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ABSTRACT

A statistical analysis was performed on the Charles F. Kettering (CFK) Scale, a popular four-section measure of school climate. The study centered on a multivariate analysis of Part A, the General Climate Factors section of the instrument, using data gathered from several elementary, junior high, and high school campuses in a large school district in the southwestern United States. Factor analysis was used to examine the construct validity of the section. The first data set consisted of 30 junior high school teachers and administrators, 78 ninth graders, 66 eighth graders, and 83 seventh graders. Five additional data sets were similar in composition to the first set, with total sizes of 415, 747, 822, 1,200, and 1,311, respectively. These subsequent data sets also included elementary and high school students and administrators. Results of the factor analysis show that the instrument subscales group in a different manner than was proposed by the scale's developers. It is suggested that new subscales be designed to improve overall scale validity. Eight tables present data from the study. (SLD)

A STATISTICAL ANALYSIS OF THE CHARLES F. KETTERING CLIMATE SCALE

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ABSTRACT

A statistical analysis was performed on the Charles F. Kettering (CFK) scale, a popular measure of school climate. The study centered on a multivariate analysis of the General Climate Factors, gathered from several elementary, junior high and high school campuses in a large school district in the Southwestern United States. Results of the factor analyses show that the instrument subscales group in a different manner than was proposed by the scale's developers. This study suggests that new subscales be designed to improve overall scale validity.

A STATISTICAL ANALYSIS OF THE CHARLES F. KETTERING CLIMATE SCALE

Elementary, junior and senior high school students, teachers and administrators in a major school district in the Southwestern United States completed the *Charles F. Kettering Ltd. School Climate Profile.* The school climate instrument is widely used to gather data for administrative planning and curriculum revision.

The purpose of this paper is two fold. First we will briefly review psychological and organizational climate research, focusing on and defining the popular synthesis provided by James and Jones (1974). This review, definition, and focus will clarify the conceptual framework of our study. Although there is considerable complexity involved in both defining and measuring climate, we will utilize the perceptual measurement-individual attribute approach in our discussion of the *Charles F. Kettering Ltd. (CFK) School Climate Profile.* Last we will report the extensive findings of our study of the General Climate section of the instrument.

Our psychometric investigation of the data suggests that some modifications may make the instrument even more effective for assessing school populations. Specifically, the data analysis questions whether the current division of the instrument into eight subdivisions is valid. Factor analysis was used to examine the construct validity of Part A, the General Climate Factors section of the CFK instrument.

A REVIEW OF PSYCHOLOGICAL AND ORGANIZATIONAL CLIMATE RESEARCH

Psychological and organizational climate has been a popular research topic during the past three decades. However, conceptual and operational definitions and measurement techniques were diverse, prompting some to characterize organizational climate as a "fuzzy" concept (Guion, 1973).

In an attempt to gain order and direction amidst such diversity, James and Jones (1974) reviewed the major conceptualizations, definitions and measurement approaches regarding organizational climate. Their review was organized into three separate but not mutually exclusive approaches to defining and measuring organizational climate: (a) the multiple measurement-organizational attribute approach, (b) the perceptual measurement-organizational attribute approach, and (c) the perceptual measurement-individual attribute approach. Their synthesis pinpointed the major theoretical issues dealing with organizational climate.

Representative of the multiple measurement-organizational approach is the definition of Forehand and Gilmer (1964) in which organizational climate is defined as a "set of characteristics that describe an organization and that (a) distinguish the organization from other organizations, (b) are relatively enduring over time and (c) influence the behavior of people in the organization" (p.362).

Principal components of organizational climate, so defined, include structure, organizational context, system values and norms, process, and physical environment as well

as the various subsystems (e.g., department) and subgroups (e.g., workgroup) contexts, physical environments, processes, system values and norms, and structures. Based on this broad definition, the following areas of study would be appropriate: studies of organizational models and taxonomies, organizational context and structure, system values and norms, as well as studies on the different facets of organizational and subgroup processes such as leadership, conflict, reward, communication, and control. Within this framework, "organizational climate" could best be defined as a "catch-all" term.

James and Jones (1974) also discuss the perceptual measurement-organizational attribute approach (Campbell, Dunnette, Lawler, & Weick, 1970), which identifies four general categories of the organizational situation: (a) structural properties, (b) environmental characteristics, (c) organizational climate, and (d) formal rule characteristics. Organizational climate is defined as: "a set of attributes specific to a particular organization that may be induced from the way the organization deals with its members and its environment" (p.390). Within an organization, the climate for an individual member takes the form of a set of attitudes and expectancies which describe the organization in terms of both static characteristics (such as degree of autonomy) and behavior-outcome and outcome-outcome contingencies. Campbell et al. (1970) identified four specific dimensions of organizational climate: (1) individual autonomy, (2) the degree of structure imposed upon the position, (3) reward orientation, and (4) consideration, warmth and support. Of special note is that, despite the authors' assessment that the critical elements of organizational climate are individual perceptions of the organization, climate itself is viewed as a situational variable or organizational main effect.

Several of conceptual and empirical points are raised by this approach. When organizational climate is perceived as embodying situational variables such as leadership, autonomy, and formalization, but not other situational variables, the differentiation criterion is not easily identified. Additionally, there is the possibility that this approach may be inconsistent. In one sense, it proposes to measure organizational attributes which have been demonstrated to vary across levels of explanation such as total organization, subsystem and group, while in another sense it is considered a psychological process which operates on a plane of explanation distinct from objective organizational characteristics and organizational processes.

Finally, James and Jones (1974) addressed the perceptual measurement individual attribute approach. They characterize organizational climate as an individual's set of summary or global perceptions about his or her organizational environment. These summary perceptions mirror the interaction between personal and organizational characteristics, in which the individual forms his or her perceptions about the overall climate.

Climate is seen as a summary perception or intervening variable based on the interaction between the individual and the environment. The major difference, however, between the two schools, is that the perceptual measurement-individual attribute approach focuses on organizational climate as an individual rather than an organizational attribute. Situational and individual characteristics are assumed to interact to produce a third set of perceptual, intervening variables. These intervening variables are individual attributes which provide a bridge between the situation and the behavior. While perhaps distinct

in a conceptual model, the interaction, intervention, and perception take place in the individual and are, therefore, individual attributes.

Many of the criticisms of organizational climate as a perceived organizational attribute are equally appropriate for climate as a perceived individual attribute (James & Jones, 1974). Further, House and Rizzo (1972) demonstrated that many climate dimensions measure the same constructs as well-known role and leadership factors, and Johannesson (1973) concluded that assessment of climate by this approach might result in the replication of the work-attitude literature.

While there is considerable complexity involved in both defining and measuring climate, our discussion of the CFK instrument is patterned within the perceptual measurement-individual approach to measuring and conceptualizing climate.

A MULTIVARIATE ANALYSIS OF THE CFK SCALE

The CFK instrument is composed of four sections: Part A, *General Climate Factors* (40 questions); Part B, *Program Determinants* (35 questions); Part C, *Process Determinants* (40 questions); and Part D, *Material Determinants* (15 questions) (Howard, et al., 1987; Phi Delta Kappa, 1974).

We used factor analysis to examine the construct validity of Part A, the *General Climate Factors* section, of the four-section CFK instrument. Nunnally (1967) noted that some researchers refer to construct validity as "factorial validity." Also, factor analysis is an attractive method for evaluating validity because it focuses on the reliable components of test data (Gorsuch, 1983). Thompson (1989) noted that the "common variance"

represented by indices of association tends to represent reliable variance, and since it is from these indices that factors are extracted, it follows that factors tend to be constructed from the "true score" components of variables. Therefore, this study investigated the construct validity of the CFK instrument using factor analytic techniques.

The *General Climate Factors* section of the instrument consists of eight subscales: (1) respect (items 1-5), (2) trust (items 6-10), (3) high morale (items 11-15), (4) opportunity for input (items 16-20), (5) continuous academic and social growth (items 21-25), (6) cohesiveness (items 26-30), (7) school renewal (items 31-35), and (8) caring (items 36-40). Five questions (variables) comprise each subscale of the instrument. The scaling technique used is two discrepancy-format columns. Each column has four descriptors: 1 = almost never, 2 = occasionally, 3 = frequently, and 4 = almost always.

Determining the number of factors to extract from the correlation matrix is a fundamental decision in any analysis (Thompson & Borrello, 1986). Most researchers follow the recommendations of Guttman (1954) and extract all factors with eigenvalues greater than one. Consequently, all principal components with eigenvalues greater than one were extracted and rotated obliquely using promax rotation.

Since the CFK uses two discrepancy-format columns, two separate first order factor analyses were performed, both for the "What Is" left side of the scale and the "What Should Be" right side of the scale. One result of these analyses was a matrix of correlations among the factors. The interfactor correlation matrices can be factored just as the two 40 x 40 intervariable correlation matrices can be. This method is called second-order factor analysis.

Kerlinger (1984) noted that "while ordinary factor analysis is probably well understood, second-order factor analysis, a vitally important part of the analysis, seems not to be widely known and understood" (p.XIV). However, Kerlinger (1984), Thompson and Borrello (1986), and Thompson and Miller (1981) presented examples of applications.

Two second-order factors were extracted from both the "What Is" and "What Should Be" interfactor correlation matrices and rotated to the varimax criterion. Second-order factors such as these are then often interpreted. However, Gorsuch (1983), argued that this is not desirable:

> Interpretations of the second-order factors would need to be based upon the interpretations of the first-order factors that are, in turn, based upon the interpretations of the variables. Whereas, it is hoped that the investigator knows the variables well enough to interpret them, the accuracy of interpretation will decrease with the first-order factors, will be less with the second-order factors, and still less with the third-order factors.... To avoid basing interpretations upon interpretations of interpretations, the relationships of the original variables to each level of the higher-order factors are determined (p.245).

The first-order factors, therefore, were postmultiplied by the second-order factors, and the product matrices (for "What Is" and "What Should Be") were then rotated to the varimax criterion. Tables 1-6 present these factor pattern coefficients for items that had coefficients greater then 0.3 in absolute magnitude.

DISCUSSION

The factors presented in Tables 1-6 indicate distinct patterns for the "What Is" and "What Should Be" portions of the CFK instrument. The composition of the data sets analyzed follows.

Two hundred fifty-seven junior high school students, teachers and administrators in a major school district in the Southwestern United States comprised the first data set. Thirty administrators and teachers, 78 ninth graders, 66 eighth graders, and 83 seventh graders participated in the junior high school study.

Our second data set (n=415) built on the first data set. These subjects were the same junior high participants as above combined with subjects from one high school. For that campus, 79 ninth graders and 79 tenth graders took part in the study.

The third data set (n=747) included junior and senior high students, administrators and teachers. This data set consisted of the 257 junior high students, along with the 79 ninth and 79 tenth graders from the precious data set, plus 332 tenth graders from another high school campus.

Our fourth data set (n=822) consisted of the n=747 data set plus 75 elementary students and administrators from the same major metropolitan area.

The fifth data set (n=1200) consisted of the 257 junior high students, 28 elementary school students, and 915 students, teachers and administrators from a large high school. The high school distribution is as follows: (1) n=17 secretaries and administrators, (2) n=77 teachers, (3) n=332 tenth graders, (4) n=249 eleventh graders and (5) n=240 twelfth graders.

Our sixth data set, n=1311, consisted of n=822 fourth data set plus n=249 eleventh graders and n=240 twelfth graders from the fifth data set.

For the "What Is" column questions, both the n=257 and n=415 data sets grouped into five and three factors respectively. The n=747, n=822, n=1200 and n=1311 data set grouped into two factors.

Essentially, factor one for the n=257 data set was comprised of the two factors which emerged for the n=747, n=822, n=1200 and n=1311 data sets. This factor contained 18 out of the 21 questions which emerged in the two factors for the four largest data sets.

For the n=415 data set, factor one was primarily factor one in the two factors which emerged in the analyses of the four largest data sets. Factor one for the n=415 data set contained ten of the fifteen questions which emerged in factor one for the four largest data sets.

For the "What Is" n=257 and n=415 data sets, there were 16 questions (2, 15, 28, 24, 5, 6, 21, 7, 39, 20, 35, 17, 27, 19, 26 and 10) and nine questions (20, 14, 1, 30, 38, 40, 24, 26 and 39) respectively which showed factorial complexity. Those factorially complex questions which loaded highest in absolute value (above 0.30) were assigned to their respective factors.

It was definite factors, in addition to this assignment procedure, that was used to assess the number of questions for each factor in the n=257 and n=415 data sets.

A distinct factor pattern emerged in the n=747, n=822 and n=1311 data sets. Two "What Is" factors emerged. Factor one consisted of the following 15 questions (13, 14, 19, 20, 24, 26, 30, 33-40). Factor two consisted of six questions (2, 6, 7, 9, 16 and 23). Furthermore, the n=747 and n=822 data sets had questions 1, 17, 18, 25, 28 and 29 in

common. The same assignment procedure for factorially complex questions that was previously mentioned was again used in assigning such questions to factors. See Table 7 for a summary of these findings.

The factor adequacy for the "What Should Be" questions is given in Table 8. As in the n=257 and n=415 data sets for the "What Is" questions, these two data sets were very fragmented factorially. Three factors emerged for both data sets. However, for the next four largest data sets, the data grouped into two distinct factors.

Overall factor one was comprised of questions 21-40. Factor two was comprised of questions 1-9, 11-14, 16 and 17. This is 20 questions for factor one and 15 questions for factor two. This grouping is straightforward except for the n=1311 data set where questions 1-7 grouped with factor one instead of factor two. For the other three data sets, the grouping was into factor two.

Overall, these data suggest there are two "What Is" subscales and two "What Should Be" subscales; therefore, the instrument is not structured psychometrically exactly as was originally proposed by its authors in suggesting eight "What Is" and eight "What Should Be" subscales (Fox, et. al., 1973). The factor structure of a measure is considered to have been proved invariant only when a similar structure has been identified in a variety of studies (Neale & Liebert, 1986; Thompson, 1989).

The authors' choice of a two-column response (discrepancy format) seems appropriate from a research perspective, because of its applicability in general or first-time assessment trials (Johnson & Dixon, 1984; Witkin, 1977). However, with the use of only a four-point scale, a question arises as to whether there may indeed be a reduction

in the respondents' discriminative power (Jenkins & Taber, 1977; McKelvie, 1978; Rotter, 1972).

There is evidence, for example, that five-point scales are the most reliable (McKelvie, 1978), at least in measuring attitude-judgement tasks. McKelvie proposed using five or six categories. He further suggests there is no psychometric advantage in a large number of scale categories and, on the other hand, that discriminative power and validity may be reduced when fewer than five categories are used. Ramsey (1973) studied the effect of the number of categories in rating scales on the precision of scale values estimated by maximum likelihood techniques and concluded that using seven or more categories provides very nearly as much precision of estimate as a corresponding task requiring continuous judgment.

In an agree/disagree context, Jenkins and Taber (1977) found that the number of response categories above five did not, in any situation, yield a significant increase in Likert discriminability. Neumann and Neumann (1981) concluded from their research that the five-point scale appears to be the most convenient to use in attitudinal surveys. In addition to the fact that the literature suggests a five-or-six point scale for Likert instrumentation, in our own work we have found that the following six-category response choices recommended by Rotter (1972) seem to reflect equidistant psychological order: 1 = disagree strongly; 2 = disagree; 3 = tend to disagree; 4 = tend to agree; 5 = agree, and, 6 = agree strongly.

We also wondered if the vocabulary used in the instrument was of a level readily understood by all the school students, especially in the cases where the words

"collaborators" and "cohesiveness" were used. Based on random 100 word instrument samples, the Gunning Fog Index indicated an average grade equivalent reading difficulty of 11.5. The sample range varied from 7.2 to 13.9, almost the sophomore college level. The Fry Readability Graph showed the average reading level to be at the beginning of the tenth grade. Caution should be exercised in administering the instrument to elementary students or poor readers at the junior high or high school levels. The readability, though, could be lowered by shortening the sentence length and by replacing difficult words with less complex language.

Considering the readability level of the instrument, one can see why the factor structure would not be invariant. Caution should be exercised in administering this instrument to elementary students or to age groups with poor reading ability.

SUMMARY AND CONCLUSION

Based on our analysis, the currently used subscale subdivisions may be inappropriate. We understand from the CFK developers that they used only face validity in the instrument construction. The general test development literature suggests, however, that at least two types of validity measures be used in scale development.

When the CFK developers departed from this conventional approach to test construction, they arbitrarily designated and assigned names to various subscales in their instrument. In actuality, however, factor analysis shows that some of their subscales fragment and group into larger subscales.

Nevertheless, we have used the CFK instrument in several general population studies and have been pleased with its overall capacity for identifying global areas of need. Thus we view our research findings as a point-of-departure for additional examination. The suggested refinements for the CFK scale are offered to help make the instrument more effective. Such is the nature of test development.

REFERENCES

Bailey, S.S., & Young, K.M. (1989). The relationship between leadership styles of high school principals and school climate as perceived by teachers. **National FORUM of Education Administration and Supervision Journal**, 6(2), 108-123.

Campbell, J.P., Dunnette, M.D., Lawler, E.E., II, & Weick, K.E., Jr. (1970). **Managerial Behavior, Performance, and Effectiveness**. New York: McGraw-Hill.

Forehand, G.A., & Gilmer, B.V.H. (1964). Environmental variation in studies of organizational behavior. **Psychological Bulletin**, 62, 361-382.

Fox, R.S., Boies, H.E., Brainard, E., Fletcher, E., Huge, J.S.,Martin, C.L., Maynard, W., Monasmith, J., Olivero, J., Schmuck, R., Shaheen, T.A., & Stegeman, W.H. (1973). **School climate improvement: A challenge to the school administrator.** Bloomington, IN: Phi Delta Kappa Educational Foundation.

Gorsuch, R.L. (1983). **Factor Analysis** (2nd ed.). Hillsdale, NJ: Erlbaum.

Guion, R.M. (1973). A note on organizational climate. **Organizational Behavior and Human Performance**, 9, 120-125.

Guttman, L. (1954). Some necessary conditions for common factor analysis. **Psychometrika**, 19, 149-161.

House, R.J., & Rizzo, J.R. (1973). Toward the measurement of organizational practices: Scale development and validation. **Journal of Applied Psychology**, 56, 388-396.

Howard, E., Howell, B., & Brainard, E. (1987). **Handbook for Conducting School Climate Improvement Projects**. Bloomington, IN: Phi Delta Kappa Educational Foundation (ED 290 211).

James, L.R. & Jones, A.P. (1974). Organizational climate: A review of theory and research. **Psychological Bulletin**, 81(12), 1096-1112.

Jenkins, G.D., & Taber, T.D. (1977). A Monte Carlo study of factors affecting three indices of composite scale reliability. **Journal of Applied Psychology**, 62, 392-398.

Johannesson, R.E. (1973). Some problems in the measurement of organizational climate. **Organizational Behavior and Human Performance**, 10, 118-144.

Johnson, W.L., & Dixon, P.N. (1984). Response alternatives in Likert scaling. **Educational and Psychological Measurement**, 44, 563-567.

Kerlinger, F.N. (1984). **Liberalism and Conservatism: The nature and structure of social attitudes.** Hillsdale, NJ: Erlbaum.

McKelvie, S.G. (1978). Graphic rating scales: How many categories. **British Journal of Psychology**, 69(2), 185-202.

Neale, J.M., & Liebert, R.M. (1986). **Science and Behavior: An introduction to methods of research** (3rd ed.). Englewood Cliffs, NJ: Prentice-Hall.

Neumann, L., & Neumann, Y. (1981). Comparison of six lengths of rating scales: students' attitudes toward instruction. **Psychological Reports**, 48, 399-404.

Nunnally, J.C. (1967). **Psychometric theory**. New York: McGraw-Hill.

Phi Delta Kappa (1974). **School Climate Improvement: A Challenge to the School Administrator. An Occasional Paper**. Bloomington, IN: Phi Delta Kappa Educational Foundation (ED 102 665).

Ramsey, J.O. (1973). The effect of number of categories in rating scales on precision of estimation of scale values. **Psychometrika**, 38, 513-532.

Rotter, G.S. (1972). Attitude points of agreement and disagreement. **The Journal of Social Psychology**, 86, 211-218.

Thompson, B. (1989). Meta-analysis of factor structures: A case study example with Bem's androgyny measure. **The Journal of Experimental Education**, 57(2), 187-197.

Thompson, B., & Borrello, G.M. (1986, January). Second-order factor structure of the MBTI: A construct validity assessment. **Measurement and Evaluation in Counseling and Development**, 148-153.

Thompson, B., & Miller, A.H. (1981). The utility of "social attitudes" theory. **The Journal of Experimental Education**, 49, 157-160.

Witkin, B.R. (1977). Needs assessment kits, models, and tools. **Educational Technology**, 17, 4-18.

TABLE 1

ROTATED PATTERN COEFFICIENTS FOR SALIENT ITEMS FOR "WHAT IS" COLUMN QUESTIONS (n=257)

What Is Item	Scale	Factors 1	2	3	4	5
8	T	0.61296	0.04852	0.14292	-0.01672	0.22773
9	T	0.46257	0.28730	0.16001	0.09571	0.19821
11	HM	0.61609	0.03202	0.19280	-0.02035	0.03262
12	HM	0.43591	0.07212	0.14484	0.04090	0.12817
15	HM	0.65417	-0.15371	0.03958	-0.21603	0.06586
22	CASG	0.38662	0.27058	0.13678	0.10791	0.13318
30	COH	0.67437	-0.05474	0.10828	0.11669	0.03259
31	SR	0.57418	0.23013	-0.03720	-0.00554	-0.18565
33	SR	0.53964	0.14791	-0.05162	-0.13314	-0.01016
36	CAR	0.42854	0.13449	-0.10094	0.04823	0.00072
37	CAR	0.96358	0.29415	-0.19539	0.15038	0.02594
38	CAR	0.56100	-0.00106	-0.06288	0.17210	0.11833
40	CAR	0.71712	-0.05828	0.02912	0.04386	0.05845
3	R	-0.09463	0.75920	0.03713	-0.16572	0.15981
32	SR	0.13525	0.46424	0.06199	0.09544	-0.14112
1	R	0.02025	0.14954	-0.59180	0.16405	0.18242
14	HM	-0.05174	-0.03551	-0.33936	-0.10715	-0.12030
25	CASG	-0.03788	0.23080	0.48708	-0.07959	0.03814
13	HM	-0.09113	-0.04765	0.25217	-0.55507	0.03941
23	CASG	-0.09104	0.02113	-0.07159	-0.48805	0.27064
29	COH	-0.10488	0.19273	0.16791	0.50903	0.16196
4	R	-0.21743	-0.09379	-0.05232	-0.06063	-0.46408
18	OI	0.03499	0.15049	-0.04788	-0.01599	0.53622
34	SR	0.11236	-0.04347	0.03297	-0.04492	0.52746
2	R	0.35440	-0.40250	0.29951	0.3 893	-0.17303
16	OI	0.55871	0.40049	0.25802	0.29025	0.24510
24	CASG	0.60546	0.38579	-0.02786	0.17566	-0.07297
28	COH	0.30642	0.35380	0.15710	0.17045	0.15090

(continued)

TABLE 1 (continued)
ROTATED PATTERN COEFFICIENTS FOR SALIENT ITEMS
FOR "WHAT IS" COLUMN QUESTIONS (n=257)

What Is Item	Scale	Factors 1	2	3	4	5
5	R	0.31986	0.04666	0.40986	0.21410	0.11249
6	T	0.74371	-0.04951	0.31645	-0.01112	0.06455
21	CASG	0.47546	0.21108	0.45646	0.26722	-0.01788
7	T	0.49924	-0.08801	-0.09438	0.38720	0.15812
39	CAR	0.61847	-0.11122	-0.00848	0.33273	0.03938
20	OI	0.91586	0.22504	0.00933	-0.07553	0.31806
35	SR	0.38195	-0.05010	0.19219	-0.21082	0.36913
17	OI	0.13845	0.30213	0.50151	-0.06139	-0.04070
27	COH	0.26011	0.35520	-0.47418	0.04929	0.08888
19	OI	0.16917	0.45376	0.17005	0.32633	0.24127
26	COH	0.55867	0.03925	-0.38225	-0.34225	-0.20011
10	T	-0.16061	-0.09651	-0.30134	0.38042	0.44099

Note. Salient items were items with pattern coefficients greater in absolute value than .30. HM = High moral; R = Respect; T = Trust; OI = Opportunity for Input; CASG = Continuous Academic and Social Growth; COH = Cohesiveness; SR = School Renewal; CAR = Caring. The Kettering instrument is available from Phi Delta Kappa in the Handbook for Conducting School Climate Improvement Projects, 1987, by Eugene Howard, Bruce Howell and Edward Brainard.

TABLE 1

ROTATED PATTERN COEFFICIENTS FOR SALIENT ITEMS FOR "WHAT SHOULD BE" COLUMN QUESTIONS (n=257)

What Is		Factors		
Item	Scale	1	2	3
4	R	0.48950	0.03672	0.08421
7	T	0.66581	0.19594	-0.03216
21	CASG	0.43422	0.29775	0.13167
24	CASG	0.59215	0.15449	0.04296
28	COH	0.45423	-0.17166	-0.04501
33	SR	0.41244	0.23938	0.15676
36	CAR	-0.00082	0.66229	0.22965
3	R	0.29913	-0.39811	0.10998
27	COH	0.20170	0.38131	0.00405
30	COH	0.25280	0.53138	0.16121
38	CAR	0.01678	0.36487	-0.12571
39	CAR	-0.03173	0.47921	0.09276
40	CAR	0.15270	0.73975	0.21305
6	T	-0.01608	0.13890	0.43678
10	T	0.12722	0.16133	0.41601
12	HM	0.16302	0.24920	0.30310
13	HM	-0.12665	-0.23199	0.53665
20	OI	0.00960	0.11030	0.33974
23	CASG	0.20467	0.01353	0.53316
22	CASG	0.48517	0.37260	0.24207
31	SR	0.39247	0.46879	-0.08802
32	SR	0.34701	0.31657	0.24934
1	R	0.32081	0.04520	0.35209
9	T	0.36688	0.10289	0.54035
25	COH	0.32244	0.22946	-0.38892
29	CASG	0.52706	-0.04448	0.40457
8	T	0.49340	0.21054	0.45766
2	R	0.31186	0.55035	0.02540
17	OI	0.16466	-0.30055	-0.44680
37	CAR	0.35229	0.43507	0.31319

Note. Salient items were items with pattern coefficients greater in absolute value than .30. HM = High moral; R = Respect; T = Trust; OI = Opportunity for Input; CASG = Continuous Academic and Social Growth; COH = Cohesiveness; SR = School Renewal; CAR = Caring. The Kettering instrument is available from Phi Delta Kappa in the Handbook for Conducting School Climate Improvement Projects, 1987, by Eugene Howard, Bruce Howell and Edward Brainard.

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TABLE 2

ROTATED PATTERN COEFFICIENTS FOR SALIENT ITEMS FOR "WHAT IS" AND "WHAT SHOULD BE" (n=415)

What Is					What Should Be				
		Factors					Factors		
Item	Scale	1	2	3	Item	Scale	1	2	3
2	R	0.42326	0.09459	0.00496	2	R	0.58443	0.02079	0.07992
5	R	0.32477	0.22873	-0.13924	21	CASG	0.33684	0.22886	-0.08860
8	T	0.53704	0.12482	0.09599	27	COH	0.40058	-0.20568	-0.12008
12	HM	0.71309	-0.00283	-0.00645	30	COH	0.48174	0.09211	0.23354
15	HM	0.59013	0.20468	0.05627	31	SR	0.41105	0.04400	-0.02398
23	CASG	0.38080	-0.13991	0.16804	36	CAR	0.60913	0.00943	0.03369
27	COH	0.71739	-0.15276	0.06996	37	CAR	0.49581	0.10999	0.17307
28	COH	0.43376	0.08751	0.08334	39	CAR	0.33458	-0.05828	-0.00844
29	COH	0.53767	0.08221	0.06130	40	CAR	0.65317	0.05048	0.14997
31	SR	0.56465	-0.01055	0.21338	1	R	0.14308	0.34725	0.24092
34	SR	0.40107	0.02822	0.15119	5	R	0.07484	-0.38782	0.15538
37	CAR	0.38513	0.11858	0.25680	7	T	0.28877	0.35182	-0.06015
4	R	0.04541	-0.38404	-0.02408	10	T	-0.00521	0.45312	0.23091
6	T	0.16027	0.35435	-0.03384	15	HM	-0.09374	-0.59439	0.09819
16	OI	0.13845	0.55830	-0.07152	18	OI	-0.10606	0.36853	0.08264
17	OI	-0.03948	0.54314	0.20099	24	CASG	0.29674	0.42997	-0.02789
19	OI	0.16686	0.58128	-0.20115	25	CASG	0.14750	0.30460	0.00200
10	T	0.25139	-0.12127	-0.41912	29	COH	0.01643	0.55345	0.11730
25	CASG	0.20525	-0.14762	0.54101	33	SR	0.29585	0.50669	0.26959
32	SR	0.22637	-0.04029	0.40772	35	SR	-0.22854	0.35788	-0.11642
33	SR	0.15079	0.11988	0.35776	4	R	0.01985	0.18034	0.37211
35	SR	0.00641	-0.11134	0.37143	8	T	0.17096	0.21263	0.54539
20	OI	0.44441	0.43148	0.07306	9	T	-0.00966	0.03413	0.45018
14	HM	0.65494	-0.32711	0.09290	12	HM	0.06374	-0.04684	0.43996
1	R	0.12962	-0.36412	-0.48965	16	OI	-0.06081	-0.00334	-0.51166
30	COH	0.67717	-0.10049	0.39892	17	OI	-0.28017	0.14857	-0.64533
38	CAR	0.39754	0.17001	0.32829	19	OI	-0.06904	0.02941	-0.33273
40	CAR	0.42960	0.22945	0.36811	22	CASG	0.43366	0.34710	0.04534
24	CASG	0.49912	0.31749	0.37428	13	HM	-0.44092	-0.13621	0.37752
26	COH	0.30006	-0.32070	0.30614					
39	CAR	0.43619	0.39274	0.33156					

(continued)

TABLE 2 (continued)
ROTATED PATTERN COEFFICIENTS FOR SALIENT ITEMS
FOR "WHAT IS" AND "WHAT SHOULD BE" (n = 415)

What Is				What Should Be				
		Factors				Factors		
Item	Scale	1	2	Item	Scale	1	2	3
				23	CASG	-0.00412	0.50962	0.51493
				34	SR	-0.10717	0.53155	0.34738
				3	R	-0.42891	0.46164	0.51416

Note. Salient items were items with pattern coefficients greater in absolute value than .30. HM = High moral; R = Respect; T = Trust; OI = Opportunity for Input; CASG = Continuous Academic and Social Growth; COH = Cohesiveness; SR = School Renewal; CAR = Caring. The Kettering instrument is available from Phi Delta Kappa in the Handbook for Conducting School Climate Improvement Projects, 1987, by Eugene Howard, Bruce Howell and Edward Brainard.

TABLE 3

ROTATED PATTERN COEFFICIENTS FOR SALIENT ITEMS FOR "WHAT IS" AND "WHAT SHOULD BE" (n=747)

What Is				What Should Be			
		Factors				Factors	
Item	Scale	1	2	Item	Scale	1	2
13	HM	-.34396	.09086	19	OI	.31216	-.25581
15	HM	.76870	-.23720	20	OI	.33968	.03025
19	OI	.39324	.05988	21	CASG	.44057	.00439
20	OI	.63015	-.09164	22	CASG	.56342	.00560
30	COH	.37231	.27028	23	CASG	.69224	.16703
33	SR	.36925	.12937	24	CASG	.73627	.09237
34	SR	.34206	.29448	25	CASG	.64251	.01124
36	CAR	.57115	-.07431	26	COH	.64775	-.00683
37	CAR	.65128	-.08454	27	COH	.72322	-.05986
38	CAR	.66469	-.15474	28	COH	.61081	.12131
39	CAR	.73080	-.25155	29	COH	.64429	.05275
40	CAR	.51130	.00767	30	COH	.86281	.09140
1	R	-.03487	-.38328	31	SR	.78483	.06996
2	R	.11148	-.44020	32	SR	.60768	-.03709
6	T	.02776	-.39654	33	SR	.81118	.04160
7	T	.07981	-.33895	34	SR	.69242	-.01822
9	T	.01645	-.48309	35	SR	.76133	-.07652
16	OI	.25763	-.39192	36	CAR	.79787	-.01819
17	OI	.00541	-.30660	37	CAR	.85122	.03072
18	OI	.07461	.67540	38	CAR	.73456	-.08282
23	CASG	-.03476	.64768	39	CAR	.69288	-.03939
25	CASG	.01267	.38729	40	CAR	.85087	.05359
28	COH	.13089	.43912	1	R	-.13185	.39227
29	COH	.02242	.36599	2	R	.00188	.52864
				3	R	-.19856	.41756
				4	R	-.11009	.62279
				5	R	-.06309	.56891
				6	T	-.13887	.36525
				7	T	-.07863	.36072
				8	T	.16986	.56773

(continued)

TABLE 3 (continued)
ROTATED PATTERN COEFFICIENTS FOR SALIENT ITEMS
FOR "WHAT IS" AND "WHAT SHOULD BE" (n = 747)

What Is				What Should Be			
		Factors				Factors	
Item	Scale	1	2	Item	Scale	1	2
14	HM	.50350	.43114	9	T	.00685	.41825
24	CASG	.44286	.33549	11	HM	.06162	.38861
26	COH	.56446	.34636	12	HM	.21827	.53482
27	COH	.43599	.47087	13	HM	.01194	.36609
31	SR	.39449	.40059	16	OI	-.07226	-.31375
35	SR	.39879	.33310	17	OI	-.16858	-.34063
				14	HM	.37078	.37898

Note. Salient items were items with pattern coefficients greater in absolute value than .30. HM = High moral; R = Respect; T = Trust; OI = Opportunity for Input; CASG = Continuous Academic and Social Growth; COH = Cohesiveness; SR = School Renewal; CAR = Caring. The Kettering instrument is available from Phi Delta Kappa in the Handbook for Conducting School Climate Improvement Projects, 1987, by Eugene Howard, Bruce Howell and Edward Brainard.

TABLE 4
ROTATED PATTERN COEFFICIENTS FOR SALIENT ITEMS
FOR "WHAT IS" AND "WHAT SHOULD BE" (n=812)

What Is		Factors		What Should Be		Factors	
Item	Scale	1	2	Item	Scale	1	2
8	T	0.43243	0.18669	21	CASG	0.33557	-0.13854
13	HM	-0.39326	0.12400	22	CASG	0.48124	-0.12084
19	OI	0.43935	-0.03508	23	CASG	0.64356	0.06882
20	OI	0.61418	-0.19334	24	CASG	0.69912	-0.01910
24	CASG	0.61904	0.24480	25	CASG	0.58519	-0.11374
26	COH	0.61132	0.23682	26	COH	0.59942	-0.12399
30	COH	0.44759	0.15946	27	COH	0.73744	0.15138
33	SR	0.42372	0.06486	28	COH	0.55745	0.01292
34	SR	0.33642	0.21367	29	COH	0.56831	-0.09070
35	SR	0.44740	0.21671	30	COH	0.84332	-0.01081
36	CAR	0.53725	-0.21793	31	SR	0.77468	-0.02506
37	CAR	0.71179	-0.17351	32	SR	0.54912	-0.18448
40	CAR	0.45906	-0.22046	33	SR	0.79331	-0.07504
1	R	-0.16502	-0.42166	34	SR	0.64368	-0.15594
2	R	0.00450	-0.47988	35	SR	0.72989	-0.22021
6	T	-0 12341	-0.43338	36	CAR	0.76887	-0.15356
7	T	0.13965	-0.36095	37	CAR	0.84346	-0.08987
9	T	-0.05368	-0.52197	38	CAR	0.68992	-0.24168
16	OI	0.21152	-0.45781	39	CAR	0.63661	-0.18556
17	OI	-0.00735	-0.34722	40	CAR	0.83326	-0.06689
23	CASG	0.06376	0.63647	1	R	-0.29333	0.37300
25	CASG	0.13082	0.31401	2	R	-0.11540	0.57746
29	COH	0.17355	0.33338	4	R	-0.26111	0.66564
14	HM	0.51296	0.32812	5	R	-0.21577	0.61254
15	HM	0.60936	-0.40287	7	T	-0.23187	0.32468
18	OI	0.32124	0.65845	8	T	0.03040	0.58817
27	COH	0.56216	0.37900	9	T	-0.17103	0.40211
28	COH	0.33647	0.41015	11	HM	-0.10240	0.37855
31	SR	0.56159	0.32978	12	HM	0.11972	0.56131
38	CAR	0.56815	-0.30434	13	HM	-0.13405	0.36236
39	CAR	0.58634	-0.41543	14	HM	0.26731	0.36236
				16	OI	-0.29964	-0.50706
				19	OI	0.15566	-0.45481
				3	R	-0.34509	0.42165
				6	T	-0.33825	0.32833
				17	OI	-0.40625	-0.53036

TABLE 5
ROTATED PATTERN COEFFICIENTS FOR SALIENT ITEMS FOR "WHAT IS" AND "WHAT SHOULD BE" (n=1200)

What Is				What Should Be			
		Factors				Factors	
Item	Scale	1	2	Item	Scale	1	2
1	R	0.39245	0.18026	3	R	0.28074	0.46058
2	R	0.37303	0.16874	4	R	0.28181	0.51995
4	R	0.37812	0.06183	1	R	0.32814	0.47908
7	T	0.33294	0.26934	2	R	0.32098	0.52146
28	COH	0.36387	-0.02720	5	R	0.35892	0.59200
29	COH	0.39807	0.02104	6	T	0.30272	0.46818
31	SR	0.31890	0.00824	7	T	0.38344	0.54252
32	SR	0.76890	-0.03299	8	T	0.44515	0.61464
33	SR	0.62349	0.13424	9	T	0.43375	0.61759
34	SR	0.53879	0.05665	10	T	0.37002	0.51023
35	SR	0.48153	0.06494	11	HM	0.46033	0.63376
36	CAR	0.55048	0.27587	12	HM	0.44749	0.59185
37	CAR	0.51666	0.25076	13	HM	0.38893	0.56514
38	CAR	0.56501	0.29528	14	HM	0.48189	0.58197
15	HM	-0.10999	0.46554	15	HM	0.41869	0.52027
16	OI	0.24661	0.62626	16	OI	0.47767	0.51375
17	OI	0.10408	0.59409	17	OI	0.41702	0.47411
19	OI	-0.00977	0.47086	18	OI	0.49762	0.49144
6	T	0.46918	0.34159	19	OI	0.55538	0.48282
9	T	0.37716	0.42609	20	OI	0.58647	0.55889
39	CAR	0.50218	0.54775	21	CASG	0.57223	0.50293
40	CAR	0.52439	0.30975	22	CASG	0.62680	0.52793
				23	CASG	0.64101	0.50445
				24	CASG	0.64225	0.49866
				25	CASG	0.60472	0.45733
				26	COH	0.59917	0.45978
				27	COH	0.60956	0.47492
				28	COH	0.59562	0.44576
				29	COH	0.64406	0.48763
				30	COH	0.70676	0.48707
				31	SR	0.63445	0.44803
				32	SR	0.65808	0.42281
				33	SR	0.72828	0.45977
				34	SR	0.67275	0.41184
				35	SR	0.71939	0.44000
				36	CAR	0.74582	0.48534

(continued)

TABLE 5 (continued)
ROTATED PATTERN COEFFICIENTS FOR SALIENT ITEMS
FOR "WHAT IS" AND "WHAT SHOULD BE" (n = 1200)

What Is				What Should Be			
		Factors				Factors	
Item	Scale	1	2	Item	Scale	1	2
				37	CAR	0.72714	0.45363
				38	CAR	0.72661	0.45010
				39	CAR	0.69526	0.42312
				40	CAR	0.74793	0.46068

Note. Salient items were items with pattern coefficients greater in absolute value than .30. HM = High moral; R = Respect; T = Trust; OI = Opportunity for Input; CASG = Continuous Academic and Social Growth; COH = Cohesiveness; SR = School Renewal; CAR = Caring. The Kettering instrument is available from Phi Delta Kappa in the Handbook for Conducting School Climate Improvement Projects, 1987, by Eugene Howard, Bruce Howell and Edward Brainard.

TABLE 6
ROTATED PATTERN COEFFICIENTS FOR SALIENT ITEMS FOR "WHAT IS" AND "WHAT SHOULD BE" (n=1311)

What Is				What Should Be			
		Factors				Factors	
Item	Scale	1	2	Item	Scale	1	2
1	R	-0.31339	0.20164	1	R	-0.46908	-0.11226
8	T	0.50958	0.09449	2	R	-0.59794	-0.05608
13	HM	-0.45668	-0.23380	3	R	-0.59345	-0.00181
14	HM	0.46252	-0.06901	4	R	-0.75534	-0.11291
19	OI	0.57669	0.21680	5	R	-0.59729	0.10665
20	OI	0.59832	0.29324	6	T	-0.50305	0.10743
22	CASG	0.44416	0.13707	7	T	-0.40506	0.04758
24	CASG	0.78818	0.02779	21	CASG	0.43207	0.19378
25	CASG	0.47210	-0.18386	22	CASG	0.53704	0.20209
26	COH	0.70918	-0.05388	23	CASG	0.58391	0.04775
27	COH	0.67619	-0.19757	24	CASG	0.63681	0.10955
28	COH	0.61744	-0.23243	25	CASG	0.61580	0.04681
29	COH	0.43509	-0.24569	26	COH	0.61195	0.08299
30	COH	0.69405	-0.01465	27	COH	0.57635	0.03047
31	SR	0.70606	-0.17894	28	COH	0.58557	-0.04709
32	SR	0.38892	-0.15439	29	COH	0.58079	-0.08725
33	SR	0.44098	-0.01523	30	COH	0.75011	-0.09174
34	SR	0.44093	-0.17688	31	SR	0.68326	-0.06190
35	SR	0.62175	-0.15102	8	T	-0.16984	0.55686
36	CAR	0.63069	0.26298	9	T	-0.25048	0.52463
37	CAR	0.76018	0.28470	10	T	-0.11228	0.64076
38	CAR	0.53212	0.23676	11	HM	-0.12988	0.65101
40	CAR	0.48566	0.17555	12	HM	-0.11076	0.55657
2	R	-0.01084	0.52037	13	HM	-0.22377	0.58721
4	R	0.01965	0.36025	14	HM	0.06743	0.58893
5	R	0.05489	0.32112	15	HM	0.01075	0.60038
6	T	-0.23997	0.41968	16	OI	0.20251	0.55442
7	T	-0.09480	0.36738	17	OI	0.17446	0.62414
9	T	-0.09423	0.52903	18	OI	0.35269	0.51296
16	OI	0.19370	0.42635	19	OI	0.50557	0.38629
				20	OI	0.35741	0.34790
				32	SR	0.65389	-0.31416
				33	SR	0.69964	-0.38878
				34	SR	0.68001	-0.36675
				35	SR	0.74111	-0.35951
				36	CAR	0.65391	-0.37113
				37	CAR	0.69010	-0.40295

(continued)

TABLE 6 (continued)
ROTATED PATTERN COEFFICIENTS FOR SALIENT ITEMS
FOR "WHAT IS" AND "WHAT SHOULD BE" (n = 1311)

What Is				What Should Be			
		Factors				Factors	
Item	Scale	1	2	Item	Scale	1	2
15	HM	0.53346	0.57464	38	CAR	0.66281	-0.41028
18	OI	0.48891	-0.35261	39	CAR	0.65792	-0.39550
21	CASG	0.35607	0.34867	40	CAR	0.67878	-0.46522
23	CASG	0.37776	-0.47200				
39	CAR	0.54784	0.39177				

Note. Salient items were items with pattern coefficients greater in absolute value than .30. HM = High moral; R = Respect; T = Trust; OI = Opportunity for Input; CASG = Continuous Academic and Social Growth; COH = Cohesiveness; SR = School Renewal; CAR = Caring. The Kettering instrument is available from Phi Delta Kappa in the Handbook for Conducting School Climate Improvement Projects, 1987, by Eugene Howard, Bruce Howell and Edward Brainard.

TABLE 7
FACTOR QUESTIONS FOR "WHAT IS" COLUMN

Data Set	Factor	Questions
n = 747	F1	13,14,15,19,20,24,26,30,33-40
n = 822	F1	8,13,14,15,19,20,24,26,27,30,31,33-40
n = 1200	F1	1,2,4,6,7,28,29,31-38,40
n = 1311	F1	1,8,13,14,18,19,20,21,22,24-30
overall (w/o n=1200)		13,14,19,20,24,26,30,33-40
n = 747	F2	1,2,6,7,9,16,17,18,23,25,27,28,29,31
n = 822	F2	1,2,6,7,9,16,17,18,23,25,28,29
n = 1200	F2	9,15,16,17,19,39
n = 1311	F2	2,4,5,6,7,9,15,16,23
overall (w/o n=1200)		2,6,7,9,16,23
n = 747 and n = 822		1,17,18,25,28,29

TABLE 8
FACTOR QUESTIONS FOR "WHAT SHOULD BE" COLUMN

Data Set	Factor	Questions
n = 747	F1	19-40
n = 822	F1	6,21-40
n = 1200	F1	18-40
n = 1311	F1	1-7,19,21-40
overall	F1	21-40
n = 747	F2	1-9,11-14,16,17
n = 822	F2	1-5,7-9,11-14,16,17,19
n = 1200	F2	1 - 17
n = 1311	F2	8-18,20
overall	F2	(1-6),7-9,11-14,16,17