CHAPTER IX

FINAL ADMINISTRATION OF THE INVENTORY FOR NORMS STUDY

9.1 INTER-GROUP DIFFERENCES

It was mentioned earlier that the Inventory was meant for the educated and English-knowing popula-tion. The item-analysis data was collected from the college students, secondary school teachers and the clerical personnel with college education. Therefore, the population of standardization of the Inventory was, the people who had been to college or who were in college. Moreover, the population was further restricted to the State of Gujarat for the practical purposes, though the language of the Inventory has been kept English for its wider applicability. This would, however, need further studies with popula-tions in the different states.

For the purpose of final administration to

determine the norms and the reliability, major sample was drawn from the college going people. Rest of the sample was drawn from the teachers in the secondary schools and the universities, and some administrative personnel and the clerical staff.

The sample of the students was drawn from the three existing universities in the State of Gujarat. The total student population in these universities is given in the table IX-1 below. The figures are based on the annual reports of the three universities for the year 1962-63.

TABLE IX-1

Number of Students in the Different Faculties of the Three Universities

Faculty	Gujarat University		M.S.University of Baroda	Sardar Vallabhbhai Vidyapeeth
	Men	Women		
Arts	12532	6141	1177	1182
Commerce	5533	149	1108	626
Science	12177	1466	820	1727
Engineering	1256	6	1875	1101
Medicine	1289	397	417	-
Ayurved	319	85	-	-
Agriculture	214	-	-	679
Law	2127	117	458	-
Fine Arts	-	-	176	-
Education	-	-	264	222
Social Work	-	-	73	-
Home Science	-	-	504	-

Separate figures for men and women students were available only from the report of the Gujarat

University. It was decided to see if there were any significant group differences on the two scales. If there are none, the matter of sampling for norms would become easier.

It was decided to select about 2500 cases for the study of norms. Students were selected from the three universities from the faculties of Arts, Commerce, Science and Engineering. The reason for selecting these faculties was that major part of the student population belonged to these. The total student population in these faculties in proportion to the entire strength of the universities is given below in table IX-2 in terms of percentage.

TABLE IX-2

Proportion of Students in the Faculties of Arts, Commerce, Science and Engineering in the Three Universities

	Total	In Faculties of Arts, Commerce, Science & Engineering	Approximate %age
Gujarat University	43808	39260	90
M.S.University	6872	4980	73
S.V.Vidyapeeth	5537	4636	84

Data was first collected from Sardar Vallabhbhai Vidyapeeth to study the nature of group differences on the two scales. The distribution of sample is given in the table IX-3 below:

TABLE IX-3

Sample of Men Students from S.V.Vidyapeeth to study the Group Differences in the Population

Faculty	Pre University	First Year	Second Year	Third Year	Post graduate
Arts	50	46	32	41	23
Commerce	76	46	42	34	56
Science	72	24	35	33	36
Engineering	62	56	40	46	-

Tables IX-4 and IX-5 show the mean scores of the different groups on the two scales and the standard deviation values.

TABLE IX-4

Means and Standard Deviations on Introversion-Extraversion Scale

Faculty	Year or Class	Mean	S.D.
Arts	Pre-Arts	11.49	2.59
	First Year	11.02	2.61
	Second Year	10.50	2.24
	Third Year	10.78	2.40
	Post Graduate	11.08	2.92
	Total	11.01	2.57
Commerce	Pre-Commerce	11.35	2.78
	First Year	10.63	2.49
	Second Year	10.85	1.88
	Third Year	11.23	2.18
	Post Graduate	10.96	2.29
	Total	11.03	2.44
Science	Pre-Science	11.64	2.85
	First Year	11.92	3.12
	Second Year	11.12	2.63
	Third Year	11.56	2.52

Table IX-4 (Contd.)

Faculty	Year or Class	Mean	S.D.
	Post Graduate	10.76	2.81
	Total	11.41	2.82
Engineering	Pre-Engineering	10.98	2.44
	First Year	11.49	2.72
	Second Year	9.32	2.36
	Third Year	11.60	2.11
	Total	10.93	2.78

TABLE IX-5

Means and Standard Deviations on Normal-Neuroticism Scale

Faculty	Year of Class	Mean	S.D.
Arts	Pre-Arts	10.45	1.96
	First Year	10.95	2.11
	Second Year	10.90	1.54
	Third Year	11.30	1.89
	Post Graduate	11.00	2.31
	Total	10.89	2.00

Faculty	Year or Class	Mean	S.D.
Commerce	Pre-Commerce	10.63	1.72
	First Year	11.50	2.33
	Second Year	11.16	1.75
	Third Year	10.62	2.13
	Post Graduate	10.11	2.09
	Total	10.76	2.03
Science	Pre-Science	9.87	1.63
	First Year	10.32	2.48
	Second Year	10.55	2.01
	Third Year	12.30	2.15
	Post Graduate	11.30	2.10
	Total	10.70	2.18
Engineering	Pre-Engineering	10.82	2.01
	First Year	11.61	1.90
	Second Year	10.32	1.86
	Third Year	11.59	2.18
	Total	11.11	2.07

Differences between the various group means

were tested for significance by analysis of variance; the results showed that there were no significant differences from one class to another, and from one faculty to another on any of the scales.

Parallel data was collected from women students from the faculties of Arts and Science. Of the total sample of 265, 160 belonged to Arts and 105 to Science. The whole sample was treated as homogeneous sample on the grounds of the results obtained above. It was compared with the total sample of men. The tables IX-6 and IX-7 give the values of means and S.D.s, for the two groups on the two scales.

TABLE IX-6

Means and Standard Deviations of Men and Women on Introversion-Extraversion Scale

	N	Mean	S.D.	SEm
Men	850	11.09	2.61	0.09
Women	265	10.72	3.05	0.18

TABLE IX-7

Means and Standard Deviations of Men and Women on Normal-Neuroticism Scale

	N	Mean	S.D.	SEm
Men	850	10.86	2.07	0.05
Women	265	11.54	2.62	0.11

The 't' ratio for introversion-extraversion scale was 1.85; for the other, it was 4.10. The first is not significant. The other is significant at 0.01 level of confidence. This means that there were significant sex differences with regard to the scale of normal-neuroticism. The women scored higher than men. The difference, though significant was less than one-third of the standard deviation of the combined samples. Therefore, for the purposes of norms, the two sex groups were treated together, even on normal-neuroticism scale.

The above results were based on the study of the students from one of the three universities. -

Data from the other two universities was collected and care was taken to spread the sample in the different faculties and the different classes, though these factors had proved to be insignificant in the determination of scores.

As the populations in the existing three universities in the State of Gujarat are drawn from the whole of Gujarat and also in small proportions from outside of it, and they represent rural and urban, men and women, it was logical to assume that there should be no significant differences from one university to another. This null hypothesis was put to actual test by comparing the mean scores of the samples from the three universities on the two scales. The results are presented below, in tables IX-8 and IX-9.

TABLE IX-8

Means and Standard Deviations of the Samples from the Three Universities on Introversion-Extraversion Scale

	University	N	Mean	S.D.	SEm
I.	S.V.Vidyapeeth	1115	11.00	2.85	0.09
II.	Gujarat University	1440	11.40	2.58	0.07
III.	M.S.University	392	11.15	2.67	0.13

TABLE IX-9

Means and Standard Deviations of the Samples from the Three Universities on Normal-Neuroticism Scale

	University	N	Mean	S.D.	SEm
I.	S.V.Vidyapeeth	1115	11.02	2.34	0.07
II.	Gujarat University	1440	11.30	2.82	0.07
III.	M.S.University	392	11.51	2.99	0.15

In case of introversion-extraversion scale, the difference of 0.40 between samples I and II was significant at 0.01 level of confidence (t = 3.50).

In case of the normal-neuroticism scale, differences of 0.28 and 0.49 between samples I and II, and I and III respectively were also significant at the same level (t = 2.80 and 2.88 respectively).

A more close look at these differences, however, revealed that the maximum difference of 0.49 was less than one-fifth of the combined SD of the sample (SD = 2.65). It was, therefore, decided to treat the data from all the three universities together for determining the norms.

Samples were also drawn from the teachers and clerical /personnel. The results of these data, as presented in the following tables, revealed that these two groups did not differ from one another on any of the scales. When combined, their means showed no significant differences from those of the college samples.

TABLE IX-10

Means and Standard Deviations of the Teachers and the Clerical Personnel on the Introversion -Extraversion Scale

Group	N	Mean	S.D.	SEm
Teachers	113	10.92	2.24	.21
Clerical Personnel	54	11.10	2.38	.32

t ratio is 1.20, which is not significant.

TABLE IX-11

Means and Standard Deviations of the Teachers and the Clerical Personnel on the Normal-Neuroticism Scale

Group	N	Mean	S.D.	SEm
Teachers	113	11.00	2.94	.28
Clerical Personnel	54	11.42	3.09	.42

t ratio is 1.68, which is not significant.

TABLE IX-12

Means and Standard Deviations of the College Students and the Non-Collegiate* Sample on Introversion-Extraversion Scale

Group	N	Mean	S.D.	SEm
College students	2947	11.22	2.68	.05
Non-collegiate sample	167	10.96	2.36	.18

* Teachers and clerical personnel combined.
t ratio is 1.37, which is not significant.

TABLE IX-13

Means and Standard Deviations of the College Students and the Non-Collegiate Sample on Normal-Neuroticism Scale

Group	N	Mean	S.D.	SEm
College students	2947	11.22	2.65	.05
Non-collegiate sample	167	11.08	3.00	.23

t ratio is .58 only, which is obviously not significant.

Most of the differences between the various sub-groups of the samples were not significant statistically. Very few, which were significant, were of the magnitude which could well be ignored[1], while calculating norms, and the whole population could be treated as a whole for this purpose. The maximum mean-difference which was obtained in this study was of the magnitude of less than one-third of the standard deviation.

9.2 NORMS

As seen in the previous section, there were no large variations from one group to another on any of the two scales. Hence it was decided to calculate norms on the basis of the total sample from which data was collected. This consisted of 3114 cases. Sample was drawn from the college students of the three universities in Gujarat, teachers, clerical and the administrative personnel. The mean

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1 H.J.Eysenck, Manual of the Maudsley Personality Inventory (London: University of London Press, 1959), p. 6.

scores of the total group with standard deviation and standard error are given in the table IX-14.

TABLE IX-14

Means, Standard Deviations and Standard Errors of the Means of the Total Sample on the Two Scales

Scale	Mean	S.D.	SEm
Introversion-Extraversion	11.18	2.70	0.05
Normal-Neuroticism	11.24	2.68	0.05

Equal values of means and standard deviations on the two scales were just accidental. As a matter of fact, there were twenty items on the first scale and twenty-two on the second. In spite of this difference, the norms would be the same for both the scales.

As the range of scores was small by virtue of the limited number of items, norms in terms of finer gradations such as percentiles could not be calculated in this case. Even otherwise, in personality measurement, categorized norms are more common.

Therefore, norms were calculated in terms of A,B,C, D,E categories.

This categorization was done on the basis of normal distribution. In fact, the scores obtained in the norms study confirmed to the normal distribution. The figures IX-1 and IX-2 demonstrate this clearly, and the test of Chi-square (Tables IX-15 and IX-16), applied to test the normality of the distribution also confirmed this fact.

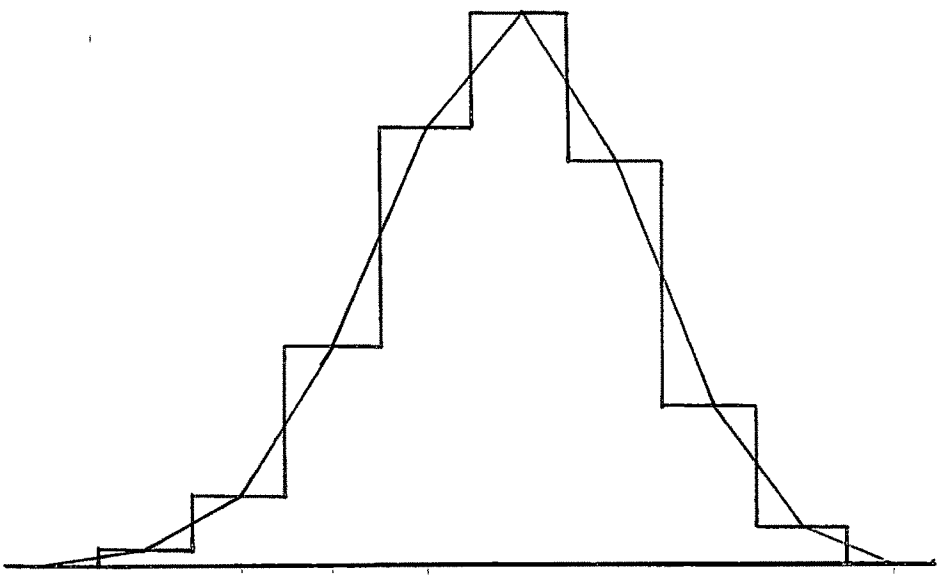
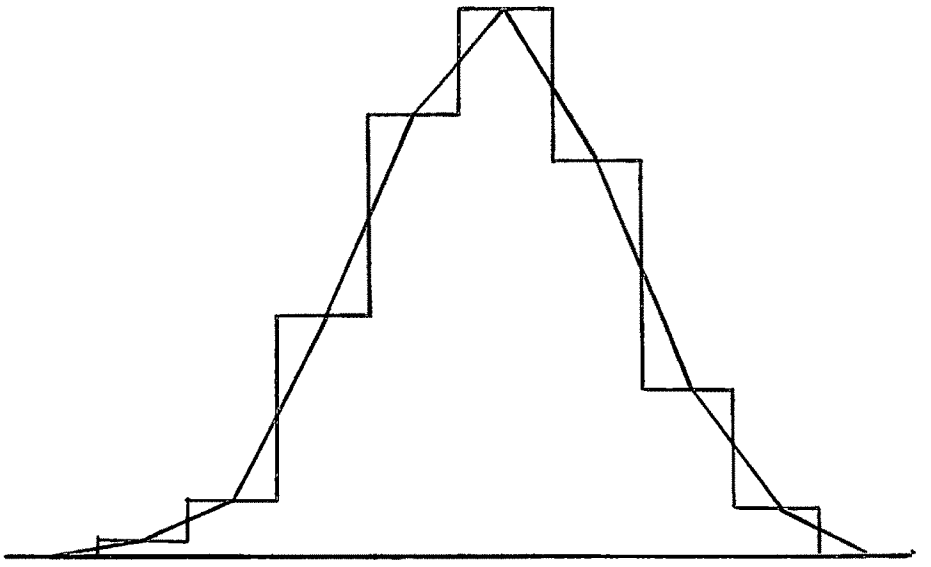


Figure IX-1

Distribution of Scores on the Introversion-Extraversion Scale



	3-4	5-6	7-8	9-10	11-12	13-14	15-16	17-18
f	13	86	391	724	903	657	271	69

Figure IX-2

Distribution of Scores on the Normal-Neuroticism Scale

TABLE IX-15

Chi-square Test of Normality of Distribution on Introversion-Extraversion Scale

Upper limits of intervals	Deviation from Mean	Deviation in σ units	Area from Mean	Area between step limits	Theoretical frequency fe	Observed frequency fo	$\frac{(fo-fe)^2}{fe}$
18.5	7.3	2.71	.5000 .4966	.0034 .0210	76	68	0.84
16.5	5.3	1.97	.4756	.0849	264	257	.19
14.5	3.3	1.23	.3907	.2063	642	664	.75
12.5	1.3	0.48	.1844	.2870	894	909	.25
10.5	-0.7	-0.26	-.1026	.2387	743	720	.71
8.5	-2.7	-1.00	-.3413	.1186	369	363	.10
6.5	-4.7	-1.75	-.4599	.0337	105	121	2.44
4.5	-6.7	-2.49	-.4936 -.5000	.0064	20	12	3.20
						X^2	8.48

df = 7; X^2 = 8.48; p = .29

TABLE IX-16

Chi-square Test of Normality of Distribution on Normal-Neuroticism Scale

Upper limits of intervals	Deviation from Mean	Deviation in σ units	Area from Mean	Area between step limits	Theoretical frequency fe	Observed frequency fo	$\frac{(fo-fe)^2}{fe}$
18.5	7.3	2.71	.5000 .4966	.0034 .0210	76	69	0.64
16.5	5.3	1.97	.4756	.0849	264	271	0.19
14.5	3.3	1.23	.3907	.2063	642	657	0.35
12.5	1.3	0.48	.1844	.2870	894	903	.09
10.5	-0.7	-0.26	-.1026	.2387	743	724	.49
8.5	-2.7	-1.00	-.3413	.1186	369	391	1.31
6.5	-4.7	-1.75	-.4599	.0337	105	86	3.44
4.5	-6.7	-2.49	-.4936 -.5000	.0064	20	13	2.45
						X^2 =	8.96

df = 7; X^2=8.96; p = .26.

The 'p' (Probability) values showed that the obtained distribution did not deviate significantly from the normal distribution.

The categorization of scores for determining the norms, as based on the normal distribution is given in the following tables:

TABLE IX-17

Raw Scores and Their Equivalent Categories (Introversion-Extraversion Scale)

Raw score	Category	Scale Meaning
6 or below	A	Extreme extravert
7-8-9	B	Extravert
10-11-12-13	C	Ambivert
14-15-16	D	Introvert
17 or above	E	Extreme introvert

TABLE IX-18

Raw Scores and Their Equivalent Categories (Normal-Neuroticism Scale)

Raw Score	Category	Scale Meaning
6 or below	A	Excellent emotional poise
7-8-9	B	Emotionally stable
10-11-12-13	C	Average
14-15-16	D	Neurotic and emotionally unstable
17 or above	E	Extreme neurotic and emotionally unstable

Attempt was made to calculate the decile points in terms of raw scores, but the narrow range of scores due to the smaller number of items made it impracticable to divide the scale into more finer categories. Moreover, the very purpose of the present Inventory was to make available a quick, practicable and reliable measure of the two important dimensions of personality. The above categorized norms serve very well this purpose.

9.3 SUMMARY

Data was collected from a large sample for the determination of the norms. Within the sample there were different sub-groups, such as men and women, students and non-students, different faculties and classes. But it was the observation that there were no significant group differences in the majority of the cases. Whatever significant differences were obtained, were of the magnitude of less than one-third of the standard deviation and, therefore, could be safely ignored. The whole sample consisting of 3114 cases was considered together for the determination of norms. The mean scores of this sample on the two scale were almost the same and also the variabilities. The norms were calculated in terms of A, B, C, D and E categories, and were based on the normal distribution.

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