A Study On The Influence Of Non-Verbal Reasoning Ability In Relation To Academic Achievement Of Eighth Standard School Pupils

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Abstract
The present study targets upon the assessment of Eighth standard level pupils in extend to their ability towards Non-Verbal Reasoning Ability. 600 students from Coimbatore district participated in this study. The data were collected on the basis of ‘Cognitive Ability Test Battery’. The results showed that most of the students had positive ability towards Non-Verbal Reasoning Ability. There is significant difference in the Non-Verbal Reasoning Ability of the students on Gender, Locality, Medium of Instruction and Type of School.

Keywords: Non-Verbal Reasoning Ability, Eighth Standard Pupils

Introduction
The Non-verbal communication is an indispensable compliment of oral and written communication. Communication takes place in many non-verbal ways. The Non-verbal reasoning test aids to identify student’s reasoning abilities through the use of spatial and figural content. The test is useful for assessing the development of students who have trouble with reading, limited capability in language, or who have limited opportunities. The subtests use geometric shapes and figures which have unlikely been seen by the students in their formal schooling. There is no reading required among the questions in the Nonverbal test. These three subtests are: Figure Matrices, Paper Folding, and Figure Classification. Best predictor of how fast the students learn. These three subtests combined make up the Nonverbal score.

Verbal reasoning and quantitative reasoning together are related to academic ability. The items in the non-verbal battery use neither words nor numbers and have little relationship with the formal school curriculum and it is claimed that this battery provides a measure of fluid intelligence. The non-verbal battery consists of, figure classification, figure analogies and figure synthesis.

• In the classification items, the student has to select a figure belonging to the same set as three others. Shading, closure, intersections, linearity and many other properties can classify the figures.
• In the figure analogies items, a figure and its image are given. The image corresponding to a new object is required.
• In the figure synthesis items several "component" shapes are shown and the student is required to specify which of a selection of shapes can be formed by from these components.

Review of related literature.
Sambo (2015) examined the students’ performance in Non-verbal Intelligence tests relative to academic achievement of some selected secondary school students. Balboni, .Naglieri and Cubelli(2014) did the concurrent and predictive validities of the Naglieri Nonverbal Ability Test (NNAT) and Raven’s Colored Progressive Matrices (CPM) and found that both the scores were related to math and reading comprehension tests and were moderate, and there were no differences between concurrent and predictive validities with reading scores. Giessman et al. 2013 suggested that gifted programs should not assume that using a figural screening test such as the NNAT2, without other adjustments to selection protocol, will address minority under representation. Flouri et al.
(2011)suggested that interventions carried out to enhance children’s emotion regulation skills in the presence of multiple adversity might be more effective if they target children who score low on non-verbal cognitive ability. Lohman (2005) discussed the role of non-verbal ability tests in the identification of academically gifted children and noted that most non-verbal tests measure verbally mediated cognitive processes, that they are neither “culture free” nor “culture fair”. The most academically talented minority students are those who show the strongest current achievement in particular domains and the best ability to reason in the symbol systems required for the acquisition of new knowledge in those domains.

Purpose of the Study

The purpose of this study was to assess the Non-Verbal Ability of secondary school pupils in relation to Gender, Locality, Medium of Instruction and Type of School and Parental Educational Qualification and Occupation.

Objectives of the Study

The study has the following objective
1. To study the Pupils Ability towards Non-Verbal Reasoning.
2. To study the influence of Non-Verbal Ability Scores based on Gender, Locality, Medium of Instruction.
3. To study the influence of Non-Verbal Ability Scores Type of School on Academic Variables.

Hypotheses

1. The pupils do not have positive ability towards Non-Verbal Reasoning Ability.
2. To examine if there is any significant difference in the total Non-Verbal Ability Scores of eighth standard students based on the like gender, locality and Medium of Instruction.
3. To examine if there is any significant difference between Non-Verbal Ability Scores and the Type of School.

Methodology

Sample
Six Hundred eighth standard school students from three Government, three Government Aided and Three Self-financing (private) schools in and around Coimbatore district participated in this study. The samples were selected by stratified random sampling method.

Tool

The investigator collected the Non-Verbal Ability data. To validate, the scale was reviewed by two experts in the field of teacher education. This initial scale comprised of 70 items which was reduced to 55 items for the final scale. The Non-Verbal battery consisted of 55 items comprising of Figure Classification (19), Figure Analogies (18) and Paper Folding (18). The correct items were scored as 1 and the wrong ones as 0. The overall score yields the students Non-Verbal Ability Scores.

Procedure

The research instrument was administered to the students. The data were collected personally by the investigator. The purpose of the research and instructions were made clear to the students.

Results

The resulting data were analysed using the test of significance. The results have been explained under the below mentioned headings.
Analysis Student’s Ability towards Non-Verbal Reasoning Ability

To determine the student’s ability towards Non-Verbal reasoning, responses of students on Non-Verbal Battery were tabulated and analysed. The statistical constants, arithmetic mean, median, mode, standard deviation, skewness and kurtosis have been summarised in table 1.

### TABLE 1.
Analysis’s of Pupils Ability towards Non-Verbal Reasoning

<table>
<thead>
<tr>
<th>Non-Verbal ability Domains</th>
<th>Mean</th>
<th>Median</th>
<th>Mode</th>
<th>Variance</th>
<th>SD</th>
<th>Range</th>
<th>Interquartile range</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure Matrices</td>
<td>11.57</td>
<td>12.00</td>
<td>12.00</td>
<td>9.77</td>
<td>3.13</td>
<td>12.00</td>
<td>1.00</td>
<td>0.05</td>
<td>0.29</td>
</tr>
<tr>
<td>Paper Folding</td>
<td>9.79</td>
<td>11.00</td>
<td>12.00</td>
<td>10.11</td>
<td>3.18</td>
<td>14.00</td>
<td>6.00</td>
<td>0.27</td>
<td>0.45</td>
</tr>
<tr>
<td>Figure Classification</td>
<td>8.19</td>
<td>7.00</td>
<td>7.00</td>
<td>10.97</td>
<td>3.31</td>
<td>19.00</td>
<td>3.00</td>
<td>0.09</td>
<td>0.79</td>
</tr>
</tbody>
</table>

Results as presented in Table 1 reveal that the Non-Verbal Ability were found to be positive towards Non-Verbal Reasoning Ability. Hence, the research hypothesis no. 1 is rejected.

### Table 2
Non-Verbal Ability SAS Scores in relation to Gender, Locality and Medium of instruction

In order to find out if there is any difference gender, locality and Medium of instruction on the Non-Verbal Ability SAS Scores, the data were analysed using the test of significance, the results of which are presented in Table 2.

Analysis of Non-Verbal Ability SAS Scores in relation to Gender, Locality and Medium of instruction

<table>
<thead>
<tr>
<th>Variables</th>
<th>Dimensions</th>
<th>Mean</th>
<th>S.D</th>
<th>N</th>
<th>‘t’ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Boys</td>
<td>90.17</td>
<td>8.86</td>
<td>300</td>
<td>6.48**</td>
</tr>
<tr>
<td></td>
<td>Girls</td>
<td>94.29</td>
<td>6.54</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>92.23</td>
<td>8.05</td>
<td>600</td>
<td></td>
</tr>
<tr>
<td>Locality</td>
<td>Rural</td>
<td>90.17</td>
<td>7.07</td>
<td>400</td>
<td>9.52**</td>
</tr>
<tr>
<td></td>
<td>Urban</td>
<td>96.36</td>
<td>8.33</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>92.23</td>
<td>8.05</td>
<td>600</td>
<td></td>
</tr>
<tr>
<td>Medium instruction of</td>
<td>Tamil</td>
<td>89.81</td>
<td>7.89</td>
<td>300</td>
<td>7.73**</td>
</tr>
<tr>
<td></td>
<td>English</td>
<td>94.66</td>
<td>7.47</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>92.23</td>
<td>8.05</td>
<td>600</td>
<td></td>
</tr>
</tbody>
</table>

** significant difference at 1% level

Results in Table 2 reveal that the calculated ‘t’ value is greater than table value at 1% level. This might indicate that the boys and girls, pupils from Rural and Urban and the Tamil medium and English medium pupils differ significantly in their Non-Verbal reasoning Ability. In the light of the present finding, the research hypothesis no. 2 has been rejected.
Table 3
Analysis of Non-Verbal Ability SAS Scores in relation to Type of School

In order to find out if there is any difference in Type of School on the Non-Verbal Ability SAS Scores, the data were analysed using the ANOVA, the results of which are presented in Table 3.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Source of variation</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of school</td>
<td>Between Groups</td>
<td>5285.863</td>
<td>2</td>
<td>2642.932</td>
<td>47.039**</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>33542.935</td>
<td>597</td>
<td>56.186</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>38828.798</td>
<td>599</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** significant at 1% level.

Since the calculated value is greater than the table value, it is inferred that the Non-Verbal Ability SAS scores differ significantly among the three types of Schools. In the light of the present finding, the research hypothesis no.3 has been rejected.

Discussion
Overall, the students showed positive ability towards Non-Verbal Reasoning Ability SAS scores. This study found significant differences in the Gender, Locality, Medium of Instruction and Type of School.

Conclusion
This study set out to assess the Non-Verbal Ability of eighth standard students in Coimbatore City. The results of the investigation showed that a significant positive ability exists upon the Non-verbal Reasoning Ability. Reasoning tests make excellent baseline assessments for the eighth standard pupils. In order to enhance academic achievement of the students, efforts should be made to facilitate Non-verbal Reasoning Ability of the students.

References