level. This confirms the above results.

Normal Hearing Children was compared to Normal Hearing Adult in Gestures Check List (R) the mean value for Normal Hearing Children is 4.11 and for Normal Hearing Adult is 5.73. The t-value is 3.869 which is significant at 0.01 level. The mean score of the Normal Hearing Adult is higher than the mean square of Normal Hearing Children. This shows that there is significant difference between Normal Hearing Children and Normal Hearing Adults in usage of gestures. This suggests that Normal Hearing Children uses representational gestures lesser than Normal Hearing Adult. In scheffe’s test the mean difference is 1.622 which is significant at 0.001 level.

Hearing Impaired Children group and Normal Hearing Adult group was compared in Gestures Check List (B) the mean found to be 5.8 for Hearing Impaired Children group and for Normal Hearing Adult it was 24.32. The t-value is 37.5231 which is significant at 0.01 level. This shows that there is significant difference between Hearing Impaired Children an Normal Hearing Adults in Gestures Check List(B). The scheffe’s test result shows the mean difference of 1.667 which is significant at 0.01 level. This confirms the above results. Normal Hearing Children and Normal Hearing Adult was compared in Gestures Check List(B) scores. The mean for Normal Hearing Children is 25.98. The mean for Normal Hearing Adult in Gestures Check List (B) is 24.32.
The t-value is 4.00 which is significant at 0.01 level. This shows that there is significant difference between the usage of gestures (Beat in Normal Hearing Children and Normal Hearing Adult group). This suggests that Normal Hearing Children uses lesser Beat gesture than Normal Hearing Adults. The scheffe's test scores shows that mean difference of 1.66 which is significant at 0.01. This confirms the above results.

A close examination of the mean values shows that in hearing impaired children the mean scores are lesser in Gestures Check List B and higher in Gestures Check List R in the three comparisons. This shows that hearing impaired children uses more representational gestures than beat gestures. But in normal children and adults this is just the reverse i.e. normal children and Adults uses beat gestures commonly.

Beat gestures are used as a supplement in oral communication. Representational gestures were meant for specific purposes i.e. to specify object things etc. They are more symbolic. In almost all hearing impaired children oral communication is very difficult. This may be the reason why hearing impaired children uses representational gestures more than beat gestures. Scheffe's test also supports the hypothesis. This results support the third hypothesis that there would be significant difference in the gestures used by hearing impaired children, normal children and adults in the gestures used. Thus the third hypothesis can be accepted.