CHAPTER

IV

CHAPTER : IV

INVENTORY DEVELOPMENT AND PILOT ADMINISTRATION

4.0 INTRODUCTION :

It has been indicated in earlier chapters that Indian Theory of Personality is derivative of Indian philosophy and has been a subject of discussion for philosophers. Only recently psychologists have shown growing interest in the subject and varied work in its application and appraisal have been done. However, only little work has been done to systematically develop and measure personality using modern psychometric tools.

Psychological measurement is well advance field in psychology and various personality measurement techniques are available. It is also one of the objectives of this research to adopt suitable technique and develop a measurement tool for measuring 'types' of personality viz. Sattvic, Rajasic or Tamasic. Development of inventory forms a part of this measurement tool. An inventory is essentially paper-and-pencil, self report questionnaire suitable for group administration.

This chapter contains step by step procedure adopted for inventory development and pilot administration. Raw scores, derived scores, statistical computations for validation and reliability have also been presented. Whenever required the reasoning behind selection of particular criterion is also elicited.

4.1 INVENTORY DEVELOPMENT :

4.1.1 Selection of characteristics of Tri-dimensional Personalities :

A detailed list of characteristics as per Table 4.1 (a,b,c) attributed to Sattvic, Rajasic and Tamasic was prepared.

TABLE - 4.1 (a) : CHARACTERISTICS OF SATTVIC GUNA

1. *Attached to knowledge*
2. *Straightforward*
3. *Endued with firmness*
4. *Compassionate*
5. *Self-Controlled*
6. *Serves the teacher*
7. *Of right discrimination*
8. *Possessed of good memory*
9. *Contented*
10. *Truthful*
11. *Free from attachments*
12. *Non-egoistic*
13. *Not moved by joy and sorrow*
14. *Clean*
15. *Calm*
16. *Balanced*
17. *Has patience*
18. *Illuminating*
19. *Religious*
20. *Hospitable*
21. *Does principled actions*
22. *Courageous*
23. *Tolerant*
24. *Devoid of passions*
25. *Peace loving*
26. *Virtu-ous*
27. *Charitable*
28. *Fearless*
29. *Pure in action and thought*
30. *Having power of exposition*
31. *Free from envy*
32. *Free from dejection*
33. *In a state of renunciation*
34. *Creative*
35. *Having foresight*
36. *Eloquent*
37. *Devoted to God*
38. *Humble*
39. *Friend of all creatures*
40. *With steadfast determination*
41. *Devoid of all expectations*
42. *Dutiful*
43. *Has strong restraint in speech*
44. *Unpretentious*
45. *Believes in Non-violence*
46. *Sacrificial, does 'Yagnas'*
47. *Auster*
48. *Alms-giving*

49. *Modest*
50. *Studies 'Shastras'*
51. *Uncovetous*
52. *Gentle*
53. *Helpful*
54. *Uses pure means only*
55. *Equal to all*
56. *Takes simple food*
57. *Likes light colours*
58. *Forgiving*
59. *Kind*
60. *Harmless*
61. *Leads sexual life only for creation*

TABLE : 4.1 (b) : CHARACTERISTICS OF RAJASIC GUNA

1. *Ambitious*
2. *Greedy*
3. *Egoistic*
4. *Aspires for power and prestige*
5. *Leader*
6. *Aggressive*
7. *Full of anger*
8. *Secretive*
9. *Showing off*
10. *Active*
11. *Revengeful*
12. *Selfish*
13. *Jealous*
14. *Cruel*
15. *Moved by joy and sorrow*
16. *Passionate*
17. *Impure*
18. *Desirous of the fruits of action*
19. *Motivated*
20. *Constructive*
21. *Valiant*
22. *Fashionable*
23. *Authoritative*
24. *Pitiless*
25. *Intolerant*
26. *Gluttonous*
27. *Proud of self*
28. *Unforgiving*
29. *Impatient*
30. *Religious for worldly gains*
31. *Likes tasty, spicy food*
32. *Likes bright colours*
33. *Charitable*
34. *Opposed to moral and ethical values*
35. *Pretentious*
36. *Untrustworthy*
37. *Leads sexual life for enjoyment*
38. *Luxurious*
39. *Full of desires*
40. *Discontented*
41. *Arrogant*
42. *Hypocrite*
43. *Plans in self-interest*
44. *Attached*

TABLE 4.1. (c) : CHARACTERISTICS OF TAMASIC GUNA

1. *Despondent*
2. *Sad*
3. *Disappointed*
4. *Undecisive*
5. *Procrastinating*
6. *Lazy*
7. *Inactive*
8. *Intolerant*
9. *Heedless*
10. *Lack of interest*
11. *Indifferent*
12. *Vulgar*
13. *Unsteady*
14. *Cheat*
15. *Malicious*
16. *Obstinate*
17. *Deceitful*
18. *Under delusion*
19. *Negligent*
20. *Unintellectual*
21. *Ignorant*
22. *Lethargic*
23. *Sadistic*
24. *Asocial*
25. *Quarrelsome*
26. *Instinctive*
27. *Devoid of religion*
28. *Immoral*
29. *Pessimist*
30. *Distructive*
31. *Irrational*
32. *Devoid of foresight*
33. *Likes dull colours*
34. *Stubborn*
35. *Takes stale food*
36. *Has no faith in God*
37. *Indolent*
38. *Passes time in sleeping*
39. *Unclean*
40. *Selfish*
41. *Antisocial*
42. *Has no respect for society*
43. *Leads immoral sexual life*

These characteristics were taken from available Indian literature, mainly Samkhya-Yoga system of philosophy, Ayurveda, Gita, Bhagawat and various commentories on these subjects. Details of sources and theory of guna have already been discussed in earlier chapters. As is obvious, many attributes or traits are synonyms to each other and it was necessary to select proper words/description and reject other synonyms and ambigious words. After prolonged discussion with experts in philosophy, religion, psychology and language (Hindu/English), the final lists of the characteristics were short listed as shown in Table 4.2 (a,b,c).

TABLE 4.2 (a) : SELECTED CHARACTERISTICS OF SATTVIC GUNA

1. *Helpful*
2. *Truthful*
3. *Knowledgeable - Having knowledge of self and God, Sastras, Religion, Moral and Ethics*
4. *Of high morality*
5. *Patient*
6. *Kind*
7. *Of right discrimination*
8. *Fearless (for right objective)*
9. *Not moved by joy and sorrow*
10. *Contented*
11. *Uses pure means only*
12. *Leads sexual life only for creation*
13. *Straightforward*
14. *Peaceful or Calm*
15. *Non-violent*
16. *Non-attached*
17. *Firm*
18. *Self-controlled*
19. *Equal to all*
20. *Takes simple food*
21. *Likes light colours*
22. *Studies shastras*

TABLE 4.2 (b) : SELECTED CHARACTERISTICS FOR RAJASIC GUNA

1. *Impure*
2. *Aspires for power and prestige*
3. *Pretentious*
4. *Unforgiving*
5. *Impatient*
6. *Egoistic*
7. *Greedy*
8. *Jealous*
9. *Plans in self-interest*
10. *Has leadership qualities*
11. *Attached*
12. *Untrustworthy*
13. *Considers sexual life for an enjoyment*
14. *Moved by success and failure*
15. *Cruel*
16. *Religious for worldly gains*
17. *Active*
18. *Full of anger*
19. *Likes spicy, tasty food*
20. *Likes bright colours*
21. *Charitable*
22. *Ambitious*

TABLE 4.2 (c) : SELECTED CHARACTERISTICS FOR TAMASIC GUNA

1. *Unsteady*
2. *Vulgar*
3. *Stubborn*
4. *Likes dull colours*
5. *Despondent*
6. *No respect for society*
7. *Heedless*
8. *Unintellectual*
9. *Lazy*
10. *Selfish*
11. *No faith in God*
12. *Antisocial*
13. *Malicious*
14. *Quarrelsome*
15. *Takes stale, tasteless food*
16. *Unclean*
17. *Immoral sexual life*

The discussion with experts also resulted in description of personality 'types' in terms of these characteristics. These descriptions of characteristics were almost similar to that given in Chapter - III (Section 2.2).

4.1.2 LANGUAGE OF INVENTORY :

After preparing complete list of characteristics and the description of all gunas, on the basis of this data, first set of items were prepared for the personality inventory. It was decided to make inventory simultaneously both in Hindi and English. The reason of making inventory in Hindi and English was that Hindi is national language and has wide coverage of population and readership and English is used in most non-Hindi speaking States as medium of instruction. Hindi and English have obvious advantage over the local regional languages.

4.1.3 ITEM WRITING AND PRELIMINARY SCREENING :

As mentioned earlier, the characteristics and the description of three gunas are available in the literature. Hence, items were constructed on the basis of personality description given in the text books. Items were written in statements form. The statements inferred some traits, attitudes or characteristics. Statements were either in generalized form or in first person, they were positive or negative. Question form in item construction was not used. Question stimulates thinking, resulting in idealistic response from the subject. Author intended to get spontaneous response which could be best done by simple statements. Since gunas manifest themselves in different behaviour patterns, a list of statements showing various aspects of behaviour in routine life were prepared. More than

one statements were prepared for the single characteristic. In preparing statements help was taken from colleagues, teachers, experts in the field of philosophy, psychology and language. During the construction of statements various alternatives to a single statement were thought and the one best suited was taken after discussion with colleagues and teachers. As far as possible simple form of expression and clear words were used in the statements. Once the preliminary list was ready, a period of three weeks was taken as idle time during which nothing was discussed or talked of on the subject to change the line of thinking or bias on statements. After three weeks, the list of statements was reviewed. Some more persons who had no discussion earlier on the subject were also contacted. This resulted in few corrections and edition in statements.

For the first draft of the inventory 56 items were constructed showing various modes of behaviour of Sattva quality, 53 items showing Rajas quality and 45 items on Tamas quality, altogether 154 items. Then, all these items were randomized and assembled into an inventory form, and subjected to scrutiny by a panel of six judges - who were conversant with the concept of 'tri-guna'. The judges were asked : (a) to make a critical scrutiny of each item and indicate whether the statement belonged to Sattvic type, Rajasic type or Tamasic type. If particular statement can be assigned to more than one type, then they were requested to indicate extent of such behaviour in particular type of personality by assigning gradation number. Grading key was as under :

	Grade
Absence of behaviour	*0*
Little presence of behaviour	*1*
Moderate presence of behaviour	*2*
Strong presence of behaviour	*3*

(b) To indicate any ambiguity, lack of clarity or possibility of misinterpretation of particular statement.

The panel included one judge each from the following fields :

- *Philosophy Deptt. of M.S.University, Baroda*
- *Psychology Deptt. of M.S.University, Baroda*
- *Sanskrit Mahavidyalaya of Baroda*
- *Education Deptt. of M.S.University, Baroda*
- *Philosophy Deptt. of Rajasthan University, Jaipur*
- *Oriental Institute, M.S.University, Baroda*

The judges accepted almost all the items as corresponding to assigned guna. Only few changes in construction of certain items were suggested. This was discussed with judges and some items were revised in the light of such comments.

Above revised inventory was again given to six different judges for scrutiny. They were instructed to do the same as first panel was asked. The second panel of judges was from following fields :

- *Education Deptt. of M.S.University, Baroda*
- *Retired Professor from Hindi Deptt., M.S.University, Baroda*
- *Ramchandra Mission, Baroda*
- *Psychology Deptt., Rajasthan University, Jaipur*
- *Philosophy Deptt., Rajasthan University, Jaipur*
- *Ayurveda College*

After second scrutiny of the inventory, the statements which fetched consensus were retained and those which were disputable

were rejected. Like this, out of the total of 154 items framed and already assembled in the form of inventory, only 5 items on Sattva scale involved disagreement. It was decided to omit these from the set of inventory. Thus 149 items were left-out in inventory comprising of 51 items on Sattva scale, 53 on Rajas scale and 45 on Tamas scale.

As is evident from the guna-theory, individuals may have characteristics of all gunas in varying proportions, therefore a five point self-administering scale was adopted wherein the respondent would indicate his extent of behaviour in the given statement by saying very much, much, moderate, little and not at all.

A separate answer-sheet was prepared for marking of the answers. Against each item number, five categories were provided for answering : very much, much, moderate, little and not at all. No doubtful or question-mark category was provided. The preliminary information regarding the individual was also included in the answer sheet.

Suitable instructions were prepared to guide respondent as to what he is supposed to do. The respondent was appealed to give honest and frank reply. Instructions for making answers in separte answer-sheet were given. An illustration was also provided in the instructions. In short adequate care was taken to make inventory self-explanatory. This set of inventory is given in Appendix - B.

Scoring keys showing the items in their respective Guna scale were also developed. These keys for the three scales are included in Appendix - B.

4.2 PILOT ADMINISTRATION :

Pre-test or pilot administration is important as it provides data for an item analysis and consequent statistical information concerning items, which is necessary for standardization of an inventory. It also helps to discover weaknesses in the instructions and in the format. Depending on requirement, Pilot administration can be repeated. The data are to be used in psychometric analysis for finding item validity, internal-consistency and reliability resulting in edition or deletion of items in subsequent test.

Pilot administration was to be conducted on a sample of population for which inventory was being designed. In the present case it was to be standardized for general population. It was difficult to define the limits of such a population and objection could be raised against the arbitrary selection of any criterion. In this work, knowledge of Hindi and/or English was considered the primary requisite for being considered because the inventory was constructed in only Hindi and English. Though the criterion is untenable theoretically , it serves the practical purpose of defining the population which was very nearly the population for which the inventory was to be standardized.

4.2.1 SAMPLE :

Having defined criterion of population, problem of selection of sample can be attacked. However, in this particular case it was difficult to exactly identify the definite section of population. There are different categories of people - male and female, educated-uneducated, urban-rural, of different

castes, of different professions, of different ages etc. In the absence of any statistical data on categories of population, only the board categories of people which composed the population could be considered.

The sample consisted of professionals like doctors, engineers, school teachers, clerical staff in Government and semi-Govt. institutions and industry, businessmen, industrial workers and housewives, of different ages, different castes, both sexes and from urban and rural areas. It should be noted that these are only broad categories and as such no division was made for population except that he should be Hindi or English knowing.

Since no data are available on the proportions of various such broad categories, no representative proportion could be assigned for sampling purpose. Efforts were, therefore, made to take few subjects from all categories to keep atleast full representation if not proportionate. For pilot study 240 subjects were selected. Table 4.3 gives the distribution of the sample according to the categories described above.

TABLE 4.3 : SAMPLE DISTRIBUTION

Profession	*No.of cases in sample*
Doctors	*7*
Engineers	*20*
Teachers	*30*
Businessmen	*10*
Clerks	*40*
Industrial Workers	*50*
Housewives	*50*
Students	*25*
IAF Workers	*8*
Male to Female ratio	*0.6 : 0.4*

4.2.2 SCORING :

Response on the inventory were received in terms of choices such as 'very much', 'much', 'moderate', 'little' or 'not at all'. These raw scores on answer-sheets were converted to numerical scores in data format. The conversion criterion was as under :

Response	Score
Very much	5
Much	4
Moderate	3
Little	2
Not at all	1

Above conversion was made by preparing different data-sheets for different scales i.e. Sattva, Rajas and Tamas. Against the name of each person his answer to all the items falling in three scales were recorded as either 5, 4, 3, 2 or 1. The addition of these scores on particular scale gives individual's total score on that particular scale. Like this, each individual in the sample got a score on each of the three scales.

4.2.3 PSYCHOMETRIC ANALYSIS :

Above data were then subjected to statistical computation to improve efficiency of inventory.

4.2.3.1 DISTRIBUTION OF SCORE :

Scores obtained by the sample of 240 subjects in each of the three scales were transformed into frequency distribution. The table below 4.4 (a,b,c) show these distributions . Frequency distributions were then subjected to further statistical computation to improve efficiency of inventory.

TABLE 4.4 (a) : FREQUENCY DISTRIBUTION AND SELECTION OF EXTREME GROUPS FOR SATTVIC SCORES

Total score on Sattvic Items	f	Cum. f
218 - 227	2	243
208 - 217	6	241
198 - 207	12	235
188 - 197	23	223
178 - 187	42	200
168 - 177	45	158
158 - 167	40	113
148 - 157	33	73
138 - 147	22	40
128 - 137	9	18
118 - 127	4	9
108 - 117	2	5
98 - 107	3	3

Calculation for Quartile Deviation

$$Q_1 = l + i \left(\frac{\frac{N}{4} - \text{Cum. } f}{f} \right)$$

$$= 147.5 + \frac{10\ (60.75 - 40)}{33}$$

$$= 153.8$$

$$Q_3 = l + i \left(\frac{3/4\ N - \text{Cum. } f}{f} \right)$$

$$= 177.5 + 10\ \frac{(182.25 - 158)}{42}$$

$$= 183.2$$

Note : 1. *For lower extreme group 60 individuals with score up to 154 were selected.*

2. *For upper extreme group only 56 individuals were available above score 183. Hence, additional 4 persons were taken from score 182.*

TABLE 4.4 (b) : FREQUENCY DISTRIBUTION AND SELECTION OF EXTREME GROUPS FOR RAJASIC SCORES

Total score on Rajasic Items	f	Cum. f
200 and above	6	243
190 - 199	9	237
180 - 189	12	228
170 - 179	33	216
160 - 169	33	183
150 - 159	44	150
140 - 149	45	106
130 - 139	23	61
120 - 129	13	38
110 - 119	8	25
100 - 109	12	17
90 - 99	5	5

Calculation for Quartile Deviation

$$Q_1 = 1 + i \left(\frac{\frac{N}{4} - \text{Cum. } f}{f} \right)$$

$$= 129.5 + 10 \left(\frac{60.75 - 38}{23} \right)$$

$$= 139.4$$

$$Q_3 = 1 + i \left(\frac{\frac{3N}{4} - \text{Cum. } f}{f} \right)$$

$$= 159.5 + 10 \left(\frac{182.25 - 150}{33} \right)$$

$$= 169.3$$

Note : 1. For lower extreme group selected 60 individuals upto total score of 139.

2. For upper extreme group only 57 individuals were present beyond score 169 and hence additional 3 individuals were taken up at socre 168 also.

TABLE 4.4 (c) : FREQUENCY DISTRIBUTION AND SELECTION OF EXTREME GROUPS FOR TAMASIC SCORES

Total Score on Tamasic Items	f	Cum. f
160 - 169	4	243
150 - 159	5	239
140 - 149	10	234
130 - 139	14	224
120 - 129	31	210
110 - 119	50	179
100 - 109	44	129
90 - 99	34	85
80 - 89	32	51
70 - 79	12	19
60 - 69	7	7

Calculation for Quartile Deviation

$$Q_1 = 1 + i \left(\frac{\frac{N}{4} - \text{Cum. } f}{f} \right)$$

$$= 89.5 + 10 \left(\frac{60.75 - 51}{34} \right)$$

$$= 92.4$$

$$Q_3 = 1 + i \left(\frac{3/4\ N - \text{Cum. } f}{f} \right)$$

$$= 119.5 + 10 \left(\frac{182.5 - 179}{31} \right)$$

$$= 120.5$$

Note : 1. For lower extreme range Q_1, 60 individuals with score up to 92 selected.

2. For upper extreme group, Q_3, 60 individuals with score 120 and above were selected.

4.2.3.2 *ITEM ANALYSIS* :

Adequacy of inventory is totally dependent on efficacy of item selected. Item analysis has 3 aspects :

1) ***Content Validity*** :

Since items were selected with repeated examination by teachers and judges, items can be presumed to have content validity i.e. they represented one or other type of guna, and as a whole represented three types of personality shown in the literature.

2) ***Item difficulty*** :

Item difficulty is a factor important for ability tests. But for personality inventory such as the present case, it was not considered necessary.

3) ***Item Validity*** :

It indicates the discriminative power of an item yielding sharp difference in the guna measured by the test as a whole. The method adopted here was to select the top 25% people and the bottom 25% people on each scale. For example, top 25% people who scored highest on Sattvic and bottom most 25% people who scored lowest on Sattvic scale were identified by applying Quartile Deviation formula. Their significance of mean difference on each Sattvic item was then computed in terms of 't' . The items which had 't' value above 2.39 were considered satisfactory or valid i.e. discriminating .

the respective characteristic. Similarly Rajasic and Tamasic extreme groups were selected, 't' value for each item was computed and those having 't' below 2.39 were rejected.

Extreme groups on each scale, consisting 60 individuals were selected by applying Quartile Deviation formula. The formula and calculation are shown in Table 4.4 (a, b, c). Separate data-sheets were prepared for all the three scales for those 60 persons, who were at the upper end of the scale and other 60 persons who were at the lower end of the scale, and the item validity value in terms of 't' obtained. The value obtained for all the items are given in the Table No. 4.5 (a, b, c).

TABLE 4.5 (a) : CALCULATIONS FOR "t" VALUES ON SATTVIC ITEMS

Item No.	M_1	M_2	SD	SE_D	t VALUE	
1	2.98	2.58	1.264	.230	1.73	*
4	4.45	3.75	1.005	.183	3.82	
6	4.15	2.50	1.324	.241	6.83	
7	2.73	1.93	1.423	.259	3.08	
9	3.80	2.66	1.307	.238	4.78	
10	4.26	2.93	1.132	.206	6.45	
13	4.33	2.88	1.110	.202	7.17	
15	4.08	3.05	1.253	.228	4.51	
19	4.16	2.95	1.341	.244	4.94	
20	4.00	2.71	1.231	.224	5.77	
21	4.08	2.71	1.115	.203	6.74	
26	3.85	2.88	1.269	.231	4.20	
30	2.87	2.65	1.538	.280	0.78	*
32	3.60	2.28	1.379	.251	5.26	
33	3.45	2.48	1.214	.221	4.39	
39	4.32	2.88	1.044	.190	7.56	
41	3.45	2.70	1.379	.251	2.98	
44	4.48	3.12	1.209	.220	7.39	
46	4.15	3.58	1.170	.213	2.67	
48	3.72	2.97	1.198	.218	3.43	
49	3.72	2.62	1.379	.251	4.38	
56	2.75	2.32	1.385	.252	1.71	*
57	3.82	2.32	1.324	.241	6.21	
58	3.20	2.83	1.275	.232	1.59	*
59	3.68	3.00	1.082	.197	3.44	

Item No.	M_1	M_2	SD	SE_D	t VALUE	
61	3.92	2.57	1.115	.203	6.64	
68	3.67	2.50	1.121	.204	5.62	
69	4.80	3.32	1.000	.182	8.11	
70	4.42	2.78	1.203	.219	7.49	
72	3.05	2.63	1.258	.229	1.83	*
77	4.58	3.13	1.016	.185	7.85	
80	3.68	2.92	1.341	.244	3.12	
81	3.33	2.50	1.242	.226	3.67	
82	3.07	2.77	1.291	.235	1.28	*
86	4.37	2.58	1.181	.215	8.33	
95	3.18	2.50	1.253	.228	2.97	
97	4.11	2.78	1.242	.226	5.88	
100	4.50	3.28	1.176	.214	5.70	
109	4.13	2.60	1.176	.214	7.15	
117	3.97	2.65	1.220	.222	5.95	
119	3.53	2.67	1.242	.226	3.80	
120	4.05	2.83	1.049	.191	6.37	
125	4.12	2.90	0.956	.174	7.02	
126	3.20	2.53	1.198	.218	3.08	
129	3.27	2.33	1.071	.195	4.83	
134	3.01	2.82	1.291	.235	0.81	*
135	3.17	2.45	1.357	.247	2.92	
137	4.23	2.82	2.890	.526	2.68	
141	3.15	2.57	1.495	.272	2.13	*
142	4.82	3.90	0.901	.164	5.59	
145	4.13	3.67	1.143	.208	2.21	*

* Insignificant mean difference at 0.02 level.

TABLE 4.5 (b) : CALCULATIONS FOR 't' VALUES ON RAJASIC ITEMS

Item No.	M_1	M_2	SD	SE_D	T VALUE	
2	2.98	1.90	1.352	.246	4.38	
3	2.57	1.43	1.093	.199	5.72	
11	3.35	1.63	1.225	.223	7.70	
12	3.83	2.12	1.181	.215	7.96	
17	3.92	3.70	1.275	.232	0.95	*
18	3.05	1.82	1.264	.230	5.36	
22	3.11	2.17	1.396	.254	3.70	
25	2.92	1.82	1.242	.226	4.87	
27	2.65	1.85	1.308	.238	3.37	
35	3.32	1.88	1.297	.236	6.09	
36	3.13	1.58	1.115	.203	7.62	
37	3.87	3.40	1.170	.213	2.21	*
40	4.17	3.20	1.275	.232	4.18	
43	3.52	2.23	1.341	.244	5.29	
45	3.10	1.60	1.148	.209	7.17	
50	2.72	1.83	1.236	.225	3.95	
53	3.25	2.25	1.176	.214	4.68	
54	4.35	3.36	1.187	.216	4.59	
55	3.22	1.80	1.247	.227	6.25	
62	4.05	2.90	1.242	.226	5.08	
64	3.42	2.52	1.319	.240	3.75	
66	3.73	1.93	1.258	.229	7.85	
71	2.48	1.85	1.214	.221	2.84	
72	4.25	2.95	1.242	.226	5.75	

Item No.	M_1	M_2	SD	SE_D	t VALUE
74	3.97	3.30	1.236	.225	2.98
78	2.95	2.13	1.247	.227	3.61
85	2.97	2.18	1.181	.215	3.67
87	3.62	2.07	1.192	.217	7.14
88	3.97	2.39	1.209	.220	7.28
89	3.67	2.27	1.258	.229	6.11
91	3.60	1.97	1.115	.203	8.04
92	3.87	2.30	1.132	.206	7.61
93	3.57	2.77	1.429	.260	3.07
94	1.97	1.23	1.005	.183	4.05
96	3.43	2.88	1.555	.283	1.94 *
102	3.42	3.45			Negative * *
104	3.20	2.37	1.324	.241	3.44
105	3.03	1.90	1.176	.214	5.28
108	3.70	2.28	1.313	.239	5.95
111	3.33	2.22	1.269	.231	4.81
112	3.33	2.35	1.203	.219	4.47
113	4.10	3.18	1.137	.207	4.44
114	3.97	2.20	1.192	.217	8.16
115	3.65	2.18	1.187	.216	6.80
118	4.15	3.30	1.126	.205	4.14
123	2.30	1.60	1.093	.199	3.52
124	3.87	2.05	1.148	.209	8.70
127	3.33	2.45	1.379	.251	3.91
132	2.78	1.33	1.049	.191	7.60

Item No.	M_1	M_2	SD	SE_D	t VALUE	
143	3.80	3.18	1.00	.182	3.40	
146	4.40	3.42	1.071	.195	5.03	
148	3.02	2.25	1.115	.203	3.80	
149	2.80	2.27	1.412	.257	2.06	*

* *Insignificant mean different at 0.02 level.*

TABLE 4.5 (c) : CALCULATIONS FOR 't' VALUES ON TAMASIC ITEMS

Item No.	M_1	M_2	SD	SE_D	t VALUE	
5	2.80	2.12	1.320	.242	2.82	
8	3.42	1.87	1.319	.240	6.45	
14	2.83	2.61	1.231	.224	0.98	*
16	3.17	1.73	1.099	.200	7.21	
23	2.73	1.37	1.055	.192	7.07	
24	2.53	1.33	0.929	.169	7.08	
28	3.38	2.43	1.352	.246	3.87	
29	2.18	1.27	1.181	.215	4.23	
31	3.03	1.87	1.302	.237	4.89	
34	2.50	1.20	1.137	.207	6.28	
38	3.90	3.28	1.253	.228	2.72	
42	3.38	1.73	1.038	.189	8.71	
47	2.92	1.62	1.264	.230	5.65	
51	3.67	2.52	1.170	.213	5.39	
52	3.05	1.53	1.423	.259	5.86	
60	3.92	3.10	1.335	.243	3.38	
63	3.00	1.75	1.264	.230	5.42	
65	2.87	1.52	1.104	.201	6.72	
67	2.90	1.73	1.088	.198	5.92	
75	3.18	2.05	1.308	.238	4.75	
76	3.35	2.13	1.159	.211	5.78	
79	3.35	2.45	1.192	.217	4.14	
83	2.08	1.08	0.918	.167	5.99	
84	3.15	2.27	1.451	.264	3.34	

Item No.	M_1	M_2	SD	SE_D	t VALUE	
90	2.77	1.92	1.115	.203	4.18	
98	2.62	1.90	1.319	.240	2.99	
99	2.75	1.70	1.242	.226	4.65	
101	2.57	2.02	1.335	.243	2.27	*
103	3.07	1.68	1.214	.221	6.28	
106	2.37	1.50	1.060	.193	4.50	
107	3.35	2.52	1.264	.230	3.61	
110	2.97	1.67	0.945	.172	7.56	
116	3.43	2.15	1.126	.205	6.23	
121	3.25	1.85	1.159	.211	6.63	
122	2.78	1.82	1.159	.211	4.55	
128	2.70	1.43	1.071	.195	6.52	
130	3.57	2.25	1.214	.221	5.97	
131	3.07	1.60	1.049	.190	7.75	
133	2.67	1.25	1.027	.187	7.59	
136	3.02	2.18	1.374	.250	3.37	
138	2.53	1.43	1.214	.221	4.98	
139	2.72	1.62	1.154	.210	5.25	
140	3.18	2.03	1.203	.219	5.25	
144	2.73	1.35	0.989	.180	7.67	
147	2.83	1.35	1.352	.246	6.01	

* Insignificant mean difference at 0.02 level

The item which had 't' value above 2.39 (at 0.02 level) were considered valid. Only 9 items had 't' values below 2.39 on Sattva scale. Five items on Rajas scale and only two items from Tamas scale were similarly found invalid.

4.2.3.3 *ITEM-TOTAL CORRELATION :*

Items were not only selected on the basis of content validity and items analysis but also by means of item-total correlation. Correlation between each item and the total score on that particular scale were computed i.e., the score on each Sattvic items was correlated with total Sattva score; score on each Rajasic item was correlated with total Rajasic score and similarly score on each Tamasic item was correlated with total Tamasic score. The above calculations were done on the same high scored groups selected for 't' test. Product Moment Formula was used for finding the correlation. Table 4.6 (a, b, c) shows the item-total correlation.

TABLE : 4.6 (a) : SATTVA SCALE

ITEM-TOTAL CORRELATION ON SATTVA SCALE

Item No.	r	Item No.	r
4	.204	61	Negative
6	.330	68	.304
7	.220	69	.280
9	Negative	70	.073
10	.220	77	Negative
13	.010	80	.252
15	.382	81	.08
19	Negative	86	.526
20	.150	95	.073
21	.110	97	Negative
26	.201	100	.314
32	.225	109	.455
33	.346	117	.074
39	Negative	119	.383
41	.535	120	Negative
44	.044	125	.205
46	.257	126	.265
48	.03	129	.257
49	.01	135	.032
57	.20	137	.296
59	.340	142	.756

TABLE : 4.6 (b) : RAJAS SCALE

ITEM-TOTAL CORRELATION ON RAJAS SCALE

Item No.	r	Item No.	r
2	.321	85	.318
3	.152	87	.214
11	.386	88	.214
12	.073	89	.326
18	.169	91	.566
22	.174	92	.246
25	.135	93	.107
27	.210	94	.347
35	.340	104	Negative
36	.466	105	.002
40	.126	108	.310
43	.384	111	.162
45	.152	112	.242
50	Negative	113	.138
53	.191	114	.108
54	.128	115	.232
55	.291	118	.052
62	.278	123	.269
64	.242	124	.037
66	.142	127	.088
71	.156	132	.463
73	.166	143	Negative
74	.193	146	.111
78	Negative	148	.131

TABLE 4.6 (c) : TAMAS SCALE

ITEM-TOTAL CORRELATION ON TAMAS SCALE

Item No.	r	Item No.	r
5	.922	84	Negative
8	.240	90	.156
16	.252	98	.252
23	.226	99	Negative
24	.248	103	.430
28	Negative	106	.243
29	.094	107	.092
31	.179	110	.247
34	.326	116	.139
38	.058	121	.229
42	.263	122	.218
47	.171	128	.430
51	.350	130	.346
52	.154	131	.352
60	.022	133	.450
63	.048	136	Negative
65	.120	138	.418
67	.288	139	.145
75	.467	140	.352
76	.218	144	.318
79	.274	147	.267
83	.068		

Each scale is comprised of several characteristics, many of which are not inter-dependent, making the scale heterogeneous. Hence, it is not necessary for each item to show high correlation with total score. In present case, correlation co-efficient of 0.25 is significant, but items showing co-efficient below this value were also included in the scale since they have high discriminative value. Thus, only those items which showed negative correlation with the scale were dropped. Total of 7 items from Sattvic category, 4 from Rajas category and 4 from Tamas category showed negative correlation and hence were dropped.

4.2.3.4 *ITEM-VALIDITY BASED ON CONTRAST GROUP* :

People termed as Sattvic due to their high score on Sattva scale should not only discriminate with lower extreme group as in 4.2.3.2, but also from people termed as Rajasic and Tamasic. Thus, score on Sattva items of Rajas and Tamas groups can be considered as external criterion for testing Sattva items. By application of 't' test, if certain Sattva items were found not differentiating Sattva group from both Rajas and Tamas groups, then they were rejected. If the item differentitates from Rajas or Tamas or both, it was retained as it showed differentiating quality between atleast two groups. For example Sattva item No.15 of Appendix - B showed no significant mean difference when compared with Rajas (t = 1.8) and Tamas (t = 1.9) and hence was rejected from Sattva scale. However, item No.59 differentiating from Tamas (t = 2.64), but not from Rajas (t = 1.0), was retained.

Similar procedure was adopted for Rajas and Tamas items and following analysis was done :

i) Significance of mean difference between scores of high Sattvic and high Rajasic groups on Sattva Scale - (Appendix - C.1)

ii) Signficance of mean difference between scores of high Sattva and high Tamasic group on Sattva Scale - (Appendix - C.2)

iii) Signficance of Mean difference between scores of high Rajasic and high Sattvic groups on Rajas Scale - (Appendix - C.3)

iv) Signficance of Mean difference between scores of high Rajasic and high Tamasic groups on Rajas scale - (Appendix - C.4)

v) Significance of Mean difference between scores of high Tamas and high Sattva groups on Tamas scale - (Appendix - C.5)

vi) Significance of Mean difference between scores of high Tamas and high Rajas groups on Tamas scale - (Appendix-C.6)

Table 4.7 to 4.9 present the comparative status of items indicating basis of selection. Items not found differentiating with balance two gunas were rejected.

TABLE 4.7 : SATTVIC CHARACTERISTICS ON HIGH RAJASIC AND HIGH TAMASIC GROUP

Item	t_r	t_t	Item	t_r	t_t	
4	3.44	2.54	68	1.39	2.16	
6	4.50	2.87	69	3.93	5.89	
7	0.46	Negative*	70	4.38	4.74	
10	2.04	2.39	80	0.43	0.21	*
13	3.11	3.21	81	1.17	0.43	*
15	1.78	1.95 *	86	3.79	3.71	
20	2.53	2.82	95	1.52	1.77	*
21	3.28	3.88	100	1.49	3.31	
26	0.30	0.72 *	109	2.01	2.61	
32	2.56	3.19	117	2.04	1.55	
33	1.51	1.66 *	119	0.90	2.20	
41	1.31	Negative*	125	1.41	3.82	
44	2.16	2.97	126	1.70	1.71	*
46	0.52	2.32	129	3.34	1.80	
48	0.93	2.84	135	1.14	0.69	*
49	1.15	2.81	137	2.75	3.21	
57	2.87	3.51	142	2.78	4.73	
59	1.00	2.64				

Note : 1. t_r = *Mean difference on Sattvic items of the groups of high Sattva and high Rajasic class.*

2. t_t = *Mean difference on Sattvic items of the groups of high Sattva and high Tamasic class.*

3. * *Indicates rejection of item.*

TABLE 4.8 : RAJAS CHARACTERISTICS SHARED BY HIGH SATTVIC GROUP AND HIGH TAMASIC GROUP

Item	t_s	t_t	Item	t_s	t_t
2	3.79	0.79	74	1.81	2.56
3	3.18	2.12	85	0.08	Negative *
11	3.75	3.87	87	1.48	1.34 *
18	2.31	0.87	88	4.09	2.65
22	0.66	0.40 *	89	4.00	2.14
25	3.28	Negative	91	4.18	2.52
27	1.99	Negative	92	2.59	3.26
35	2.73	Zero	93	1.02	0.71 *
36	3.98	1.74	94	2.33	Negative
40	1.72	3.62	108	5.07	1.43
43	Negative	Negative*	111	3.36	2.04
45	2.60	0.73	112	3.74	0.04
53	3.36	0.66	113	2.13	2.63
54	1.98	1.29	114	3.59	2.18
55	4.64	Zero	115	1.23	2.06
62	2.96	1.90	123	2.63	Negative
64	1.61	Negative*	132	5.84	0.82
66	3.77	Negative	146	1.34	4.69
71	0.71	0.29 *	148	1.55	1.09 *
73	1.90	2.47			

Note : 1. $t_s = \left(\frac{M_1 - Ms}{SE_D} \right)$ mean difference between high Rajasic score and high Sattvic group on Rajas items.

t_t = mean difference on Rajas items by persons of high Rajasic and high Tamasic group.

2. * Indicates rejection of item.

TABLE 4.9 : TAMAS CHARACTERISTICS SHARED BY SATTVIC GROUP AND RAJASIC GROUP

Item	t_s	t_r		Item	t_s	t_r	
5	1.85	1.18	*	83	3.88	2.18	
8	2.33	1.06		90	1.65	Zero	*
16	2.73	1.65		98	0.33	Neg.	*
23	2.34	1.08		103	4.14	Neg.	
24	1.12	Negative	*	106	4.06	2.45	
29	3.42	2.81		107	2.07	Neg.	
31	0.98	0.62	*	110	2.90	0.95	
34	4.92	2.87		116	4.64	2.69	
38	1.03	Negative	*	121	3.86	1.47	
42	5.18	1.62		122	3.06	1.34	
47	4.72	0.64		128	2.75	0.83	
51	2.54	2.37		130	2.31	Neg.	
52	4.19	0.74		131	3.92	0.89	
60	0.99	0.63	*	133	4.24	1.69	
63	2.05	Negative		138	3.19	1.61	
65	4.52	1.22		139	3.24	2.03	
67	2.13	Negative		140	2.14	1.00	
75	3.36	0.92		144	3.40	2.01	
76	1.72	1.05	*	147	3.57	2.83	
79	1.19	0.98	*				

Note : 1. t_s = Mean difference between high Tamasic and high Sattvic on Tamasic scale.

t_r = Mean difference between high Tamasic and high Rajasic on Tamasic scale

2. * Indicates rejection of item.

Significance of Mean difference was computed using 't' test. This resulted in rejection of 10 items on Sattva, 8 items on Rajas and 9 items on Tamas scale.

4.2.4 *CHECKING INDEPENDENCE OF SCALE :*

Above psychometric analysis resulted in addition and deletion of statements to give discrimination to individual items. To check how much discrimination they impart to the scale, the test (after revision 4.2.3) was administered on a selected sample of 50 persons. Their scores on each scale were summed up and correlation co-efficient was found between Sattva-Rajas, Sattva-Tamas and Rajas-Tamas scales.

Table 4.10 : Correlation Co-efficient between Scales

	Sattva	Rajas	Tamas
Sattva	--	- 0.45	- 0.35
Rajas	--	--	+ 0.73
Tamas	--	--	--

The results as indicated in Table 4.10 showed that there was high correlation between Rajas and Tamas scale. The matter was discussed and it was inferred that this was due to several common characteristics in Rajas and Tamas. For example, both are jealous, impure, greedy, attached and selfish, only the extent varies. Tamas is greedy and selfish but passive. Rajas is greedy and selfish but active and aspires and acts to gain. Hence, some Rajas items were further edited and some more

were added to give higher emphasis on activity in conjunction with these characteristics.

This revised test was further administered on a different sample of selected 50 persons. Product Moment correlation was computed to find correlation between scores on Sattva-Rajas, Sattva-Tamas and Rajas-Tamas. The results are given in Table 4.11.

Table 4.11 : Correlation Co-efficient between scales on Revised Test

	Sattva	Rajas	Tamas
Sattva	--	- 0.35	- 0.24
Rajas	--	--	+ 0.27
Tamas	--	--	--

The above table shows low correlation between Rajas and Tamas. The three scales, therefore, can be considered as independent. Final inventory, thus, contained 88 items which have been listed in Appendix - D.

4.2.5 VALIDITY :

An index of validity shows the degree to which a test measures what it purports to measure. The construction and use of a test implies that the instrument has been evaluated against

accepted standard, or other criteria which are regarded by experts as a best evidence of the traits or abilities to be measured by the test.

But the problem of validating the test as constructed by the investigator was difficult, because there were no suitable criteria against which the test could be validated. Since work on gunas is still in its infancy, no such test or criteria has been developed so far. The investigator, therefore, decided to use acquaintance rating scale criteria to validate the test.

4.2.5.1 *OBJECTIVE VALIDITY :*

Objective validity was tested by administering inventory on 30 persons and then rating these people on some characteristics by their close acquaintances. List of these characteristics is given in Appendix - F. Acquaintances were asked to rate the subject on 5 point scale similar to what is adopted in the inventory. The scores obtained by both the methods i.e. (i) self-rating by individuals on inventory and (ii) rating given to individuals by their acquaintances on particular scale, were then correlated, as indicated in Table - 4.12.

Table 4.12 : Objective Validity - Test (Correlation Co-efficient)

Sattva	-	*0.51*
Rajas	-	*0.41*
Tamas	-	*0.54*

Table 4.12 shows moderate correlation, thereby providing objective validity of inventory i.e. the inventory is describing the personality of an individual in conformity with the description of acquaintances.

The other method adopted to check its objective validity was to correlate it with the Eysenck's MPI. The description of an individual having dominant tendencies of Rajasic guna is close to the description of an Extravert in Eysenckian framework. Similarly Tamasic guna is parallel to neurotic type in Eysenckian description. Hence, it was decided to check objective validity of Rajasic and Tamasic scale by finding correlation with Extravert and Neurotic scale respectively. For this 50 subjects were administered the inventory alongwith Eysenck's MPI. Correlation was computed on scores of three scales of Tri-dimensional scale Vs Extravert and Neuroticism.

Table 4.13 : Correlation Coefficient with Eysenck's MPI

	Extravert	*Neuroticism*
Sattva	*0.11*	*0.17*
Rajas	*0.28*	*0.19*
Tamas	*- 0.17*	*0.54*

As indicated in Table 4.13, Rajas scale shows significant correlation with extraversion and Tamas scale shows high correlation with neuroticism. Other correlations such as between Sattva Vs extraversion, Sattva Vs neuroticism, Rajas Vs

neuroticism, Tamas Vs extraversion show low correlations.

Above two tests confirmed the objective validity of the inventory.

4.2.6 *RELIABILITY :*

Reliability refers to the extent to which instrument yields consistent results on testing and re-testing. If a test does not have a high degree of reliability, it can have but limited value, if any, in predicting an individual's performance or level of development. Reliability is not, however, an all or none law; it is a matter of degree. It is difficult to obtain 100% reliability as far as human behaviour is concerned. There is always some variation in results. It may be due to some error of measurement, large or small, or to the fact that it is 'normal' for human beings who are constantly in the process of growth and development to vary in performance.

The following methods are normally used to obtain reliability :

i) Test-Retest Method :

The same form of the test may be administered twice to the same group of individuals.

ii) Equivalent Form Method :

Two separate but equivalent forms of the test may be administered to the same individuals.

iii) Split-Half Method :

The test items of a single test are sub-divided into two presumably equivalent and separate sets.

Out of three, the most useful method for a heterogenous test is the retest variety. The test is repeated on the same group, after a period of time and co-efficient of correlation is calculated between the two sets of scores. The advantage of retest is that it yields information about the stability of rank orders of individual's over a period of time. A high correlation from this source indicates that person change very little in status within their population from the first to the second testing. It also indicates that the test measures the same functions before and after the interval.

To test the reliability of constructed scales it was readministered after the gap of 6 weeks on the group of 50 subjects who were also the subjects for testing independence of scales. Co-efficient of correlation between these two sets of scores was found out. Results are presented in Table 4.14.

Table : 4.14 : Reliability Co-efficient

Sattva	*Rajas*	*Tamas*
0.62	*0.83*	*0.70*

Reliability co-efficient for Sattva scale was 0.62, for Rajas scale 0.83 and for Tamas scale it was 0.70. These are fairly high co-efficients and show that the test is reliable.

SUMMARY :

i) Following item selection procedure described in 4.2.3, only 88 items remained as final inventory from the initial list of 149 items.

ii) The final inventory maintained items on most of the characteristics of Sattva, Rajas and Tamas personalities.

iii) The three scales i.e. Sattva, Rajas and Tamas were found to be independent of each other.

iv) The final inventory passed the criterion validity and objective validity test.

v) Final inventory was found to be reliable.
