CHAPTER VII

RELIABILITY AND VALIDITY

As mentioned in the preceding chapter, the standardized test must be a reliable and valid test, (if it is to be used by others). A test is reliable if it is consistent or stable or shows same results when it is administered repeatedly. And a test is valid if it measures what it is meant to measure. This chapter discusses both these characteristics of the test.

Reliability

The term reliability refers to the accuracy or precision of a set of measurement or, from reverse point of view the variation within the set of repeated measurements of a single individual. It also implies that individual stays in about the same place in his group. Not only that the correlation of coefficient provides us with a statistical index of the extent to which two things together, high with high and low with low. Lindquist (85) defines reliability thus:

> Reliability concerns the accuracy and consistency with which it measures whatever it does measure in the group with which.... ..... it is used. Again Thorndike and Hegan

(---------) define it as "The accuracy or precision with which a measure based on one sample of test tasks at one point in time represents performance based on a different sample of the same kind of tasks or a different point of time or both. Accuracy may be expressed by a reliability coefficient or by the standard error of measurement.

why only Correlation?

There are three methods by which the reliability is measured, viz.:

1. Test-Retest Method
2. Split-half Method
3. Parallel Form Method or Equivalent Form Method

(1) Test-Retest Method

This method refers to comparative performances on the same test by same subject administered the test at different intervals. Several objections are raised for this method of computing reliability. They are, particularly, with regard to memory effects, practice effect and the confidence induced by familiarity with material, when test is taken in a short time interval - say about couple of days or couple of weeks. It is also objected on the ground that growth effect will increase the score if the time interval is rather long - say six months or more. But as Garrett (51, p. 338) has put,

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Robert L.Thorndike and Elizabeth P.Hegan, Measurement and Evaluation in Psychology and Education, New Delhi: Willey Eastern Private Ltd., p. 654.

> Given sufficient time interval between first and second administration of a test to off set memory, practice and other carry over effects the retest coefficient becomes a close estimate of stability of test scores. In fact, the test is given and repeated, the reliability coefficient is primarily a stability coefficient.

For predictive value and for internal consistency test-retest method is preferred by many psychologists. In the present study, the retesting was done within one and a half month to five and a half months. The correlation coefficient is found to be 0.80. This can be considered as high coefficient of correlation and implies the test to be a reliable test.

(2) Split-half Method

As Lindquist (85, p. 579) has put, "in the interest of the economy it becomes desirable to set up procedures for extracting an estimate of reliability from a single administration of a single test." Also Garrett (51, p. 340) puts forth another argument. He writes, "the split-half method is employed when it is not feasible to construct parallel forms of the test." The present test consists of two parallel parts. Hence using split-half with each part is not considered to be very essential. Though, it is considered by many as the best method for measuring test reliability, objections are raised with regard to the uniqueness of value, since when various

methods are employed, its value changes.

(3) Parallel Form Method

The preparation and administration of two equivalent test forms, though quite satisfactory as a procedure for estimating reliability, presents certain practical difficulties. They are mainly the problems of time and labour involved in both construction and administration of two complete forms. From the point of view of Garrett

> For well made standard tests, the parallel form method is usually the most satisfactory way of determining reliability. If possible, an interval of at least two or four weeks should be allowed between administration of the test.

To have a satisfactory measure, to avoid possible effects of specific practice and recall, and to have a useful instrument for follow up studies and to find effects of some intervening experimental factors upon test performance, parallel forms seemed to be more useful. Hence, two forms were devised for the test. The coefficient of correlation between the two forms of this test is found to be 0.80.

Validity of the Test

An index of validity shows a degree to which a test measures what it purports to measure. It indicates how well the test serves the purpose for which it is

used. Fundamentally, all procedures for determining test validity are concerned with the relationships between performance on the test and other independently observable facts about the behaviour characteristic under consideration.

Anastasi[1] describes four types of validation procedures, viz.,

1. Content Validity
2. Predictive Validity
3. Concurrent Validity
4. Construct Validity

1. Content Validity

Anastasi has observed that the content validity involves essentially the systematic examination of the test content to determine whether it covers a representative sample of the behaviour domain to be measured. That is, a search for the tasks, skills or abilities supposed to be involved in the listening-comprehension itself leads to validation process. Thus, it can be said that content validity is mainly a matter, dependent upon the qualities of the test matter; his knowledge about the traits he wants to identify, the amount of literature and tests

1. Anastasi, Anne, Psychological Testing. New York: The Macmillan Company, 2nd edition, 1961,(Ch. 6).

available to him at the time of making the test and the skill with which he synthesizes these in his tests.

In the present study, as it has already been pointed out earlier, the available literature on listening comprehension, viz., articles, tests, books, encyclopedias and measurement yearbooks have been carefully read and analysed; and components mentioned therein have been noted in detail. All of them are noted at the end of the second chapter (in the section of behavioural specifications). It is not possible to measure all the behaviours involved in listening comprehension at a time. So some of them which were suitable to eighth standard have been chosen; and the tests were constructed to fulfil the objectives.

first explain face validity

Many times content validity is confused with 'face validity'. The face validity is not validity in the technical sense; it refers, not to what the test actually measures, but to what it appears superficially to measure. Anastasi remarks that the common usage of the term "validity" in this connection may make for confusion, yet face validity itself is a desirable feature of tests. It is concerned with rapport and public relations. It is obvious from the foregoing discussion that, if the test content appears irrelevant in appropriate, silly or childish to the subjects who take it or the users of the test, the result will be poor co-operation, regardless of the actual validity of the test. The test also needs face validity to

function effectively in practical situations.

In the present study, while administering the test, theresearcher got full co-operation from the administrators concerned. The subjects took the test with utmost interest. The administrators and the subjects tried to know about various aspects of the tests - and its administration with utmost curiosity. This suffices to establish the face validity of the present test. Yet it is an apparent validity and not 'true' validity. For true validity the test remains to be directly checked and so other types of validation procedures are also used.

(2) Predictive Validity

From the point of view of Anastasi[1] predictive validity indicates the effectiveness of a test in predicting some future outcome. For this purpose, test scores are checked against a direct measure of the subjects' subsequent performance (the criterion). This type of validity information is most relevant for tests used in the selection and classification of personnel.

In this type of validation procedure, a representative sample of the population under consideration is given the test. After having the data of subjects' subsequent performance, the agreement between the two is seen. On

1 Ibid., p. 138.

that basis the predictions are made.

It is obvious that, this test is not going to be used for selection and classification of pupils for various purposes. So this type of validation procedure is not employed.

(3) Concurrent Validity

Anastasi[1] defines concurrent validity as "the relation between test scores and indices of criterion status obtained at approximately the same time is known as concurrent validity. It is frequently impracticable to extend validation procedures over the time required for predictive validity."

In the present study, to establish this type of validity the scores of this test (Form A) were correlated with the achievement scores in Gujarati achieved by the 751 subjects at annual examination of seventh standard. The correlation is found to be 0.40 which is positive and significant.

Many times ratings are used by teacher and instructors in specialized courses to establish this type of validity. Here this criterion is not employed as pupils do not have any special course of listening comprehension

1. ibid., p. 141.

or special activity is not given regularly in most of the schools. Though, pupils listen to teachers, and teachers may have rough idea of "listening" ability of pupils, they are never evaluated from this point of view. So any rating by teachers would have been a rating of how far pupils pay attention in the class which would not cover all aspects of listening comprehension. Again, teachers have no clear idea of the process of listening comprehension (which the researcher has taken into account) and so ambiguity may affect reliability of rating. In view of this, the validity of this test by the method of correlating this performance with teachers' rating is not attempted.

(4) Construct Validity

Quoting Anastasi[1] again, "The construct validity of a test is the extent to which the test may be said to measure a "theoretical construct" or trait. Examples of such constructs are intelligence, mechanical comprehension, verbal fluency, speed of walking; neuroticism and anxiety." The term "construct" has been elaborately explained by Thorndike and Hegan.[2] They note:

> The term construct is used in psychology to refer to something that is not observable, but is literally "constructed" by the

1. ibid., p.145.
2. Robert L. Thorndike and Elizabeth P.Hegan, "Measurement and Evaluation in Psychology and Education," Willey Eastern Private Ltd., 1970, p.174, footnote.

> investigator to summarize or account for the regularities or relationships that he observes in behaviour. Thus most names of traits refer to constructs. We speak of person's "sociability" as a way of summarizing observed consistency in his past behaviour and of organizing a prediction of how he will act on future occassions.

Thus, construct validity can be regarded as the "touch stone of scientific success".

The construct validation procedure requires the gradual accumulation of information from a variety of sources. The techniques utilized for this validity in this test are described one by one.

(i) Internal Consistency

The essential characteristic of internal consistency, from the point of view of Anastasi is that, the criterion is none other than the total score on the test itself. Internal consistency is of two types: (1) based on items and (2) based on subtests. To establish first type of validity adaption of constructed group method is used, extreme group being selected on the basis of the total test score. The performance of the two groups are compared for each item and only significant items are selected. Often, correlational procedures are also employed for this purpose. Where, biserial correlation betweem "pass-fail" on each item is computed. Both these procedures have been employed in present study. Items with high correlational

values are only selected.

Another application of the criterion of internal consistency involves the correlation of each subtest scores with total score. The Table No. 9 shows the correlation between the scores of subtests and the scores of the main tests.

TABLE 9

Correlation Between Total Test Scores and 34 Sub-tests Scores (decimals omitted)

Form A

Sub-test No.	Name of the test	Correlation r = Total Test Scores
1	General Significance	413
2	Story	599
3	Poetry	450
4	General Talk	581
5	Note Details	552
6	Anecdote	651
7	Inference	381
8	Boys' Talk	572
9	Accuracy of Ideas	462
10	Idioms	477
11	Proverbs	492
12	Synonyms	504
13	Antonyms	439

Sub-test No.	Name of the Test	Correlation r = Total Test Scores
14	Triplet Nos.	405
15	Letter List	369
16	Five digits	558
17	Phonetic Variations	217
Form B		
Sub-test	Name of the test	Correlation r =
18	Sentence Repetition	408
19	Consequences	596
20	Sentence Completion I	576
21	Sentence Completion II	474
22	Words Recall	610
23	Number Recall	559
24	Letter Span	428
25	Delayed Spelling	454
26	Singing	390
27	Illogical Spellings	492
28	Haphazard Speech	465
29	Nonsense Letter Grouping	436
30	Meaningful Letter Grouping	519
31	General Reasoning	268
32	Correcting Order	485
33	Matching Words	531
34	Arithmetical Reasoning	412

It will be seen from the Table 9 that the correlations range from 0.27 (Test No. 31) to 0.65 (Test No. 6). All the correlations are significant at .01 level. Thus, the test can be considered as a valid test.

(ii) Factor Analysis

Factor analysis is one of the method used to validate the test. It is a statistical procedure for the identification of psychological traits. A major purpose of factor analysis is to simplify the description of behaviour by reducing the number of categories from an initial multiplicity of test variables to a few common factors or traits. After factors have been identified they can be utilized in describing the factoral composition of a test. That is, in this test, it will not only give a theoretical understanding of the complex process, as listening comprehension has been thought to be, but also to learn what might be an implication for the design and construction of material tests. Again simple enumeration of components do not give sufficient picture of the process. However, they do not operate in isolation. Their interrelationship established by method of factor analysis would give a better picture of listening comprehension process, internal consistency of components and the validity of the test. With this point in view the performances of subjects on main six subtests in both forms were subjected to

statistical procedure called factor analysis.

The data was analysed with the help of a computer at PRL, Ahmedabad. The correlation coefficient matrix for all the 34 subtests and six main tests are given below. The table Nos. 10 and 11 show correlations between 34 subtests for forms A and B. These 34 subtests have been grouped into 6 groups of 6 main tests. Table No. 12 shows the correlations between these six main tests, which may be called the components of listening comprehension. The tables No. 10 and 11 show that all the correlations are positive and significant at .01 level. The moderate and low correlations between these tests show that though they have something in common each of them is not identical with another and at the same time measure which other tests do not measure. Thus, all the tests can be considered to be contributing to the listening comprehension which again supports the assumption that listening comprehension is a complex ability.

The high correlations found between six main tests (Table 12) (componental factor) also validates the assumption of test factors the test as described above.

Initially the data was fed to the computer for the purpose of extracting maximum number of factors. The Table Nos. 13 and 14 show the loadings of 34 subtests

TABLE 12

Correlation Matrix of Six Main Subtests

Form A						Form B					
	1	2	3	4	5	6	1	2	3	4	5	6
1		.611	.471	.599	.494	.595		.577	.483	.619	.470	.576
2			.434	.462	.354	.497			.454	.462	.347	.474
3				.479	.300	.476				.491	.315	.493
4					.546	.539					.551	.553
5						.419						.421
6						-						-

TABLE 10

Correlation Matrix (Upper Half) of 34 Subtests

Form A

Sr. No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1		.239	.173	.161	.204	.213	.214	.184	.110	.152	.178	.190	.174	.062	.116	.160	.117	.119	.170	.152	.098
2			.369	.382	.343	.450	.298	.396	.236	.335	.312	.326	.329	.179	.164	.332	.145	.231	.292	.265	.21
3				.383	.314	.425	.234	.332	.175	.248	.245	.314	.271	.178	.155	.271	.009	.224	.267	.261	.21
4					.362	.398	.263	.395	.176	.250	.239	.291	.266	.188	.183	.244	.099	.247	.239	.231	.27
5						.459	.313	.375	.184	.257	.224	.289	.227	.155	.140	.235	.099	.295	.271	.322	.20
6							.388	.452	.283	.342	.319	.348	.298	.208	.193	.361	.112	.361	.350	.357	.
7								.312	.156	.193	.188	.214	.165	.177	.135	.221	.041	.298	.223	.208	
8									.209	.307	.282	.334	.253	.210	.181	.274	.140	.285	.270	.272	
9										.190	.193	.161	.184	.126	.159	.267	.131	.185	.239	.192	.16
10											.344	.271	.229	.194	.174	.274	.127	.191	.241	.252	.21
11												.277	.262	.170	.176	.263	.097	.190	.230	.241	.24
12													.320	.204	.129	.224	.223	.213	.291	.260	.22
13														.154	.176	.237	.150	.128	.201	.214	.18
14															.182	.209	.114	.163	.207	.188	.18
15																.211	.133	.118	.209	.182	.16
16																	.161	.240	.319	.265	.28
17																		.105	.171	.119	.05
18																			.318	.341	.24
19																				.302	.25
20																					.32
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2	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
30	.174	.062	.116	.160	.117	.119	.170	.152	.099	.183	.162	.658	.082	.168	.130	.056	.135	.141	.092	.098	.159	.090
26	.329	.179	.164	.332	.145	.231	.292	.265	.211	.301	.285	.147	.168	.244	.240	.188	.255	.223	.235	.194	.300	.245
14	.271	.178	.155	.271	.009	.224	.267	.261	.215	.267	.251	.240	.236	.246	.229	.174	.280	.218	.253	.152	.264	.214
91	.266	.188	.182	.244	.099	.247	.239	.231	.276	.262	.281	.126	.225	.195	.229	.135	.243	.221	.235	.156	.294	.251
59	.227	.155	.140	.235	.099	.295	.271	.322	.209	.327	.294	.156	.225	.221	.259	.206	.293	.230	.269	.140	.283	.213
48	.298	.208	.[illegible]	.361	.142	.321	.350	.367	.270	.380	.323	.142	.244	.282	.297	.230	.320	.326	.308	.205	.339	.282
14	.165	.177	.135	.221	.041	.298	.223	.308	.180	.303	.264	.115	.221	.199	.261	.162	.282	.256	.230	.141	.258	.210
84	.253	.210	.181	.274	.140	.255	.270	.272	.252	.321	.390	.123	.224	.146	.239	.082	.202	.275	.268	.209	.242	.297
61	.184	.126	.139	.267	.1 1	.155	.239	.192	.162	.217	.195	.094	.124	.112	.145	.103	.166	.154	.226	.153	.185	.182
71	.229	.194	.174	.274	.[illegible]7	.191	.241	.252	.218	.215	.230	.147	.191	.181	.168	.088	.170	.194	.260	.186	.247	.215
77	.262	.170	.176	.263	.097	.190	.230	.241	.244	.223	.191	.131	.163	.217	.165	.109	.212	.239	.239	.161	.261	.279
	.320	.204	.129	.224	.223	.213	.291	.260	.224	.253	.235	.191	.227	.196	.162	.065	.196	.170	.235	.129	.244	.226
		.154	.176	.237	.150	.128	.201	.214	.181	.184	.185	.098	.113	.217	.141	.111	.172	.154	.186	.150	.225	.194
			.182	.209	.114	.163	.207	.188	.181	.194	.174	.108	.165	.092	.123	.056	.127	.144	.224	.132	.218	.154
				.211	.133	.118	.209	.183	.166	.212	.201	.112	.097	.123	.135	.021	.115	.169	.203	.102	.199	.174
					.161	.240	.319	.265	.280	.323	.335	.134	.184	.196	.188	.160	.223	.236	.259	.162	.271	.259
						.105	.171	.119	.058	.167	.147	.070	.093	.087	.122	.047	.079	.105	.153	.115	.156	.075
							.318	.341	.241	.314	.285	.307	.337	.253	.241	.266	.346	.242	.270	.104	.240	.143
								.302	.257	.447	.352	.214	.275	.207	.312	.162	.282	.252	.309	.154	.263	.236
									.321	.310	.288	.217	.267	.230	.279	.166	.270	.235	.283	.105	.238	.227
										.239	.282	.209	.231	.175	.163	.087	.194	.181	.217	.137	.235	.210
											.518	.265	.297	.218	.305	.164	.266	.238	.297	.183	.302	.215
												.314	.291	.213	.266	.171	.243	.217	.276	.143	.282	.217
													.348	.207	.285	.115	.185	.128	.214	.067	.170	.161
														.214	.321	.136	.285	.222	.266	.104	.214	.148
															.355	.304	.350	.269	.198	.115	.220	.071
																.376	.439	.256	.276	.088	.209	.132
																	.368	.209	.167	.025	.167	.042
																		.310	.209	.068	.214	.104
																			.344	.118	.236	.159
																				.186	.279	.027
																					.205	.207
																						.218

TABLE 11

Correlation Matrix (Upper half)
of 34 Subtests

Form B

Sr. No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1		.314	.237	.262	.225	.510	.161	.245	.189	.192	212	.249	.175	.098	.131	.197	.064	-117	.244	.224	.19
2			.329	.377	.303	.419	.224	.343	.320	.275	.302	.339	.287	.245	.167	.344	.073	-146	.297	.358	.262
3				.309	.221	.324	.160	.285	.197	.193	.176	.205	.172	.111	.101	.192	.069	-161	.252	.228	.141
4					.287	.393	.235	.337	.253	.244	.266	.280	.249	.224	.182	.297	.063	-199	.303	.349	.226
5						.299	.170	.222	.148	.171	.197	.199	.151	.176	.177	.144	.071	-165	.231	.264	.281
6							.261	.231	.288	.314	.346	.342	.325	.224	.202	.356	.107	-202	.397	.385	.299
7								.274	.211	.237	.194	.184	.140	.089	.111	.210	.041	-212	.229	.174	.151
8									.259	.321	.293	.316	.296	.185	.155	.289	.108	-247	.389	.252	.202
9										.264	.281	.275	.258	.213	.203	.257	.121	-124	.231	.290	.201
10											.391	.277	.318	.161	.162	.261	.111	-136	.305	.214	.188
11												.294	.301	.227	.214	.287	.082	.087	.275	.229	.207
12													.325	.248	.195	.298	.082	.117	.278	.295	.192
13														.187	.161	.239	.081	.079	.238	.247	.208
14															.207	.292	.043	.485	.214	.232	.185
15																.228	.103	.137	.164	.198	.158
16																	.118	.160	.317	.309	.211
17																		.127	.140	.109	.077
18																			.280	.182	.133
19																				.270	.216
20																					.364
21																					
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12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
49	.175	.098	.131	.197	.064	.117	.244	.224	.190	.179	.145	.078	.160	.079	.135	.131	.187	.102	.179	.091	.201	.174
39	.287	.245	.167	.344	.073	.146	.287	.358	.262	.251	.234	.221	.277	.137	.214	.175	.221	.241	.292	.146	.341	.246
05	.172	.111	.101	.192	.069	.161	.252	.228	.141	.188	.170	.120	.175	.165	.181	.169	.205	.135	.212	.100	.195	.216
80	.249	.224	.182	.297	.063	.199	.303	.349	.226	.266	.244	.253	.254	.175	.229	.211	.260	.198	.294	.147	.300	.215
99	.151	.176	.177	.144	.071	.168	.231	.254	.281	.350	.295	.167	.214	.123	.219	.174	.148	.227	.257	.136	.208	.120
42	.325	.224	.202	.356	.107	.202	.397	.285	.299	.302	.244	.249	.284	.215	.249	.243	.283	.208	.324	.146	.340	.273
84	.140	.089	.111	.210	.041	.212	.229	.174	.151	.162	.187	.064	.111	.150	.136	.162	.205	.232	.117	.181	.189	.105
16	.296	.185	.155	.289	.108	.247	.389	.252	.202	.246	.251	.134	.198	.220	.222	.247	.276	.292	.270	.169	.278	.175
75	.258	.213	.203	.257	.121	.124	.231	.290	.201	.192	.222	.263	.170	.087	.137	.134	.163	.218	.255	.123	.272	.226
77	.318	.161	.162	.261	.111	.136	.305	.214	.188	.217	.215	.168	.174	.131	.168	.186	.253	.148	.129	.114	.252	.182
94	.301	.227	.214	.287	.082	.087	.275	.229	.207	.212	.223	.151	.178	.115	.155	.141	.237	.146	.203	.121	.298	.226
	.325	.248	.195	.298	.082	.117	.278	.295	.192	.226	.218	.116	.175	.138	.165	.162	.216	.193	.227	.125	.307	.232
		.187	.161	.239	.081	.079	.238	.247	.208	.180	.169	.166	.172	.103	.136	.146	.171	.139	.213	.059	.226	.237
			.207	.292	.043	.485	.214	.232	.185	.219	.161	.259	.266	.056	.116	.104	.138	.185	.224	.124	.274	.202
				.228	.103	.137	.164	.198	.153	.184	.220	.139	.105	.096	.118	.135	.152	.104	.201	.049	.200	.147
					.118	.160	.317	.309	.211	.307	.282	.250	.239	.108	.178	.177	.209	.228	.305	.102	.346	.237
						.127	.140	.109	.077	.105	.072	.119	.085	.079	.133	.083	.074	.108	.087	.036	.109	.075
							.280	.182	.133	.278	.238	.130	.183	.329	.310	.285	.287	.164	.175	.084	.183	.109
								.270	.216	.379	.315	.198	.197	.283	.313	.298	.384	.227	.264	.105	.301	162
									.364	.332	.219	.299	.301	.195	.282	.258	.192	.298	.349	.159	.304	.242
										.258	.193	.271	.249	.160	.248	.208	.140	.203	.275	.152	.187	.189
											.481	.218	.219	.218	.309	.253	.218	.243	.287	.152	.272	.193
												.144	.177	.157	.222	.200	.143	.179	.178	.131	.242	.193
													.285	.198	.284	.249	.173	.255	.280	.056	.221	.171
														.197	.284	.216	.198	.216	.305	.122	.212	.146
															.441	.417	.337	.193	.182	.094	.111	.059
																.419	.377	.257	.229	.108	.153	.144
																	.411	.218	.215	.122	.191	.135
																		.177	.156	.106	.214	.141
																			.385	.099	.234	.158
																				.110	.270	.197
																					.112	.072
																						.272

TABLE 13

Factor Loadings of 34 Subtests

FORM A

Sr. No.	Tests	Factors 1	2	3	4	5	6	7
1	General Significance	.330	-.866	-.241	.197	.162	.424	-.166
2	Story	.602	-.183	-.286	.420	.126	.658	-.107
3	Poem	.558	.746	-.257	-.132	.918	-.251	-.561
4	General Talk	.558	-.138	-.234	-.238	.315	.200	-.510
5	Noting Details	.500	.113	-.239	-.237	.117	.129	-.156
6	Anecdote	.695	-.880	-.239	-.102	-.150	-.134	.524
7	Inference	.515	.641	-.147	-.152	-.243	.185	.233
8	Boys Talk	.588	-.235	-.143	-.238	-.774	.105	.149
9	Accuracy of Ideas	.393	-.164	.741	.181	-.301	-.191	-.882
10	Synonyms	.497	-.240	-.345	.690	.207	-.145	-.292
11	Antonyms	.487	-.186	-.998	.177	.251	-.264	-.108
12	Idioms	.516	-.200	-.964	-.122	.356	.983	-.158
13	Proverbs	.446	-.247	-.215	.211	.288	-.130	-.147
14	Triplet No. 3	.367	-.182	.211	.682	.611	-.121	.235
15	Letter List	.350	-.203	.235	.250	-.797	-.140	-.150
16	Five Letters	.542	-.160	.106	.119	-.218	-.211	-.204
17	Phonetic Variations	.262	-.136	.186	.477	-.356	.434	-.566
18	Sentence Writing	.544	.378	.129	-.124	.395	.493	.108
19	Consequences	.379	.277	.244	.242	-.151	.347	-.228
20	Sentence Completion	.557	.727	.840	-.128	.466	-.121	-.485
21	Sentence Completion(Late)	.469	-.777	.184	-.185	.148	-.323	-.395
22	Word Recall	.606	.474	.272	-.920	-.243	.217	-.248
23	Number Recall	.572	.491	.303	-.130	-.151	.148	-.294
24	Letter Span	.379	.271	.427	-.129	.395	.109	-.514
25	Delayed Spelling	.480	.287	.281	-.199	.266	.101	.970
26	Musical Lines	.458	.346	-.182	.304	.240	-.487	-.133
27	Haphazard Speech	.524	.506	.295	.102	.323	.601	.101
28	Illogical Grouping	.347	.512	-.253	.237	-.143	-.138	.152
29	Illogical Grouping	.520	.448	-.184	.101	-.400	-.114	.380
30	Letter Grouping	.484	.141	-.517	.170	-.154	-.193	.183
31	Letter Grouping	.534	-.297	.218	.111	-.588	-.137	.204
32	Solving Problems	.315	-.271	.823	.193	-.323	.219	.534
33	Word Findings	.631	-.953	.420	.124	.138	.305	.120
34	Arithmetical Reasoning	.425	-.290	.121	-.173	-.645	-.659	.282

TABLE 1

Factor Loadings of 34 Subtests

Form B

Sr. No.	Tests	Factors 1	2	3	4	5
1	General Significance	.420	-.182	-.214	-.302	.126
2	Story	.610	-.239	-.308	-.250	.423
3	Drama	.447	-.644	-.228	-.351	.107
4	General Talk	.587	-.962	-.486	[illegible]	-.[illegible]
5	Noting Details	.481	-.925	.128	-.194	-.248
6	Narration	.664	-.136	-.121	-.159	-.376
7	Inference	.398	-.217	-.354	-.413	.629
8	Girls Talk	.570	-.614	-.321	-.394	.192
9	Accuracy of Ideas	.485	-.251	.111	.137	.184
10	Synonyms	.498	-.176	-.265	.208	.136
11	Antonyms	.510	-.276	-.165	.200	-.179
12	Idioms	.523	-.251	-.940	.710	-.265
13	Proverbs	.463	-.275	-.110	.105	-.656
14	Triplet No.3	.410	-.220	.234	.207	-.813
15	Letter List	.366	-.976	.134	-390	.870
16	Five Letters	.563	-.180	.125	.152	-.163
17	Phonetic Variations	.206	+.838	.911	.357	.632
18	Sentence Writing	.405	+.426	-.151	.117	.784
19	Consequences	.603	.135	-.220	.132	-.170
20	Sentence Completion	.596	-.261	.273	-.166	.454
21	Sentence Completion(Late)	.478	.111	.271	-.200	.114
22	Word Recall	.561	.151	.135	.158	-.188
23	Number Recall	.493	.692	-.144	.277	-.187
24	Letter Span	.435	.154	.408	-.453	-.638
25	Spelling	.463	.126	.265	-.245	.191
26	Musical Lines	.401	.591	-.140	-.162	.390
27	Haphazard Speech	.500	.531	.359	-.326	.183
28	Illogical Grouping	.475	.500	-.784	.134	-.134
29	Illogical Grouping	.497	.352	-.321	.103	-.852
30	Letter Grouping	.450	.124	.363	.855	-.115
31	Letter Grouping	.539	-.702	.347	-.115	-.606
32	Solving Problems	.250	.966	.786	-.109	[illegible]
33	Word Finding	.549	-.190	.681	.131	-.845
34	Arithmetical Reasoning	.414	-.217	.879	.633	.666

on 7 factors in form A and 5 factors in form B.

The tables for forms A and B clearly show a common factor running in all the variables which may be named as "listening comprehension" factor. It collaborates with the result of Spearritt's (123, p.92). He has noted, "Of greatest interest was the identification of a separate 'listening factor', described in more exact terms as "comprehension" of verbal material presented in spoken form."

Again, on the basis of the nature of subtests, the subtests can be divided into six groups of: (1) subtests No. 10 to 13 may be denoted as Vocabulary tests, (2) Subtests No. 14 to 17 as Attention Tests, (3) Subtests No. 18 to 24 as Memory Tests, (4) Subtests No.25 to 28 as Auditory Resistance Tests, (5) Subtests No.30 to 34 as Reasoning Tests. While tests No. 1 to 9 may be considered to be dependent upon the above abilities. Hence, in this test battery we can assume the main factors to be those viz. Vocabulary, Attention, Memory, Auditory Resistance and Reasoning; and small residual factors. In the factor analysis also we have found seven and five factors in forms A and B respectively in both the forms. It shows that the whole test battery can be reduced to five factors mentioned above with unknown small residual factors.

If we combined these 34 subtests and divide the whole data into six group tests and then factor analysed them, we find in Table 16 only two factors. Out of the two, one common factor is running with high loadings. This also validates our assumption of main five factors of this whole test battery.

TABLE 15

Factor Loadings of Six Main Tests

Sr. No.	Form A		Form B	
	Factor 1	Factor 2	Factor 1	Factor 2
1	.841	-.519	.830	-.499
2	.741	-.350	.727	-.347
3	.687	-.347	.707	-.356
4	.804	.238	.817	.220
5	.676	.647	.672	.655
6	.783	-.112	.779	-.962