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In this article, new arguments and empirical evidence are presented justifying the use of Standardized R - analysis (or equivalently Q - technique) in certain types of factor-analytic studies. The standardized R - analysis analyses the intercorrelations among respondents based on their "ipsative" scores, as opposed to the unstandardized R - analysis (or equivalently R - technique) which analyses the intercorrelations among variables based on "normative scores. Broverman (1961) contended the commonly accepted view that since "ipsative" standardization results in some loss of information, unstandardized R - techniques should be preferred over the standardized R - analysis and presented empirical arguments to support his view that the factors extracted by the two techniques are different in character. Our results and conclusions are generally supportive of Broverman's view. The empirical evidence presented and discussed in this article are taken from the study "Organizational Climate of Schools" by the author in which both techniques were employed. (Author)

STANDARDIZED VERSUS UNSTANDARDIZED FACTOR ANALYSIS IN A STUDY OF "ORGANIZATIONAL CLIMATE"

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In this article, new arguments and empirical evidence are presented justifying the use of Standardized R - analysis (or equivalently Q - technique) in certain types of factor-analytic studies. The standardized R - analysis analyses the intercorrelations among respondents based on their "ipsative" scores, as opposed to the unstandardized R - analysis (or equivalently R - technique) which analyses the intercorrelations among variables based on "normative" scores. Broverman (1961) contended the commonly accepted view that since "ipsative" standardization results in some loss of information, unstandardized R - techniques should be preferred over the standardized R - analysis and presented empirical arguments to support his view that the factors extracted by the two techniques are different in character. Our results and conclusions are generally supportive of Broverman's view. The empirical evidence presented and discussed in this article are taken from the study "Organizational Climate of Schools" by the author in which both techniques were employed.

The relationship between R and Q techniques of Factor Analysis has been the subject of unmitigated controversy ever since the introduction of Q-technique in (1936) by Stephenson (14, 15). Even today no satisfactory mathematical solution has been found which settles this question in a decided manner, although for reasons related to mathematical soundness and tractability the R-technique has been predominantly, and often indiscriminately, chosen over the Q-technique in applications. Moreover, due to the seeming mathematical intractability again,not much work has gone into the investigation or development of Q-technique or into making a formal comparison of the two techniques. Most of the information available in this respect is through evidence obtained in empirical studies and particular experimental situations.

Factor analysis as a branch of multivariate analysis deals with the internal structure of matrices of intercorrelations among the observable variables under study. Its aim is to explain the variability and intercorrelations among these variables in terms of a smaller number of underlying factors or random components. The basic assumption in factor analysis model (section 5) is linearity, namely, that the variables are linear functions of a number of underlying random components, and the object is to (a) identify these components and (b) to estimate the unknown linear structures so as to explain the individual and collective variation among the variables. Suppose that a battery of K tests (or K stimuli) are administered to n respondents and their responses are arranged in the form of a n x K matrix, each column representing the scores of respondents on a test and each row representing the scores of a respondent on different tests. The usual R-technique of factor analysis is based on the analysis of intercorrelations among variables computed from

the so-called "normative" scores, namely, the respondent scores which have been standardized into equivalent units for all columns -- say, with a mean of 50 and standard deviation of 10 for each column. The Q technique, on the other hand, is based on an analysis of the intercorrelation matrix which correlates respondents over the observable variables. The object in doing so is to study the behaviour and relationship among respondents vis-a-vis the variables representing the respondent behaviours or perceptions. In Q-technique, the intercorrelation matrices analysed are based on the so-called "ipsative" scores, namely, the scores which are obtained through restandardization of scores for each respondent over his "normative" scores. Before standardizing ipsatively into equivalent units, it is considered essential to standardize normatively as described above so that the "ipsative" standardization is performed on scores which have been converted into equivalent units.

Suppose now that after the respondent scores have been standardized ipsatively, instead of the Q-technique, the usual R-technique of factor analysis is applied to the ipsative scores. Such an R-analysis is designated in this article as "standardized" R-analysis as opposed to the usual R-analysis based on the normative scores which in the present article is designated as "unstandardized" R-analysis. After Burt's mathematical demonstration (2), it is now generally accepted that the Q and R analyses, respectively, of the data based on ipsative scores produce two sets of factors that are "transposable" (1:72-3). Cattell (3), while not disagreeing

with this view has maintained nevertheless that Q-analysis (or, equivalently, the "standardized" R-analysis) results in some loss of information due to "ipsative" standardization and, therefore, the "unstandardized" R-analysis should be preferred. According to him, after the general "species" factor has been extracted using the usual ("unstandardized") R-analysis, the residual intercorrelations do contain information concerning the inherent differences among the respondents. Broverman (1) does not agree with the latter viewpoint and points out that residual correlations cannot contain information not contained in the original correlations. Broverman maintains that the "standardized" R-analysis produces factors that are different in character from those produced by the usual "unstandardized" R-analysis. He designates the former "normative personological" factors as opposed to what he calls "Normative Group" factors produced by the usual "unstandardized" R-analysis.

The object of the present article is to present further empirical evidence in support of Broverman's point of view. Our studies (9,10) show not only that the two techniques--the usual R and Q analyses applied to the "normative" and "ipsative" scores respectively--yield factors that are somewhat different in character, but that, not infrequently, the results yielded by the "standardized" R-analysis are more meaningful in that they bring out factors which are consistent with the predicted ones and thereby explain the underlying relationships much more clearly. (In this article, the "standardized" R-analysis and Q-analysis are considered equivalent procedures.) Some new arguments and remarks on the "ipsative"

transformation of the linear factor analysis model are also included in support of our assertions and conclusions.

In the first two sections below, the problem investigated and the procedures used in our study of "organizational climate" of schools are described. The main arguments and assertions of this article are contained in sections 3 to 5. The last section 6 presents a discussion and interpretation of the "Normative Personological" factors derived in our study through an application of the "standardized" R-analysis.

1. Organizational Climate

The contemporary organization theory views a social organization as comprised of a number of interdependent and interrelated parts. These parts in their operation interact and by their interaction is created a new entity, which may be termed as the "climate" or the character of the organization. A study of the literature on organization points to three basic components of a social organization: (1) The formal organization and its role-structure; (2) The individual and his personality disposition; and (3) The informal group and its norms and culture. The organization in order to achieve its objectives lays down a set of principles and behavioural expectations for each role, and in so doing demands a certain amount of conformity from the individual. The individual on the other hand, works with the organization to help achieve its objectives and at the same time satisfy his own personal and social needs. The informal group operates as a mediating agency between the organization and the individual. On one hand, it helps the

individual to adapt to the organizational expectations and, thus, reconcile his needs to his role expectations; on the other hand, it helps the organization to modify its role expectations under the pressure of the individual needs. Each of the three components plays a functional role and feeds back on the other constituent parts. The organizational climate may be defined as the product of the interaction among tnese various constituents parts.

The study (9) on which the contents of the present article are partially based assumes the above model with the additional postulates that (a) the "climate" of an organization can be measured through a number of observable variables and can be represented on an "open-closed" linear continuum and that (b) by observing the scores of a given organization on these variables, one can make an approximate determination of the point on the continuum representing the "climate" of this organization.

The inspiration for this study by the author came from an earlier study completed by Halpin and Croft (5) on the above lines in which the authors had developed an instrument "The Organizational Climate Description Questionnaire Form IV" (OCDQ) which, according to them, is capable of measuring the "climate" of a school. The results of their study bring forth three salient factors underlying the organizational climate of the sampled schools. They are: (1) Social Control; (2) Social Needs; and (3) Esprit. Social Control factor is a measure of the principal's behaviour and refers to the controls exercised by the organization. Social Needs is a measure of the individual and refers to the social needs satisfaction of the group members. Esprit is a measure of the grcup and refers to the group morale.

The study by Halpin and Croft, however, needed further investigation and authentification from several standpoints. The one which motivated the present study was to see if the "OCDQ" would lead to the same basic factors when applied to a cultural and organizational set up different from that of the United States. It should also be pointed out that the results of Halpin and Croft's study are based on the respondents' perceptions of their own and other group members' behaviour. The variance due to the respondents perceptions had not been taken into consideration in the analysis employed in their study (5, p. 10). This is, in fact, the central point described in the present article. The results reported in this article are based on an application of the "OCQD" to a random sample of secondary schools, State of Delhi, India.

2. Identification of the Basic Factors

It was our hypothesis to start with that the basic factors underlying the organizational climate of Delhi Schools should be the same as identified in Halpin and Crofts' study. If these factors had turned out to be substantially different, it would have, in fact, been very surprising; for then the results would be in conflict with certain basic theories propounded in social psychology (13 Chap. 2). To our pleasant surprise, the results turned out to be highly consistent with our hypothesis when the collected data were factor-analysed using the "standardized" R-analysis. In as much as the main object of this article is to present evidence in support of using the "standardized" R-analysis when the usual "unstandardized" R-analysis does not yield results amenable to interpretation, the following information should be helpful in understanding the nature of our

analysis techniques, particularly since the evidence presented in this article in support of the "standardized" R-analysis is primarily of empirical nature.

To replicate the work of Halpin and Croft, the first step in the analysis was the identification of "clusters" of items, each of which may be viewed as measuring a major identifiable pattern - a dimension or subtest - of individual or group behaviour. For this more or less the same techniques of Cluster and Factor Analyses were followed as in Halpin and Croft and the following eight dimensions were identified: (1) Disengagement (2) Aviscidity (3) Esprit (4) Intimacy (5) Controls (6) Hindrance (7) Thrust and (8) Task-orientation. The first four dimensions (or subtests) are measures of group members' (teachers') behaviour whereas the last four are characteristics of leadership (principal's) behaviour.

It should be pointed out at this stage that the dimensions identified above are somewhat different in item-composition from those delineated in Halpin and Crofts' study. Nevertheless, they appear to be measures of important aspects of principals' and teachers' behaviour and find both theoretical and empirical support in literature. It is our premise, however, that the basic factors underlying the delineated dimensions, as pointed out earlier also, should invariably remain the same under different conditions--although appearing, perhaps, in a slightly transformed form. (12:123)

3. R-Analysis of the "Normative" Subtest Scores

For the extraction of the underlying basic factors from the subtest scores of the respondents, the subtest intercorrelation matrix

was computed in the following manner: The mean subtest scores for each of the N=668 respondents were obtained by cumulating his responses on items constituting each subtest and dividing the sum by the number of items in the subtest. Next the raw (mean) subtest scores for N=668 were converted into "standard" scores with a mean of 50 and standard deviation of 10. Such "standardized" scores have been termed in literature as "normative", since they reflect the standing of each respondent on a subtest relative to the group norm. Using these normative subtest scores the subtest intercorrelation matrix given in Table 1 was derived. Insert Table 1 about here

It is important to note at this point that the same intercorrelation matrix would be obtained if, instead of the above "standardized" scores, the raw subtest scores were employed for computing the correlations. Consequently, the usual R-analysis based on the normative subtest scores is referred to as the "unstandardized" R-analysis (because of the irrelevance of normative standardization). Nevertheless this standardization would be of relevance in the next section where the intercorrelation matrix obtained from the "doubly" standardized or so called "ipsative" scores is analysed.

Our next step in the analysis was to apply the usual (unstandardized) R-analysis technique to the intercorrelation matrix of Table 1 using the principal-component method and the three-factor varimax rotational solution obtained is given in Table 2, where the proportion of the total variance extracted by each factor is also given.

Insert Table 2 about here

TABLE 1

SUBTEST INTERCORRELATION MATRIX

(N = 688)

	OCDQ SUBTEST	1	2	3	4	5	6	7	8
Teacher's Behaviour	1 Disengagement	1.00	.33	.58	.18	.74	.23	.62	.03
	2 Aviscidity		1.00	-.06	.28	.18	.44	.01	.02
	3 Esprit			1.00	.29	.72	.02	.82	.44
	4 Intimacy				1.00	.26	.13	.33	.41
Principal's Behaviour	5 Controls					1.00	.13	.77	.26
	6 Hindrance						1.00	.08	-.02
	7 Thrust							1.00	.53
	8 Task-Orientation								1.00

On examining the three factor rotational solution in Table 2, one discovers that the high communalities (h^2) for all eight subtests as well as the total variance extracted of 79% are both very satisfactory features. Yet the loadings of the subtests on the three factors suggest no definite pattern consonant with the theoretical model or the results of the earlier studies in literature. Four subtests with high loadings on the first factor, namely, Disengagement(1), Esprit (3), Controls (5), and Thrust (7) should be measuring more or less the same thing as first factor. The first two of these are measures of teachers' behaviour and the latter two that of the principal; and there seems no conceptual similarity among these dimensions, so that it is hard to conceive of a single concept which can represent the above four dimensions. In fact, the above analysis clearly leads to the conclusion that there is some strong common feature which has (presumably) made two of the well-known organizational behaviours of "group morale" and "organizational control" -- reported earlier in literature -- coalesce into a single factor. This question is further examined below using the "standardized" R-analysis as described above.

TABLE 2

THREE-FACTOR VARIMAX ROTATIONAL SOLUTION

("Unstandardized" R-Analysis, N = 668)

OCDQ Subtest	1	2	3	h^2
1 Disengagement	.86	.35	-.12	.87
2 Aviscidity	.06	.85	.11	.74
3 Esprit	.84	-.15	.32	.83
4 Intimacy	.13	.31	.77	.70
5 Controls	.90	.14	.12	.85
6 Hindrance	.03	.80	-.01	.64
7 Thrust	.85	.13	.39	.90
8 Task-orientation	.20	-.13	.86	.79
Factor Value	3.05	1.65	1.62	
Proportion of the Total variance	.38	.21	.20	Total = .79

The second and the third factor, on the other hand, although not quite agreeing with the basic factors reported in Halpin and Crofts' study, nevertheless present no difficulty of the above nature and may with some justification be regarded as representing single concepts. One observes that the fourth and eighth dimensions, namely.Intimacy (4) and Task-orientation (8) have appreciably high loadings on the third factor whereas Aviscidity (2) and Hindrance (6) have high degree of saturation on the second factor.

4. Normative Group vs. Normative Personological Factors

Broverman (1), reports in Psychological Review having confronted a situation similar to the one mentioned above in a factor-analytic investigation related to a study of "Conceptual versus Perceptual-motor Dominance." Previous studies had indicated that each individual has "stylistic tendencies to develop specialized abilities in either (a) novel or difficult conceptual behaviours, or (b) novel or difficult perceptual-motor behaviours. Accordingly, a battery of tests, consisting of several tests pertaining to each of the above-mentioned tasks, were given to a number of respondents and it was hypothesized that the usual "unstandardized" R-analysis (i.e., R-analysis of the "normative" scores) should produce a factor "defined by inversely related conceptual and perceptual-motor tasks." (1:75) Previous studies had also indicated that each individual had ability to perform both simple but highly practiced conceptual and perceptual-motor tasks and this ability varied independepently of the above style. Accordingly, a second factor representing abilities to perform simple automatized tasks

was also predicted. However, the usual "unstandardized" R-analysis of the data, Broverman reports, produced four unrelated factors none of which appeared to agree with the hypothesized factors.

Since the usual "unstandardized" R-analysis consists of factor-analysing the subtest intercorrelation matrix obtained from "normative" scores, the factors so derived have been termed by Broverman as "Normative Group factors," viewing them as factors which refer to "patterns of consistency in the group or population" of respondents.

Let us now consider the "standardized" R-analysis, namely, the R-analysis of the subtest intercorrelation matrix obtained from the doubly standardized or so called "ipsative" scores. Although the relationship between the "unstandardized" and "standardized" R-analyses is not completely clear, it is now generally accepted that the factors obtained from Q-analysis and R-analysis are essentially transpose of each other when both techniques are applied to the doubly standardized "ipsative" scores. Since the "ipsative" scores reflect the within-variation of variables for each respondent (a respondent, in the present context, may be the individual teacher or the group of teachers representing the school), the factors obtained through "standardized" R-analysis has been termed by Broverman as "Normative personological" factors. According to this view, the "ipsative" factors in the present study would pertain to consistencies in intra-psychic perception organization common to the respondents. An excerpt from his paper follows:

> It appears, then that the two techniques produce factors which refer to different strata of behaviour. Normative group factors describe consistencies in the composition of a group. Such characterization may be useful in developing a taxonomy of group behaviour or in establishing parameters along which relationship between performances of individuals vary. Normative personalogical factors, on the other hand, describe common patterns of intra-psychic variations in ability. Isolation of these factors is an appropriate goal for inquiries aimed at establishing the parameters of intra-psychic functioning. (1:74)

Let us return briefly to Broverman's study related to "Conceptual versus perceptual-motor dominance." On re-examination of the data, it was realized that since the observations were "based on inter-group comparisons of intra-individual variations in ability," the hypothesis should have been formulated in "ipsative" terms. A "standardized" R-analysis of the data then, Broverman reports, produced (normative personological) factors which were in close agreement with the hypothesized factors.

5. Additivity in Linear Models

An important but tacit assumption on which the usual "unstandardized" R-analysis is based is that the respondents in the sample differ from each other only in their responses to various subtests determined by the underlying factors, but otherwise in their reactions they are all alike. This assumption, although reasonable in many situations is certainly not always tenable. Suppose for example, as seems to be the case in the present study, the respondents have heterogeneous backgrounds in cultural and socio-economic levels. It is not inconceivable then that their responses may be conditioned by many extraneous influences which may have no relevance to the quantities the subtests are supposed to measure. In case of the responses of the teachers, they may be

due to variance within the perceiver due to the socio-economic, temperamental or other individual variations. This view seems to be shared by perpetual psychologists.[1] Halpin and Croft also support this view. They write:

> The third limitation imposed by the nature of the data with which we are dealing pertains to what can be described best as the "phenomenological box." Specifically, when we ask members of a group to describe their leader we can properly ask 'Is this how he really behaves?' Stated differently, how much of the description of the leader that is given by the actual stimulus object of the leader and how much is determined by elements within the perceiver which operate, as it were, almost independently of the person who is being described. (5:9).

These are precisely the considerations which have led statisticians to introduce more general two and multiway linear (random or " fixed" effects) theoretical models in Analysis of Variance. A simplifying assumption in such models is that of "additivity" which is described below for the analogous linear factor-analysis model. The standard factor-analysis model is the following: Let Z_j denote the random response on the j^{th} subtest in standard form, that is, with mean zero and standard deviation one, and

$$(1) \quad Z_j = \Sigma_{k=1}^{r} \ell_{jk} f_k + \ell_j U_j \qquad (j = 1,2,\ldots\ldots,K),$$

f_k being independent random variables in standard form representing the k^{th} factor ($k = 1,2,\ldots,r$), ℓ_{jk} the loading of the j^{th}subtest on k^{th} factor, $\ell_j U_j$ representing the component due to the specific factor associated with the j^{th} subtest. Consider now the observed value of Z_j for the i^{th} respondent, namely, Z_{ji} (the response of the i^{th} subject on j^{th} subtest) and suppose that

$$(2) \quad Z_{ji} = \Sigma_{k=1}^{r} \ell_{jk} f_{ki} + \ell_j U_{ji} + \alpha_i$$

where Z_{ji} is again in (normatively) standardized form, f_{ki} is the k^{th}

factor score for the i^{th} respondent and α_i is the constant representing the cumulated extraneous effect due to the i^{th} respondent. With the exception of the component α_i, the rest of the expression on the right side corresponds to the usual (preceding equation) model for which the "unstandardized" R-analysis would be appropriate. The respondent effects α_i are assumed to be additive in the above model.[2]

Suppose now that underlying situation corresponds to the linear model described by the last equation above, whereas the "unstandardized" R-analysis is applied for studying the basic factors. Clearly then the basic factors derived would be confounded with the respondent effects α_i. If the respondent-effects α_i vary considerably from respondent to respondent, the confounding may lead to extracted factors so hopelessly altered as to render them beyond any reasonable interpretation. On the other hand, if the "standardized" R-analysis is used, the respondent effects would be eliminated (as demonstrated below) and there would be no confounding. The "ipsative" factors so extracted then would be based on the within-variation of each respondent's subtest scores and may be called after Broverman "Normative personological" factors.

Normative Personological Factors and Ipsative Scores Model

It is clear from the two preceeding equations (1) and (2) that the "ipsative subtest scores Y_{ji} $(j = 1,2,.....,K)$ for the i^{th} respondent would follow approximately the model

$$(3) \quad \tau_j Y_j = Z_j - \bar{Z} = \Sigma_{k=1}^{r}(\ell_{jk} - \bar{\ell}_k) f_k + (\ell_j U_j - \overline{\ell U})$$

where $\bar{Z} = (\Sigma_{j=1}^{K} Z_j / K)$, $\bar{\ell}_k = (\Sigma_{j=1}^{K} \ell_{jk}/K)$, $\overline{\ell U} = (\Sigma_{j=1}^{K} \ell_j U_j / K)$ and τ_j = standard deviation of $(Z_j - \bar{Z})$ $(j=1,2,.....,K)$, If we now set

(4) $\ell^*_{jk} = (\ell_{jk} - \bar{\ell}_k)/\tau_j$, $U^*_j = (\ell_j U_j - \overline{\ell U})/t_j$ and

$\ell^* = (t_j/\tau_j)$, where t_j = standard deviation of $(\ell_j U_j - \overline{\ell U})$,

the equation (3) takes the form

(5) $Y_j = \Sigma_{k=1}^{r} \ell^*_{jk} f_k + \ell^* U^*_j \qquad (j = 1,2,.....,K).$

In the transformed model equation (5), the "ipsative" scores $Y_j = (Z_j - \bar{Z})/\tau_j$, the common factors f_k's and the specific factors U^*_j's are all in standard form ($j = 1,2,....,K$, $k = 1,2,...,r$) and apart from the fact that the "normative" subtests scores Z_j have been replaced by the "ipsative" subtest scores Y_j, the model given by equation (5) is of exactly the same form as given by equation (1).

The extraction of common factors f_k by using "ipsative" respondent scores following model (5) would have estimated subtests loadings corresponding ℓ^*_{jk} and not the original loadings ℓ_{jk} ($j = 1,2,...,K$; $k = 1,2,....,r$) of equation (1). The conceptual interpretation of the factors f_k would, accordingly, also undergo change. The following considerations will throw some light on this equation when we relate our observations based on model (5) with the view presented by Broverman.

First it is clear from the "ipsative" model equation (5) that the loadings ℓ^*_{jk}, of factor f_k on the j^{th} subtest, ($k=1,2,...,r$; $j=1,2,...,K$) are on the ipsatively transformed subtest variables Z_j ($j=1,2,...,K$) and, consequently, any interpretation or conceptualization of the factors f_k, $k=1,2,...,r$ - in view of the transformed subtest loadings ℓ^*_{jk} - refers to the distribution among respondents of the intra-respondent perception variation. The explicitly stated "ipsative" model (5), thus, substantiates the view of Broverman in designating the factors f_k in the new context as "Normative Personological" factors. We wish to point out, however, that factors f_k remain the same; it is their interpretation with reference to the ipsatively transformed subtest variables

that undergoes change and may provide more meaningful explanation of the underlying situation. Secondly, if the original model (1) has a (dominant) general common factor, of little interest in the study and only causing a blurring effect, its effect would be virtually eliminated in model (5) provided the original subtest loadings on this factor are approximately equal - not an unreasonable assumption in respect of the general factor after the scores have been normatively standardized into equivalent units. This statement in respect of the "ipsative" transformation of model (1) into model (5) would explain the elimination of the effect of the general "species" factor discussed by Broverman (1:69-72) and Cattell (4). Finally, the loadings $\ell^*_{jk}=(\ell_{jk} - \bar{\ell}_k)/t_j$, for each factor f_k, satisfy the relation $\Sigma_{j=1}^{K} t_j \ell^*_{jk} = 0$. This shows that some of the "Normative Personalogical" factors may have (even in a varimax solution) both significant positive and significant negative subtests loadings. This may explain why some of these "ipsative" factors turn out to be bipolar (1:78).

Our view is that in situations where the usual "normative" R-analysis does not produce hypothesized factors, an R-analysis of "ipsative" scores may bring out a clearer picture and a meaningful interpretation of the extracted factors, either because the data is such that it warrants ipsative standardization due to approximately "additive" respondent-effects or because the predicted factors appropriately correspond to the respondent scores in "ipsative" form. In either case, as the empirical evidence suggests, the proper step to take is ipsative standardization and then an application of the R-analysis.

6. "Standardized" R-analysis

In view of the above discussion and the difficulty experienced in meaningfully interpreting the extracted factors (especially the first factor), the "standardized" R-analysis as described above was applied. The subtest intercorrelation matrix based on ipsative scores is given in Table 3.

Insert Table

TABLE 3

SUBTEST INTERCORRELATION MATRIX BASED ON IPSATIVE SCORES

	OCDQ SUBTEST	1	2	3	4	5	6	7	8
	1 Disengagement	1.00	.20	-.29	-.24	-.05	.16	-.33	-.44
Teacher's	2 Aviscidity		1.00	-.48	-.33	-.16	.14	-.47	-.46
Behavior	3 Esprit			1.00	-.13	-.07	-.27	.24	.51
	4 Intimacy				1.00	-.21	-.26	-.09	-.08
	5 Controls					1.00	-.15	.04	-.07
Principal's	6 Hindrance						1.00	-.50	-.50
Behavior	7 Thrust							1.00	.51
	8 Task-Orientation								1.00

TABLE 4

THREE FACTOR VARIMAX ROTATIONAL SOLUTION

("Standardized" R-analysis, N=688)

OCDQ Subtest	Esprit	Social Needs	Social Control	h^2
1 Disengagement	-.52	-.39	.05	.42
2 Aviscidity	-.73	.05	-.02	.54
3 Esprit	.72	-.22	-.27	.63
4 Intimacy	-.10	.89	-.20	.84
5 Controls	-.02	-.18	.86	.78
6 Hindrance	-.46	-.52	.45	.68
7 Trust	.72	.12	.29	.62
8 Task-Orientation	.77	.18	.11	.63
Factor Value	2.64	1.33	1.66	5.13
Proportion of the Total Variance	.33	.17	.14	.64=Total

The three factor varimax rotational solution relative to the above correlation matrix is given in Table 4.

Insert Table 4 about here

Table 4 shows that the first factor has high positive loadings on Esprit, Trust and Task-Orientation whereas it has substantial negative loadings on Disengagement, Aviscidity and Hindrance. This pattern suggests that the factor be appropriately named organizational esprit, as measured positively by Esprit, thrust and Task-Orientation, that is, group's orientation and drive towards organizational goals, on one hand, and negatively measured by Disengagement, Aviscidity and Hindrance. This is a bipolar factor as described in the preceding section. The second factor has high positive loading on Intimacy and substantial negative loadings on Disengagement and Hindrance. This factor can be identified by Social Needs. Some positive correlation with thrust and Task-Orientation may be explained by some items of "consideration", a dimension in Halpin and Crofts' study, in the present dimension Thrust. The third factor can be recognized as that of Social Control, since on this factor the dimension (principal's) Controls has high positive loadings and (principal's) Thrust also has appreciable loadings. This factor is a measure of principal's behavior.

The three basic factors identified in our study and described above seem basically to be the same as those derived by Halpin and Croft in their study. The ostensible difference in the pattern of loadings seems to be due to the differences in the formation of subtests (dimensions) and the "ipsative" standardization necessitated (presumably) by the nature of the data. Inasmuch as the main objective of the present study was to investigate if the basic factors, which determine the "climate" of schools,

are the same under a different cultural and administrative environment, the answer obtained from the preceding analysis appears to be a clear and convincing answer in the affirmative.

Our experience with the two techniques of "unstandardized" and "standardized" R-analyses in the "Divided-Year" study (10) was of a similar nature. The results obtained separately by using the two techniques had to be interpreted differently in "normative" and "ipsative" terms, respectively. Accordingly, on the basis of both the empirical results and the arguments presented in section 5, the "standardized" R-analysis seems to be the desirable and effective factor analysis technique in situations where either the individual subjects or respondents do, indeed, differ substantially in their individual "effects" or where a dominant general factor blurs or conceals the contribution of other basic factors which may be of primary interest in the study.

Our arguments and results supplement those of Broverman (1), to whose article particularly we would like to refer the reader for related readings. It is our hope that the results and recommendations of this paper would prove useful to research workers in the area of applied factor analysis.

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FOOTNOTES

[1]Kretch and Crutchfield classify the two determinants of perception as Structural factors and Functional factors. Structural factors refer to the extra-organismic factors which derive solely from the nature of the physical stimuli or the environment. The functional factors are those which are derived primarily from the needs, moods and past experiences and memory of the individuals (8:82).

[2]A tacit assumption also is that respondent effect is more or less the same for all subtests