DOCUMENT RESUME

ED 060 543 EA 004 110

AUTHOR Miskel, Cecil; Heller, Leonard E.
TITLE The Stability and Reliability of a Modified Work Components Study Questionnaire in the Educational Organization.
PUB DATE Apr 72
NOTE 18p.; Paper presented at American Educational Research Association Annual Meeting. (57th, Chicago, Illinois, April 3-7, 1972)

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS *Administrative Personnel; *Administrator Attitudes; Administrator Characteristics; Educational Administration; Educational Research; Factor Analysis; *Job Satisfaction; Organization; *Questionnaires; *Reliability

ABSTRACT

The investigation attempted to establish the factorial validity and reliability of an industrial selection device based on Herzberg's theory of work motivation related to the school organization. The questionnaire was reworded to reflect an educational work situation; and a random sample of 197 students, 118 administrators, and 432 teachers was made. Statistical procedures included varimax and maxplane factor analysis and Cronbach's item analysis. Six stable factors composed of 56 items with reliabilities ranging from .73-.83 were isolated. Finally, the theoretical basis and similar psychometric properties in different organizational types are indicative of versatility for probing many provocative relationships related to work motivation. (Author)

THE STABILITY AND RELIABILITY OF A MODIFIED WORK COMPONENTS STUDY QUESTIONNAIRE IN THE EDUCATIONAL ORGANIZATION

Cecil Miskel

Leonard E. Heller
The University of Kansas

Annual Meeting
American Educational Research Association
April, 1972

THE STABILITY AND RELIABILITY OF A MODIFIED WORK COMPONENTS STUDY QUESTIONNAIRE IN THE EDUCATIONAL ORGANIZATION

Although the selection of competent school administrators is generally recognized as a crucial problem in education, little attempt has been made to systematically advance the procedures used in identifying those persons who can fulfill the complex role expectations of educational leadership. If the selection process is to become more effective, efforts must be made to establish the predictive capabilities of the selection instruments. Since the current devices, such as, interviews, letters of recommendation, and biographical information blanks, have questionable value for selection purposes, it becomes necessary to develop new instruments or modify existing instruments with empirically proven predictive powers. A recent study (Ford, Borgatta, Bohrnstedt, 1969) has demonstrated the predictive powers of the Work Components Study (WCS) questionnaire as a selection device on a probabilistic basis for the selection of industrial managers.

Conceptually, the WCS is adaptable to the school organization because of its strong theoretical basis. However, prior to the verification of the instrument as a predictor of job performance in school administration, the necessary first steps are to empirically test the WCS for stability and reliability in the school organization. Therefore, the purpose of the current research has been to establish the factorial validity and reliability of the WCS in the public school system. Specific questions to be answered were as follows: Is the WCS a factorially valid instrument when used in the context of the public schools? What is the level of reliability of the WCS and its subscales in the public school setting?

Theoretical Basis of the WCS

The two-factor theory of motivation to work which has been developed by

Herzberg, Mausner, and Snyderman (1959) is the primary conceptual foundation for construction of the WCS. The first-level factors involve the objective elements of the job situation while the second level factors involve the need and value systems of the workers. Herzberg found that positive events are dominated by references to intrinsic aspects of the actual job (achievement, recognition, work itself, responsibility, advancement). Conversely, negative events are dominated by references to extrinsic or environmental aspects of the job situation (company policy and administration, technical supervision, interpersonal relations, working conditions, job security). Herzberg has labeled the intrinsic variables as motivators or satisfiers, and the extrinsic variables as hygiene factors. Furthermore, King (1970) maintains that the research completed in the industrial setting since the original study supports the following assertions: (1) All motivators combined contribute more to job satisfaction than to job dissatisfaction. (2) All hygiene factors combined contribute more to job dissatisfaction than to job satisfaction.

The research of Blum (1961) has also been instrumental in the development of the WCS. His findings indicate that the desire for security could be the deciding factor involved in job selection. It is further posited that differences exist among individuals with respect to the degree of importance placed upon the desire for security as a factor in vocational choice. Some persons might select a job situation where the elements of security were high, while others, being less concerned with security, would choose jobs in which opportunities for responsibility, achievement, recognition and advancement were high.

In developing the WCS, the original researcher (Borgatta, 1967) has assumed that persons respond differently to the factors that surround the

job situation and that an organization would want to favor those persons for managerial positions who have a moderate or incidental concern rather than those who are greatly or overly concerned with hygiene factors. The rationale supporting the foregoing position is that managerial positions are probably low in hygiene and high in opportunities for intrinsic reward. Consequently, an individual possessing a play-safe or security complex can not function in the typical managerial positions, since low hygienic conditions create frustration and minimize the motivation to perform.

Extending the above rationale to the educational organization, it is reasonable to assume that the most desirable individuals for positions in school administration place emphasis on the intrinsic factors rather than extrinsic factors of the job. The comparative results should be that administrators oriented towards the job itself will acquire positive job attitudes and be motivated to perform while administrators oriented to the job surroundings will acquire negative job attitudes and lack of motivation to perform.

Development of the WCS

Ten theoretical categories were devised that assumed some correspondence to Herzberg's first- and second- level factors. An attempt was then made to draw up an inclusive list of content ideas under each of the categories. The primary analysis of the WCS was based on samples of at least 153 University of Wisconsin college students. Using principle components, varimax rotation, six factors were selected as having reasonably clear definition with the promise for the construction of subtests having some degree of independence (Borgatta, 1967).

As development continued, the WCS underwent further refinement (Borgatta, Ford, and Bohrnstedt, 1968). Through the analysis of new data and the

reanalysis of earlier data two modifications were made. First, one of six factors was divided into two, yielding seven. Second, several items were added to bolster one factor. The revised WCS contained 64 five-point Likert-type items and seven factors. Furthermore, the reliabilities of the factors using Cronbach's alpha coefficients ranged from .66 to .83. The final seven factors are described by Ford et al. (1969). A brief description of each follows:

1. Potential for personal challenge and development (8 items). The factor contains items which purport to measure the desire in job situations where there is an opportunity for creativity, an opportunity for as much responsibility as one wants, and an emphasis on individual ability.

2. Responsiveness to new demands (7 items). The factor contains items which measure the responsiveness of an individual to emergency situations and changing demands in a job.

3. Competitiveness desirability (and reward of success) (9 items). The factor contains items which measure whether an individual seeks job situations where the salary is determined by merit, the competiton is keen, and the emphasis is on accomplishment.

4. Tolerance for work pressure (7 items). The factor contains items which measure attitudes toward situations where the work load might be excessive or where a person might have to take work home.

5. Conservative security (12 items). The factor contains items to measure whether the individual wants to play it safe and have security with well-defined promotion guidelines and job routines.

6. Willingness to seek reward in spite of uncertainty versus avoidance of uncertainty (12 items). The factor contains items to measure whether the individual is willing to do interesting work even though he might get fired

easily or it might be a short-run job.

7. Surround concern (9 items). The factor contains items to measure the individuals concern with the hygienic aspects of the job.

Method

Instrumentation

To modify the WCS for use in the public schools and yet preserve the content, the original items were reworded by replacing those words pertaining to an industrial work situation with words indicating an educational work situation. For example, "school" was substituted for "company" and industry was replaced with "school district."

Following a procedure similar to the original developers, the WCS was administered as a self-report form (Borgatta, Ford, and Bohrnstedt, 1968). The respondents read: "How desirable would YOU consider each of the following items in a job for YOU? A job where . . ." The items followed, each with a five Likert-type response varying from "completely undesirable, would never take the job" to "extremely desirable, would favor job greatly." The categories were assigned arbitrary values of one to five.

Sampling Procedures

The sample of 743 included 153 senior and 42 graduate students in the School of Education and 118 administrators and 432 teachers randomly selected from three public school districts. The number of teachers and administrators in each district is as follows: district A, 400; district B, 1500; and district C, 2300. Therefore, the sample of 549 teachers and administrators from the three public schools represented a population of approximately 4200.

To ensure adequate returns from the different segments of the population for analysis purposes, a stratified random sampling procedure with three guidelines was used. Proportionately larger samples were selected as follows:

(1) 25% from district A, the smallest, versus 12.5% from districts B and C, (2) 50% of the administrator's and counselors versus 10% of the teachers, and (3) a separate sample of 50 elementary male teachers.

The data from the student sample were collected in the classroom by the instructor. The data from the public school sample were collected through a mail procedure. Overall, 683 questionnaires were mailed and 550 or 80.5% were returned.

Analysis

The analysis of the data consisted of three statistical techniques. Varimax orthogonal and maxplane oblique R-factor analysis procedures were used to determine the factorial stability of the WCS. Cronbach's alpha coefficient (1951) was calculated to estimate the internal consistency of items with the factor and the items with the instrument.

The criteria for determining the number of factors are as follows: the scree test, discontinuity of eigenvalue (Cattell, 1966), interpretability (Rummel), the findings of the earlier research on the WCS (Ford, Borgatta, Bohrnstedt), and Kaiser's eigenvalue-one (1960). In addition, six criteria were used in selecting items for further research. The criteria are as follows: (1) minimum factor loadings of .40 after the varimax rotation, (2) minimum pattern loadings of .40 after the maxplane rotation, (3) minimum structure loadings as product moment correlations of the variables with the oblique factors (Harmon) of .40, (4) a reasonable consistency between items and factor content, (5) items loading on the factors indicated by the original developers (Ford, Borgatta, Bohrnstedt), and (6) minimal cross loading on two or more factors.

Results

Number of Factors

The scree test and the discontinuity of eigenvalues indicated the best factor solution was a six factor structure. Combining the foregoing results with the seven factor solution indicated by the developers, six and seven factor rotations were completed. However, the seventh factor accounted for only 2.69 percent of the original variance and only 6.53 percent of the explained variance. Furthermore, only two items loaded above .40 (.42 and .46) on factor seven and they also loaded above .40 (.45 and .41) on two other factors. Consequently, the six factor solution was considered to be better than the seven factor solution. Apparently, the original factor two, as defined by Borgatta (1968), Responsiveness to new demands, collapsed into other factors.

Item Analysis

Ten items (three from the original factor two) were eliminated using the aforementioned criteria for item selection. Varimax and maxplane factor analysis procedures were again completed with the remaining 56 items. Of the remaining four items of factor two, items 18 and 28 loaded with items for Tolerance for work pressure and items 42 and 45 loaded with the items for Potential for personal challenge and development. The items in the six factor groups for the educational organization and the factor loadings are presented in Table 1.

Table 1 about here

Factor Correlations

With the exceptions of factors 3 and 5 correlating at .55 and factors

1 and 6 correlating at .39, the six factors are relatively independent. The factor correlation matrix is presented in Table 2.

Table 2 about here

Reliability

The reliability of the original seven factor, 66 item WCS has had a range from .65 to .85 (Borgatta, et al., 1968 and Summers, et al., 1971). The reliability of the six factor, 56 item WCS in the educational organization compares very favorably with the results of Borgatta and Summers with a range of .73 to .83. A summary for the reliabilities of the six factors are presented in Table 3.

Table 3 about here

Discussion

Instead of seven prevalent factors in the WCS, the factor analysis procedures demonstrated that six unidimensional factors were operating in the educational organization; that is, after eliminating weak items, the remaining items describing each of the six factors matched the items identifying each of the six factors as reported by Ford, Borgatta, and Bohrnstedt (1969). The six factors which can be used to measure work motivation in the educational organization are as follows:

1. Potential for personal challenge and development (8 items)
2. Competitiveness desirability and reward of success (7 items)
3. Tolerance for work pressure (9 items)

4. Conservative security (11 items)

5. Willingness to seek reward in spite of uncertainty vs. avoidance of uncertainty (10 items)

6. Surround concern (11 items)

The collapsing factor, Responsiveness to new demands, should have been composed of seven items. However, the factor was not unidimensional since two of the items loaded with the items describing Potential for personal challenge and development, two items loaded with the items describing Tolerance for work pressure, and the remaining three items cross loaded below .40 on three factors. The collapse was not overly surprising as the factor was developed by splitting factor one, Potential for personal challenge and development. Furthermore, Borgatta, et al. (1968) noted a strong relationship between the underlying content of the factors, Responsiveness to new demands and Tolerance for work pressure. Therefore, with a slight rewording of two items, it was maintained that the items reflect the content of the designated factors.

Other psychometric properties of WCS for the educational setting appear to be adequate for further research investigation. The reliabilities of .73 to .83, and the relative independence of factors support the foregoing assertion.

Finally, the WCS seems to have versatility in probing many provocative relationships based on the motivation to work in an educational organization. Possible questions for future investigations and establishing construct validity, include the following: Are school administrators significantly higher in intrinsic motivation than are teachers? Can the WCS be used as a screening instrument for selecting administrators or teachers? Do the intrinsically motivated individuals remain in education or do they matriculate to other occupations? What are the relationships among motivation to work, organizational incentives, job satisfaction, and effectiveness?

TABLE I

VARIMAX AND MAXPLANE FACTOR LOADINGS
FOR EACH ITEM

Item Number	Item	Varimax Loadings	Maxplane Pattern	Loadings Structure
	Factor 1. Potential for Personal Challenge & Develop.			
13	there is opportunity for creative work.	.55	.49	.59
24	I would have a chance to really accomplish something, even if others wouldn't know about it.	.47	.43	.50
31	there would be emphasis on individual ability.	.56	.52	.61
34	the school district is located in a university center and would encourage further specialized work.	.62	.66	.59
39	I would have a chance to further my formal education.	.63	.61	.65
*42	I would always have a chance to learn something new.	.53	.52	.55
*45	the work itself keeps changing and I need to change to keep up with it.	.51	.48	.53
56	there would be emphasis on originality.	.60	.56	.63
	Factor 2. Competitiveness Desirability (& Reward of success)			
3	salary increases would be strictly a matter of how much you accomplished for the school district.	.63	.62	.64
11	the school district is known to be involved in heavy competition.	.50	.48	.52

21	persons are supposed to "get the boot" if they don't make good and keep making good.	.40	.36	.44
35	there are opportunities to earn bonuses.	.51	.56	.58
37	competition would be open and encouraged.	.53	.51	.57
49	there is emphasis on the actual production record.	.60	.60	.59
52	salary increases would be a matter of how much effort you put in.	.64	.63	.67
	Factor 3. Tolerance for Work Pressure			
7	trouble might come up that I would have to take care of myself, even outside regular hours.	.48	.53	.57
12	the work might be excessive sometimes.	.63	.74	.66
**18	the schedule of hours might have to be flexible in response to the amount of work.	.46	.54	.50
22	I might sometimes have to take work home with me.	.58	.72	.54
27	the work might build up "pressures" on me.	.65	.75	.70
**28	the nature of the job changes because the school district changes.	.44	.48	.51
43	there might occasionally be some physical danger.	.43	.45	.56
48	the work might come in big pushes.	.61	.72	.64
50	I might be on call when there is pressure to get jobs done.	.62	.72	.66

	Factor 4. Conservative Security			
2	the emphasis would be on carrying out clearly outlined school district policies.	.50	.43	.50
10	the job is managing a small group of people doing routine jobs.	.64	.65	.62
14	the work would be routine, but would not be hard to do.	.75	.75	.76
15	I would work as a member of a more-or-less permanent group.	.41	.43	.46
20	the pay is not too high, but the job is secure.	.45	.46	.43
26	the work is routine, but the initial salary is high.	.73	.71	.73
33	I would be under civil service.	.46	.55	.44
36	promotions come automatically.	.52	.54	.58
41	the work is routine, but highly respected in the community.	.70	.70	.69
47	the salary increases are regularly scheduled.	.48	.50	.56
54	there would be emphasis on satisfying superiors by carrying out school policy.	.48	.38	.46
	Factor 5. Willingness to Seek Reward in Spite of Uncertainty Vs. Avoidance			
1	I could get fired easily, but the work would be very interesting.	.66	.68	.66

4	I could not be sure I could keep my job as long as I want it.	.50	.46	.51
6	the school district is not stable.	.49	.47	.49
9	the school district has in the recent past been having a hard time holding its position.	.50	.44	.51
19	the work might run out, but it would be extremely interesting while it lasted.	.48	.50	.53
25	I could get fired easily.	.68	.64	.69
32	there is little permanency of positions.	.75	.76	.73
40	I could get fired easily, but the rewards would be high.	.73	.79	.76
46	the job is insecure.	.70	.67	.71
53	rewards are high, and the work interesting, but if one loses his job it is very difficult to get another one.	.50	.52	.53
	Factor 6. Surround Concern			
5	the lighting is good.	.61	.72	.58
8	the community has good recreational facilities.	.59	.67	.56
16	the climate would be pleasant.	.60	.65	.62
17	the community would be a wonderful place to raise a family.	.55	.57	.57
23	the physical working conditions would be attractive.	.60	.61	.63

***29	the fringe benefits are very good.	.59	.57	.62
30	the ventilation is modern.	.73	.81	.72
38	the community would have a good social and cultural life.	.48	.41	.57
44	the supervisors are nice people.	.55	.60	.59
***51	the retirement plan is good.	.56	.57	.58
55	I would have nice people for co-workers.	.58	.63	.61

*Items from the original factor two with a slight modification in wording.

**Items from the original factor two.

***Fringe benefit items loadings with factor 6.

TABLE 2

FACTOR CORRELATION MATRIX

Factor	Factor 1	2	3	4	5	6
1	1.00					
2	.13	1.00				
3	.13	.30	1.00			
4	-.17	-.01	-.23	1.00		
5	.17	.15	.55	-.27	1.00	
6	.39	.24	-.01	.26	-.12	1.00

TABLE 3

CRONBACH'S ALPHA COEFFICIENTS

	College Freshmen[a]		High School Students[b]		Public School Employees
	Males N=1000	Females N=1000	Males N=359	Females N=364	N=738
1. Potential for Personal Challenge and Development.	.71	.69	.75	.76	.80
2. Competitive Desirability (and Reward of Success)	.68	.65	.70	.65	.73
3. Tolerance for Work Pressure	.72	.74	.66	.67	.79
4. Conservative Security	.82	.79	.70	.72	.81
5. Willingness to Seek Reward in Spite of Uncertainty Vs. Avoidance of Uncertainty	.82	.80	.68	.76	.82
6. Surround Concern	.83	.82	.80	.85	.83

a. Data for college freshmen are from Borgatta, et al. (1968, 406).

b. Data for high school students are from Summers, et al. (1971).

References

Blum, S. H. The Desire for security. Journal of Educational Psychology, 1961, 52, 317-321.

Borgatta, E. F. The work components study: A set of measures for work motivation. Journal of Psychological Studies, 1967, 16, 1-11.

Borgatta, E. F., Ford, R. N. and Bohrnstedt, G. W. The work components study: A revised set of measures for work motivation. Multivariate Behavioral Research, 1968, 3, 403-414.

Cattell, R. B. Extracting the correct number of factors in factor analysis. Educational and Psychological Measurement, 1958, 18, 791-837.

Cattell, R. B. The scree test for the number of factors. Multivariate Behavioral Research, 1966, 1, 245-276.

Cronbach, L. J. Coefficient alpha and the internal structure of tests. Psychometrika, 1951, 16, 297-334.

Ford, R. N., Borgatta, E. F. and Bohrnstedt, G. W. Use of the work components study with new college-level employees. Journal of Applied Psychology, 1969, 53, 367-376.

Harmon, H. N. Modern factor analysis. (2nd ed.) Chicago: University of Chicago Press, 1967.

Herzberg, F., Mausner, B., and Snyderman, B. B. The motivation to work. New York: John Wiley and Sons, Inc., 1959.

Kaiser, H. F. The application of electronic computers to factor analysis. Educational and Psychological Measurement, 1960, 20, 141-51.

King, N. Clarification and evaluation of the two-factor theory of job satisfaction. Psychological Bulletin, 1970, 74, 18-31.

Rummel, R. J. Applied factor analysis. Evanston: Northwestern University Press, 1970.

Summers, G. F., Burke, M., Saltiel, S., Clark, J. P. Stability of the work components structure among high school students. Multivariate Behavioral Research, 1971, 6, 35-50.