CHAPTER IV

STATISTICAL ANALYSIS OF RESULTS

Part I

In analysing the data of the present study, we shall first deal with the first hypothesis viz,, "congruence between perceived self-acceptance and ideal self-acceptance varies directly with objective acceptance of others".

The Q-sort method used for this hypothesis was this: each of the 240 subjects made two appraisals with the sample of 49 statements, namely: (1) a description of himself as he actually perceived himself, and (2) a description of himself as he would most like to be. These appraisals were made by placing the statements in 7 different categories as reported on Table II. Accordingly, the statements received different scores. Thus there were 49 statements with two distributions of scores. These distributions were then correlated by the Pearson product-moment coefficient of correlation and an r was obtained for each subject. Thus a distribution of 60 r's was obtained for each of the four communities. These r's were converted to Fisher's z's, and the mean z for each community was obtained and converted back to an r. See Table III.

TABLE III

CHARACTERISTICS OF THE DISTRIBUTION OF r's REFERRING TO THE CONGRUENCE OF PERCEIVED SELF ACCEPTANCE & IDEAL SELF ACCEPTANCE FOR EACH COMMUNITY

Distributions	Mean	Standard deviation	Range
Zoroastrians	.46	.34	-.28 to .88
Hindus	.42	.27	-.25 to .82
Catholic	.29	.35	-.53 to .82
Muslims	.38	.29	-.22 to .79

a) For the Zoroastrians, these r's were all positive values ranging from .00 to .88 except in two cases where they were -.16 and -.28 for subjects 1 and 30, both girls. The distribution of the z equivalents had a standard deviation of .354 and a mean of .494. This mean converted back to an r score was .46. See Table XVI in the Appendix.

Since for an N of 49, correlations above .273 and below -.273 are significantly different from zero at the five per cent level of confidence, and correlations above .350 and below -.350 are significantly different from zero at the one per cent level of confidence, it was found that 33 correlations (15 girls & 18 boys) were significant at the .01 level, and 11 correlations (7 girls & 4 boys) were significant at the .05 level, and one was significant at the .05 level on the negative side, -.28 for subject 30.

b) For the Hindus, the r's were all positive values ranging from .08 to .823 except in three cases where they were -.166, -.009 and -.250 for subjects 11, 26 and 57, two girls and one boy. The distribution of the z equivalents had a standard deviation of .272 and a mean of .446. This mean converted back to an r score was .42. See Table XVII in the Appendix.

It was found that 36 correlations (19 girls & 17 boys) were significant at the .01 level of confidence, and 7 correlations (4 girls & 3 boys) were significant at the .05 level, and none was significant on the negative side.

c) For the Catholics, 50 r's were positive values and 10 r's were negative values (6 girls & 4 boys). The positive r's ranged from .039 to .823; and the negative r's from -.529 to -.009. The distribution of the z equivalents had a standard deviation of .367 and a mean of .292. This mean converted back to an r score was .29. See Table XVIII.in the Appendix.

It was found that 23 correlations (9 girls & 14 boys) were significant at the .01 level, and 2 correlations (1 girl & 1 boy) were significant at the .05 level. On the negative side, only one correlation (a girl) was significant, and that at the .01 level.

d) For the Muslims, the r's were all positive values ranging from .019 to .794 except in five cases where they were -.117, -.058, -.029, -.019 and -.225 for subjects 5, 27, 43, 50 and 58, two girls and three boys. The distribution of the z equivalents had a standard deviation of .294 and a mean of .402. This mean converted back to an r score was .38. See Table XIX.

It was found that 30 correlations (15 girls & 15 boys) were significant at the .01 level of confidence, and 7 correlations (3 girls & 4 boys) were significant at the .05 level, and none was significant on the negative side.

TABLE IV

CHARACTERISTICS OF THE DISTRIBUTION OF SCORES OF ACCEPTANCE OF OTHERS FOR EACH COMMUNITY

Distribution	Mean	Standard deviation	Range
Zoroastrians	138.16	14.66	101 to 172
Hindus	140.55	13.91	102 to 167
Catholics	131.51	12.69	106 to 170
Muslims	139.40	13.50	103 to 169

In order to measure "acceptance of others", the subjects were asked to describe themselves in terms of the scales of acceptance of others as has been explained in Chapter III. But before the administration of these scales, a measure of their reliability was obtained thus: 20 Junior B.A. students, boys and girls, who had not taken part in the testing programme of the present study, were administered the above scales. Two days later, the same subjects repeated the same operation. The scores were correlated and a reliability coefficient of .84 was obtained. Then the scales were administered to the subjects of the present study.

See Table IV for the characteristics of the distributions of scores of acceptance of others for each community.

The total scores for each Zoroastrian subject on the scales of acceptance of others is given in Table XX in the Appendix. The mean Zoroastrian score was 138.16 and the standard deviation was 14.66.

The total scores for each Hindu subject on the scales of acceptance of others is given in Table XXI in the Appendix. The mean Hindu score was 140.55, and the standard deviation was 13.91.

The total score for each Catholic subject on the scales of acceptance of others is given in Table XXII in the Appendix. The mean Catholic score was 131.51, and the standard deviation was 12.69.

The total scores for each Muslim subject on the scales of acceptance of others is given in Table XXIII in the Appendix.

The mean Muslim score was 139.40, and the standard deviation was 13.50.

To test the hypothesis in each community separately, the z's of the congruence of perceived self-acceptance and ideal self-acceptance of each community were correlated (Pearson r) with the total score of acceptance of others of the same community. Since for an N of 60, correlations above .325 and below -.325 were significantly different from zero at the one per cent level of confidence, it was found that the resulting r of .40 of the Zoroastrians was significant at the .01 level. And since for an N of 60, correlations above .250 and below -.250 are significantly different from zero at the five per cent level of confidence, it was found that the resulting r of .29 of the Hindus was significant at the .05 level. The resulting r of .05 of the Catholics, and the r of -.13 of the Muslims, failed to reach significance. See Table V.

TABLE V

CORRELATIONS BETWEEN CONGRUENCE OF PERCEIVED SELF ACCEPTANCE AND IDEAL SELF ACCEPTANCE AND SCORES ON THE SCALES OF ACCEPTANCE OF OTHERS FOR EACH COMMUNITY

Communities	r	Sig.
Zoroastrians	.40	1% level
Hindus	.29	5% level
Catholics	.05	Not sig.
Muslims	-.13	"

Part II

The second hypothesis states that, "the relationship ... is a function of various psychological factors as found in Indian College Student Communities".

From the results as explained in Part I, it is clear that the hypothesis came true in two communities only viz., Zoroastrian and Hindu; and that the degree of significance was high in the Zoroastrian community, while it was considerably lower in the Hindu community. A further study was made to find out the various psychological factors responsible for these findings and for Zoroastrian and Hindu differences. To this purpose it was decided to select the eight Zoroastrians with the highest correlation of congruence between self-ideal acceptance, and to compare them with the eight Hindus who stood highest in the same correlation. That is, a comparative study between the best representatives of each community.

It will be remembered that, these subjects made a self-appraisal on 49 Q-sorts expressing self-acceptance. Thus a variate was obtained for each person of his perceived self-acceptance. Eight Zoroastrian variates were then correlated with eight Hindu variates to investigate in what measure self-acceptance was shared by Zoroastrians and Hindus, and what it meant in terms of psychological factors.

A. Persons Reliability

Table VI presents the reliability coefficient of each person. These persons' self-appraisals were at issue, and in each case a reliability coefficient was obtained by repeating the self-appraisals a few days later. The results showed a satisfactory reliability for the present study, although subject No. 16 had a remarkably low coefficient of .752 compared to the others.

The coefficient range for Zoroastrians was from .872 to .960 with an average of .916. The Hindu range was from .752 to .951 with an average of .874.

This Table reports a slight difference in reliability between Zoroastrians and Hindus.

TABLE VI

RELIABILITY COEFFICIENT OF EACH ZOROASTRIAN (1 to 8) AND OF EACH HINDU (9 to 16) FOR THE TEST ON PERCEIVED SELF ACCEPTANCE.

Subjects								
Zoroastrians	1 .932	2 .902	3 .960	4 .902	5 .902	6 .902	7 .960	8 .872
Hindus	9 .951	10 .912	11 .872	12 .922	13 .803	14 .940	15 .840	16 .752

B. Intercorrelations

Eight Zoroastrian variates of subjects 1 to 8, and eight Hindu variates of subjects 9 to 16 were correlated with one another, and a correlations matrix was formed. Table VII shows the Pearson product moment correlations between Zoroastrians and Hindus, for their perceived self-acceptance appraisals. It may be noted that all the coefficients are positive. Zoroastrian coefficients are all significant at the .01 level. The coefficient range is from .41 to .73, with a mean r of .551. Hindu coefficients are considerably lower; of these 10 coefficients reach the .01 level, 5 are significant at the .05 level, and 15 fail to be significant. Their range lies between .08 and .68, with a mean r of .336. The "cross-correlations" between Zoroastrians and Hindus are all positive also; of these 41 reach the .01 level, and 8 the .05. Their average is .438. This correlation table reports that Zoroastrians correlate highly among themselves and Hindus correlate poorly among themselves.

The mean correlations were computed after converting the correlation coefficients into Fisher's z's.

TABLE VII

CORRELATIONS BETWEEN 16 STUDENTS FOR N=49 SELF REFERENT STATEMENTS ASSESSED FOR SELF-APPRAISAL. EIGHT ARE ZOROASTRIANS (1 to 8) AND EIGHT HINDUS (9 to 16)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	-	55*	59*	57*	59*	61*	57*	59*	70*	60*	48*	48*	12	61*	41*	16
2			57*	53*	45*	67*	41*	44*	52*	43*	31**	52*	38*	52*	38*	16
3				73*	52*	63*	47*	42*	56*	66*	42*	56*	26	50*	34**	24
4					54*	57*	55*	46*	66*	59*	41*	59*	14	52*	29**	25
5						47*	48*	58*	59*	41*	64*	21	31**	67*	49*	21
6							51*	51*	66*	71*	53*	45*	23	70*	45*	33**
7								60*	56*	34**	45*	44*	11	54*	30**	02
8									70*	24*	44*	30**	10	66*	35*	27
9										59*	58*	55*	08	68*	47*	31**
10											33**	28**	18	59*	20	17
11												26	19	51*	45*	28**
12													16	30**	17	26
13														09	08	24
14															48*	20
15																39*
16																

Cross-correlation range .02 to .71 ; Zoroastrian range .41 to .73 ; Hindu range .08 to .68

Cross-correlation mean .43 ; Zoroastrian mean .55 ; Hindu mean .34

* P .01 ** P .05 Decimal points are omitted in all cases

C. Centroid Factor Analysis

The correlation matrix reported in Table VII was subjected to a centroid factor analysis by the Thurstone technique. It is difficult to agree upon a criterion for discontinuing factorization. In the present study, however, McNemar's criterion (3) was used to decide on sufficient factors. This criterion rests on the comparison of the estimated standard deviations of the remaining partial correlations after the extraction of the nth factor, with the standard error of a zero correlation. Thus it is possible to determine when the remaining variance in the residual correlation matrix can be attributed to chance errors. Table VIII shows the standard deviations of the partial correlations after Factor I and II were extracted.

TABLE VIII

ESTIMATED STANDARD DEVIATIONS OF RESIDUAL PARTIAL CORRELATIONS AFTER EXTRACTION OF FACTORS I AND II

Factors	I	II
σ res	.163	.106
Standard Error of zero - r	.143	.143

As σ res after extraction of Factor II was smaller than the standard error of zero-r, its variance could be attributed to chance errors, and hence Factor III was not considered.

To test the significance of Factor II, Guilford and Lacey's test (1) was used. It consists in multiplying the two highest factor loadings for a given factor regardless of sign. In the present case they were .364 and .348. If their product is higher than the standard error of a zero correlation, the factor is deemed significant. As the product of the above factor loadings was .138, that is, lower than .143 as shown in Table VIII, then Factor II was considered non-significant.

TABLE IX

CENTROID FACTOR MATRIX FOR EACH ZOROASTRIAN, AND FOR EACH HINDU, FOR PERCEIVED SELF ACCEPTANCE, TOGETHER WITH COMMON SPECIFIC & ERROR VARIANCES

Zoroas-trians	I	h	s	e	Hin-dus	I	h	s	e
1	.784	.615	.317	.068	9	.838	.702	.249	.049
2	.707	.500	.402	.098	10	.661	.437	.475	.088
3	.771	.594	.366	.040	11	.651	.424	.448	.128
4	.765	.585	.317	.098	12	.576	.332	.590	.078
5	.737	.543	.359	.098	13	.287	.083	.720	.197
6	.822	.676	.226	.098	14	.778	.605	.335	.060
7	.654	.428	.532	.040	15	.540	.291	.549	.160
8	.692	.479	.393	.128	16	.365	.133	.619	.248
$\frac{\Sigma a^2}{n}$	.552	.552	.364	.084		.376	.376	.498	.126

Table IX shows the factor matrix of Zoroastrians and Hindus together with the communality, specificity, and error variance for each person. The communalities were obtained by squaring the

common factor loadings for each person; each person's specificity was computed by substracting the communality of each person from their respective reliability coefficients; and the error variance was obtained by substracting the reliability coefficient of each person from unity. This table shows also the proportion of the total variance attributable to common, specific, and error factors $(\frac{\Sigma a^2}{n})$.

In order to study the different psychological factors as found in Zoroastrians and in Hindus under investigation, this procedure will be followed:

(1) error variances, specificities, and communalities will be compared; (2) Zoroastrian and Hindu contributions of Factor I, and differences in its nature will be examined; (3) differences between Zoroastrians and Hindus in the nature of Factor I will be interpreted in terms of a Factor Array of the statements of the Q-technique sample used, in rank order of their factor-scores, as suggested by Stephenson (4, p. 174).

Reference to Table IX reveals a difference between Zoroastrians and Hindus in their respective amounts of common, specific and error variances in the self-appraisals for perceived self-acceptance.

Since a slight difference was found in the reliability coefficients of Zoroastrians and Hindus, it follows that some discrepancy would show up also in their respective error variance. In fact, the proportion of total error variance accounted for by

Hindus is 59.4% while 40.5% is the Zoroastrian contribution.

Another difference was found between Zoroastrians and Hindus with regard to their specificity. Hindus account for 57% of the total amount of specificity in the 16 persons under study, while the Zoroastrian contribution was 42%. Hence it appears that Hindus have more specific factors which make them share less in the common variance with Zoroastrians. The true variance of a person contains both his communality and his specificity. Zoroastrian and Hindu differences appear again in this that, Zoroastrian communality is high, and Hindu communality is considerably lower.

Considering the size of Factor I in Table IX, it appears that Factor I nearly exhausted the common variance in the correlation matrix. It was found that the proportion of common variance accounted for by Factor I was 86%. A glance at Table IX reveals that Zoroastrian Factor I loadings cluster together ranging from .654 to .822; while Hindu Factor I loadings scatter over a wide range from .287 to .838. Comparing the size of Factor I in Zoroastrians and Hindus, it was found that Zoroastrians had a much larger general factor than Hindus. Zoroastrian Factor I took up 59.4% of the common variance, while the proportion of common variance of Factor I was 40.5% for Hindus.

D. Testing for Homogeneity of Variance

Zoroastrian and Hindu differences in the nature of Factor I may be studied more significantly by testing for Homogeneity of Variance the variances of Zoroastrian Factor loadings and

of Hindu Factor loadings. If the difference between Zoroastrian variance and Hindu variance were not significant, then these two groups might be said to be samples of the same population. But if the obtained difference is significant, it shows that Zoroastrians and Hindus belong to two different populations.

Fisher's method and Snedecor's Tables were used. An F of 11.6 was obtained, which is significant at the 2% level of confidence.

TABLE X

ZOROASTRIAN AND HINDU VARIANCES IN FACTOR LOADINGS TOGETHER WITH F VALUE

Persons	s^2	F	Sig.
Zoroastrians	.003	11.6	2% level
Hindus	.035		

In terms of the hypothesis of the present study, the above findings indicate that a significant difference exists in the nature of Factor I between Zoroastrians and Hindus. The Zoroastrian Factor loadings, having a small variance, tend to cluster together round a pattern; while the Hindu Factor loadings, with a much larger variance, scatter over a wide range. These differences will be interpreted later in the factor-array.

E. Factor-Array Method

Differences in Factor loadings will be interpreted by a Factor-Array Method as explained by Stephenson (4, p. 174), and will be labelled in terms of the contents of the Q-sorts that stood highest and of those which stood lowest in the array.

Stephenson says:

> "Factor-arrays consist of all the statements or the like of a Q-technique sample, arrayed in rank order of their factor scores. The statement which gains the highest score for a factor is placed at the head of the list and that scoring least is placed at the bottom. In this way all the statements are laid out before us; we can then look them over, much as we might look down a list of the names of students who have been ranked in order of their achievement at school".

The eight Zoroastrian arrays and the eight Hindu arrays have the same mean, and the same standard deviation. But as each person had a different "weight" with regard to Factor I loadings, a method is devised to obtain an array which will have the best approximation to Factor I. The following formula will be used:

$$\frac{w_p}{w_q} = \frac{r_{pa}\,(1 - r^2_{qa})}{r_{qa}\,(1 - r^2_{pa})}$$

If two persons have loadings p and q, respectively, in factor a, the "weights" would be in proportion to each other as above. Here r_{pa} and r_{qa} are the factor loadings of the person P and Q in factor a, and the required "weights" are w_p and w_q.

The working of this method will appear more clearly when differences in Factor loadings will be interpreted in Chapter V, Part II.

Part III

Item Analysis on Objective Acceptance of Others

This third part is a continuation of the study of Zoroastrian and Hindu differences. Just as in Part II eight Zoroastrians and eight Hindus were compared on their perceived self-acceptance, thus in this Part III Zoroastrian and Hindu subjects will be compared on obtained scores on the scales for acceptance of others.

The study in Part II revealed some psychological factors which were responsible for the Zoroastrian-Hindu differences in perceived self-acceptance. It was thought that a similar study on obtained scores on acceptance of others would confirm these differences or reveal new ones. This study was done not by Factor Analysis as in Part II, but by an Item Analysis.

In order to test the discriminative power of each individual item of the scales, an Item Analysis was made. It was thought that Zoroastrian-Hindu differences could be interpreted more objectively in terms of the contents that those significant individual items contained. The Item Analysis was made first on the responses of the Zoroastrian high and low groups. The Chi Square test was used, as explained by Guilford (2, p. 425):

$$X^2 = \frac{N\,(P_u - P_l)^2}{4\,pq}$$

It was found that items Nos. 22, 24 and 37 obtained a X^2 value of 4.27, 3.98 and 4.27 which are significant at the .05 level of confidence. Items Nos. 5, 8 and 11 had a

discriminative power which is significant at the .06, .06 and .09 levels respectively.

The same procedure was followed with regard to the responses of the Hindu high and low groups. Here it was found that no item difference reached the .05 level of significance, but items Nos. 6 and 10 obtained an X^2 value of 3.58 and 2.91 respectively, which are significant at the .06 and .09 levels of confidence respectively.

The difference between the Hindu high group and the Zoroastrian low group was tested also by the same Chi Square test. It was found that items Nos. 22, 24 and 23 with X^2 values of 4.87, 4.87 and 3.95 respectively, showed a difference which is statistically significant at the .05 level of confidence.

These Chi Square test results show that the scales used in the present study to measure acceptance of others have a high discriminative power with regard to some individual items.

TABLE XI

ITEM ANALYSIS OF ZOROASTRIAN-HINDU DIFFERENCES. Chi SQUARE TEST RESULTS OF SOME ITEMS OF THE SCALES OF ACCEPTANCE OF OTHERS

Items	X^2 values	Sig.
27	1.39	Not sig.
12	1.15	"
2	.761	"
13	.678	"
17	.615	"
21	.558	"

Now, in order to study objectively Zoroastrian-Hindu differences on the scales of acceptance of others, the 30 Zoroastrians and the 30 Hindus who stood highest in the scores of acceptance of others were compared. The individual scores of each of the 30 Zoroastrians were added up for each of the 38 items of the scales, and the same procedure was followed for the 30 Hindus. Thus two columns of scores were obtained for the 38 items of the scales. Then, to test the significance of the difference between Zoroastrian scores and Hindu scores for each item, the Chi Square test was used.

These were the results: no individual item showed a difference which is significant at the .05 level of confidence. Therefore, in terms of statistical significance, the individual items of the scales cannot be used for interpreting Zoroastrian-Hindu differences. Items Nos. 27 and 12 obtained an X^2 value of 1.39 and 1.15 respectively; and items Nos. 2, 13, 17 and 21 obtained an X^2 value of .761, .678, .615 and .558 respectively as reported in Table XI.

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