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ATTITUDES TOWARD SERVICES OF STATE DEPARTMENTS OF EDUCATION[1,2]

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ABSTRACT

The structure of attitudes toward services rendered by state departments was studied in six southeastern states with a 70-item scale. Development procedures are described. The scale was administered to randomly chosen samples of superintendents (N = 671), central office personnel (N = 404), principals (N = 627), teachers (N = 3,684), and other local personnel (N = 373). Data from each group were factored and studied for dimensionality. The two factors common to all groups consisted, respectively, of positively and negatively worded items despite the fact that the instrument was developed in a way intended to minimize response set factors. A third factor dealt with university-state relationships.

THIS STUDY was conducted as a part of the evaluation of the Regional Curriculum Project, (RCP), the goal of which is the study of the instructional leadership role of state departments of education in the Southeast. The Regional Curriculum Project is designed as a large, long range field experiment. Twenty-four school systems, four in each of six southeastern states, have been chosen as experimental systems. These systems are receiving intensive consultative, and to some degree, financial assistance by the RCP and their own state department. These 24 systems will be compared eventually with the remaining systems in regard to changes in many criteria.

One of the criteria is attitudes toward state department services. An attitude scale was developed by the authors for the purpose of assessing attitude changes over the experimental period. This paper describes briefly the scale development and the results of the norm testing which is to serve as the pretest attitude data for the RCP. Specific attention is given to the factor analysis results since these results were especially interesting.

SCALE DEVELOPMENT

A large pool of items was compiled in workshops consisting of RCP staff, state department personnel, and public school personnel. The authors edited the item pool to reflect, as nearly as possible, unifactor attitude stimuli.

Items were clustered subjectively into ten clusters reflecting attitude stimuli of particular interest to the RCP project goals. Examples are "Readiness for Change," "Value of Publications," "Relations with Higher Education," and so forth. Within each of the item clusters, items were reworded so that half of the cluster consisted of positively worded items and half were negatively worded items. A pool of 172 items was selected for pilot testing.

After considerable discussion, it was decided to use a standard 5-point Likert scale. The use of a multiple choice format in which scale points were separately defined for each item was a preferred format; however, this format was discarded as being too bulky in terms of test materials. Items were presented as a series of simple, declarative sentences. The response choices were identical for every item and ranged from

"1--I almost always disagree with this statement; or in almost all instances, this statement is false."

to

"5--I almost always agree with this statement; or in almost all instances, this statement is true."

Respondents were directed to omit an item only if they had insufficient information upon which to base a response. This definition of omissions was used so that omission patterns could be studied as indicative of areas in which information exchanges were weak.

A pilot sample of 122 graduate students at the University of Georgia was chosen. This pilot sample

consisted largely of in-service extension classes and contained representatives of all job categories of interest. Pilot data were analyzed by a series of factor analyses. The 172 items were split into three sets of 57, 57, and 58 items for initial factoring. Items were discarded on the basis of over-complexity (high loadings on several factors), low communalities (implying low reliability as well as identifying specifics), and redundancy. Data were re-analyzed iteratively until a final pool of seventy items was chosen.

The pilot data yielded eight identifiable common factors consisting of five to thirteen items each. Each subset of items was reworded so that half of each subset consisted of positively worded items and half consisted of negatively worded items. The dimensionality of the pilot data was determined largely by nature of the repeated analysis of the same data, and hence is not directly comparable to final results.

SAMPLE

All subjects are public school personnel from six southeastern states. State department records and tape listings were used to identify simple random samples of personnel in four job categories. The percentages of persons in each job category included in the target sample were

1.	Superintendents	100 percent
2.	Central Office Personnel	12 percent
3.	Principals	10 percent
4.	Local School Personnel	3 percent

These percentages were higher for the samples drawn from the twenty-four experimental systems.

Test materials were distributed through the six state departments. Subjects returned the materials by mail and stamped envelopes were provided for this purpose.

The percentage return ranged from 55 percent for local personnel to 100 percent for central office personnel. The total percentage return was about 60 percent. Percentages were relatively consistent state-by-state.

The category "local school personnel" was divided into "classroom teachers" and "local personnel who are not teachers" by sorting obtained data.

The sample sizes obtained were as follows:

Superintendents	671
Central Office Personnel	404
Principals	627
Non-teacher, other local personnel	373
Teachers	3,684
Total	5,759

The high percentage return from supervisory persons (near 100 percent in every state) was especially pleasing since this group is the focal point of state-local system relationships.

ANALYSIS

Extensive analysis was made of the data for the RCP; however, this discussion will focus only on the factor analyses. Items were factored by job category with unities on the principal diagonal of the intercorrelation matrices and varimax rotations were used.

The major problem was the determination of dimensionality. Several alternatives have been suggested, the most common being Kaiser's "little jiffy" criterion of using the number of factors corresponding to the number of latent roots exceeding one. Another commonly used criterion is to take the number of factors that are psychologically definable. This non-analytic procedure requires multiple rotational analyses, but is defensible psychologically.

Related to this second criterion is the use of the number of factors that appear consistently over several sets of data, a criterion which is defensible psychologically, but is often useless due to the absence of replication data. This point-of-view has been used to some degree in this study.

The authors chose to follow, as far as possible, Cattell's point-of-view on dimensionality (1: 174-243). Cattell points out (p. 207) that the Kaiser criterion is inadequate for large analyses.

> ...the Kaiser test... cuts off too soon when variables are few ($n < 20$), and cuts off too late when they are many ($n > 50$).

This expectation led to the prediction that our analyses would yield many roots larger than one--an outcome that was obtained and is commonly obtained in item factoring.

Cattell proposes his "scree test" as a semi-analytical solution. His scree test consists of plotting the magnitude of the roots against the number of the root and examining the smaller roots for a straight line trend. He states (p. 206):

> When successive roots extracted begin to fall in this regular way one is dealing only with common factors due to a large number of random small influences...

He points out that these "random small influences" would be explained by classic theory as probably specifics orthogonal in the population and measurement error.

He goes on to say (p. 206):

> In large samples, there are usually clear representations of <u>two</u>, not one, successive straight scree slopes. In this case, one takes the line of the upper slope.

TABLE 1

FIRST 25 ROOTS FOR ALL ANALYSES

Root	Group				
	Superintendent	Principal	Other Control	Teachers	Other Local
1	14.49	11.97	12.97	16.41	12.49
2	5.07	9.38	8.76	10.06	10.82
3	3.37	2.68	2.92	1.63	2.20
4	1.88	1.68	1.79	1.41	1.90
5	1.55	1.57	1.57	1.30	1.65
6	1.49	1.41	1.50	1.17	1.47
7	1.39	1.35	1.42	.99	1.46
8	1.32	1.27	1.35	.97	1.39
9	1.28	1.19	1.28	.96	1.34
10	1.24	1.17	1.27	.94	1.23
11	1.18	1.15	1.27	.90	1.22
12	1.12	1.10	1.19	.87	1.17
13	1.10	1.08	1.14	.86	1.10
14	1.07	1.01	1.12	.82	1.06
15	1.03	.99	1.10	.80	1.03
16	.98	.97	1.06	.79	1.01
17	.96	.95	1.01	.76	.97
18	.94	.94	.97	.75	.96
19	.93	.91	.95	.73	.93
20	.91	.89	.91	.71	.89
21	.89	.88	.89	.71	.88
22	.86	.84	.88	.70	.85
23	.85	.80	.86	.70	.84
24	.82	.79	.83	.68	.81
25	.78	.78	.80	.67	.76

RESULTS AND DISCUSSION

A partial table of roots for the five analyses appears as Table 1. The roots from the five analyses were plotted and examined for scree slopes. In each analysis, the lower scree line was obvious. The second scree line appeared clearly in three of the five analyses and less clearly in the other two. Figure 1 shows the typical root graph with two scree lines. Note that in Figure 1 the "root-of-one criterion" intercepts the scree line in a way that would identify a large number of factors, whereas the upper scree line identifies a very small number of factors.

FIGURE 1

TYPICAL SCREE GRAPH SHOWING THREE FACTORS

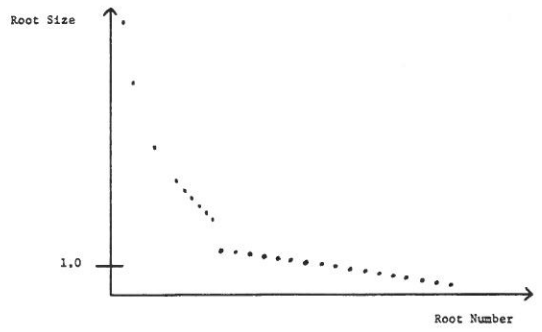


Table 1 shows the number of roots identified by the "greater-than-one" criterion. From 14 to 17 roots exceeded one in four analyses and six roots exceeded one in the teacher data.

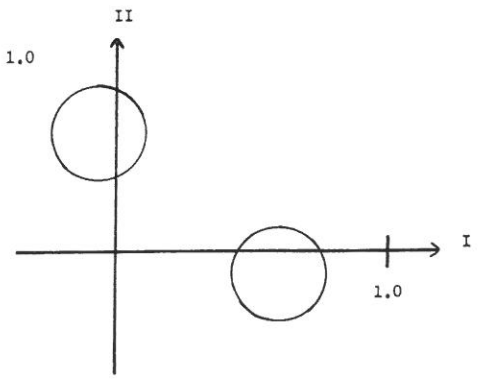
The scree plots were judged as identifying three roots in the data for superintendents, other central office personnel, and principals. Two roots were judged to be important in the data for teachers and other local personnel.

Factor similarity coefficients were calculated for factor matching. Matching factors generally had similarity coefficients in the range .85 to .95.

The factors were examined for identification. At least twenty-five items were found common to all five analyses as identifying both factors I and II. Plots of factor loadings showed that the two factors consisted of mutually exclusive item clusters. A typical plot appears in Figure 2.

FIGURE 2

TYPICAL SCATTERGRAM OF ROTATED LOADINGS ON FACTORS I AND II



The first two factors correlate in the range of 0 to -.3 for four analyses. The correlation is about -.7 for superintendents. The first two factors in all five sets of data define a definite response set splitting positively worded items and negatively worded items into mutually exclusive subsets.

The third factor, identified clearly by six items common to three analyses, consisted of items dealing with the relationship of the state departments to institutions of higher education. The failure of local school people to yield factor III is most likely due to insufficient knowledge at this level to allow consistent responses to these items.

Scales defined by items loading highly on each factor were analyzed for internal consistency reliability by calculating alpha coefficients for thirty job-by-state subgroups. Alpha coefficients for factors I and II were in the range .84 to .95, 25 of the thirty coefficients exceeding .90 for both factors. Factor III alpha coefficients were lower, being largely in the range .70 to .87. Test-retest reliabilities over a 1-month interval were obtained on a sample of seventy-two and were all in the mid-seventies.

Factors I and II clearly indicate that subjects responded independently to positive and negative items. The authors have been unable to determine any artifact that would force this solution. Skewness in the distributions of item responses would not create the split, since the skewness has the effect of forcing pear-shaped joint distributions on all item pairs, thus affecting correlations in a fairly homogeneous way. The skewness certainly can affect the total structure by lowering correlations of item pairs that correlate negatively in the population when both items are either positively or negatively worded. However, this possibility does not seem to be related to the result of independence between positive and negative items.

This result has also been obtained in other studies. Some of the authors of this paper found such an item split in two of several factors identified in an independent study of the attitudes of teachers toward their county system services. In a personal communication to the senior author, Garry Foster (2) of the Nova School Project reports getting several factors in children's responses to items about their attitudes toward education. Two of Foster's factors were negative and positive attitudes.

A suggestion of this response set is also seen in Kerlinger's (3) study of progressive and traditional attitudes toward education. Kerlinger reports two independent major attitudes as second order factors--namely, progressive attitudes and traditional attitudes. A review of the items loading on these two factors suggests that the response set found by the present authors could have been operating in Kerlinger's study. Kerlinger's items could be identified as negatively worded or neutrally worded items. There were no positively worded items. In general, the negatively worded items loaded highly on only the "traditional attitude" factor.

Whether or not the positive-negative response set is a methodological problem to be overcome or a substantive finding remains to be seen. Certainly one can avoid the set by constructing items having only

positively, negatively, or neutrally worded items without mixing the item types. It can also be avoided by choosing alternate item formats such as a semantic-differential-like item format. However, such scales might serve merely to hide what is perhaps a significant and substantive effect--a tendency to evaluate independently the good and the bad aspects of an educational stimulus.

FOOTNOTES

1. Supported by the USOE as part of the evaluation of the Regional Curriculum Project, 50 Whitehall Street, Atlanta, Georgia, directed by Edward T. Brown. The conduct of the study and opinions expressed are solely those of the authors and do not reflect official opinions of the RCP.

2. Authors are listed alphabetically. Appreciation is expressed for the assistance of Edward T. Brown and Edith Miller, Regional Curriculum Project, H. T. Conner, Richardson Foundation, and the many persons in each of the six states who assisted in the data collection.

REFERENCES

1. Cattell, Raymond B., "The Meaning and Strategic Use of Factor Analysis," in Cattell, Raymond B. (Ed.) Handbook of Multivariate Experimental Psychology, Rand-McNally, Chicago, 1968.

2. Foster, Garry, personal communication, December 18, 1967.

3. Kerlinger, Fred N., "The First/and Second-order Factor Structures of Attitudes Toward Education," American Educational Research Journal, 4: 191-206, May, 1967.