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Empirical investigations have demonstrated that employment tenure can be predicted by systematically analyzing the biographical information of job applicants. Similarly, long- and short-tenure industrial workers can be differentiated with various measures of interest. The present study examined the responses of two groups of employees, long- and short-tenure personnel, on a personality inventory, the Thurstone Temperament Schedule.

Two hundred-ninety male employees were selected from the production population of a textile company. Of this number, 174 men constituted a long-tenure criterion group: they had been employed by the company for six consecutive months or longer. The short-tenure group, consisting of 116 men, had terminated their employment voluntarily before completing three consecutive months of work. One-third of both of these primary groups was selected at random to provide a holdout sample for a cross-validation analysis. While there were no consistent significant differences between the long- and short-tenure employees in terms of biographical information (age, education, and marital status), the long-tenure personnel, on two statistical analyses, scored significantly higher on a mental ability test than did the short-tenure workers.

The item analysis of the responses of the primary tenure groups produced 30 Schedule items which significantly

differentiated between long- and short-tenure employees. These items, however, when used as unit and variable weighted scoring systems and applied to the Schedule responses of the holdout groups, produced no statistically significant difference between the long- and short-tenure personnel. As the initial findings were not substantiated in the cross-validation analysis, it was suggested that the differences obtained in the primary analysis were attributable to chance factors.

Non-significant findings were similarly found in a long- and short-tenure total, primary, and holdout group comparison of the seven scale scores of the Schedule.

A CONSIDERATION OF THE THURSTONE TEMPERAMENT SCHEDULE AS A PREDICTOR OF JOB TENURE IN A TEXTILE COMPANY: An Item Analysis

by

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INTRODUCTION

The prediction of employee behavior has traditionally been a concern of personnel departments in business and industrial organizations. Job applicants are selected for employment on the assumption that these individuals will, in a reasonable period of time, meet demands or requirements established for their particular job. These demands, expressed in terms of performance criteria, vary from organization to organization and from job to job, but, in general, they reflect some measurable degree of job success.

Employee job success, being multidimensional in nature, can be evaluated in terms of the quality or quantity of an employee's production, the number of absences, the number and severity of accidents, advancement rate, and turnover rate as well as other criteria. Each variable has its utility and the criterion chosen by an organization will reflect the particular needs and values of that organization.

Of the several criteria of employee performance, the rate of turnover has received increased attention in recent years. Numerous empirical investigations have been conducted in business and industrial organizations in an effort to reduce an increasing rate of employee turnover. Behavioral measures have been analyzed to determine significant differences between those employees who work for a relatively long period

of time (long-tenure employees) as contrasted with those employees who work for a relatively short period of time (short-tenure employees). The measures which differentiate between long- and short-tenure employees have predictive value and can be employed to identify potential long-tenure workers from the responses of job applicants.

One of the more successful instruments for predicting employee tenure has been a measure based on biographical information. Biographical information blanks, composed of multiple-choice items which allow the job applicant " . . . to describe himself in terms of demographic, experiential, or attitudinal variables presumed or demonstrated to be related to . . . occupational pursuits [Owens & Henry, 1966, p. 1]" have been used in several recent investigations and have produced statistically significant differences between long- and short-tenure employee groups.

Shott, Albright, and Glennon (1963), using responses on employment application forms, found that a number of items, when combined and assigned scoring weights, would significantly differentiate between long- and short-tenure clerical employees in a gas company. Minor (1958), in a similar approach, found eleven biographical items that were related to tenure of female clerical workers in a midwestern insurance company. These items, in the form of an optimally weighted scoring key, yielded a correlation coefficient of .51 with the responses of long-tenure workers.

Fleishman and Berniger (1960) report that clerical and

secretarial turnover in a large university could be reduced with the aid of a weighted application blank. Similarly, Kirchner and Dunnette (1957) found that long-tenure office workers employed by a large manufacturing industry in Minnesota could be differentiated from short-tenure employees on a 15 item personal-history form. The primary findings in this investigation were supported in a cross-validation analysis; long-tenure personnel were identified from a second employee sample with the aid of a weighted scoring key. Mosel and Wade (1951) demonstrated that long-tenure department store personnel could be identified using the weighted application blank approach. With a sample of 85 short-tenure and 162 long-tenure women sales clerks, 12 statistically significant items were found to be related to length of employment. Further, when given weights and combined in the form of a scoring key, these items significantly differentiated between another sample of short- and long-tenure workers in a cross-validation analysis.

In an investigation of clerical employees in a life insurance company, Kriedt and Gadel (1953) found that turnover could be predicted with a battery of tests, questionnaires, and biographical information. The biographical data were reported to be the single best predictor, but, by using the other measures, including a company-constructed 285 item interest questionnaire, the effectiveness of turnover prediction was further increased. Wickert (1951), however, in a study of the turnover rate of over 600 telephone operators,

reported that neither biographical data nor personality inventory responses (using a self-constructed test) would successfully predict the length of employment tenure.

Another approach in selecting long-tenure employees was described by Bolanovich (1948). A self-constructed interest inventory was administered to 212 women hired by an electronics company in New Jersey. Of the 271 items in the inventory, 114 were significantly related to the length of employment. These discriminating items, when assigned scoring weights, successfully identified long- and short-tenure employees in a larger employee sample. Bolanovich reports that had only those applicants who received high scores on the weighted inventory been employed, turnover would have been reduced by approximately 40 per cent for a six month time period. Similar findings were obtained when the weighted inventory items were scored for a second group of applicants.

Tiffin and Phelan (1953) report that turnover in a midwestern metal parts factory was reduced by using Kuder Preference Record items that were significantly related to job tenure. The 74 items that were statistically significant in discriminating between 1109 long-tenure and 450 short-tenure male employees were combined as a scoring key and applied to a comparable holdout group of 487 men. The key was highly successful in predicting long-tenure personnel. Tiffin and Phelan also report that four of the seven scales of the Kuder were significantly related to job tenure.

These investigations have, in summary, revealed statistically significant differences between long- and short-tenure production and clerical employees in terms of biographical and interest inventory responses. Moreover, by combining significant response items in the form of a scoring key, the identification and selection of long-tenure personnel from job applicants can be augmented. That is to say, applicants responding similarly to long-tenure personnel, when employed, are more likely to remain with the organization than those individuals who are employed but whose response patterns are unlike those of long-tenure employees.

A review of the literature produced no empirical study to determine the degree to which significantly discriminating personality inventory items can predict long-tenure personnel from job applicants. While two scales on the Guilford-Zimmerman Temperament Survey (MacKinney & Wolins, 1960) and one scale on the Bernreuter Personality Inventory (Robbins & King, 1961) are reported to be significantly related to the tenure of production foremen, no attempt has been made to analyze the items of these or other personality inventories in terms of long-tenure employee identification. An investigation of the tenure predictability of the items of a personality inventory such as the Thurstone Temperament Schedule would seem to be a logical extension of the biographical and interest inventory validity studies. Furthermore, it would offer additional empirical evidence for an area of psychological testing which Dunnette and Kirchner (1965) have referred to as " . . .

the least advanced part of man measurement . . ., the area of personality assessment (p. 29)."

PROBLEM

This study involves an examination of personality inventory responses of industrial applicants in an attempt to develop a method of identifying, before employment, those individuals who are likely to remain on their jobs for a short or long period of time. More specifically, it represents a statistical analysis of the 140 items of the Thurstone Temperament Schedule in order to determine if there are significant response differences between two groups of employees in a textile company. One of these groups, the short-tenure sample, terminated employment within three months after they were initially hired. The second group, long-tenure personnel, remained on their jobs for a period of at least six months. Items discriminating between the two criterion groups, if identified in the primary analysis, would be cross-validated on a second employee group.

An alternate technique would be to develop a tenure prediction key using the seven scales of the Thurstone Temperament Schedule. Significantly discriminating scales, if identified in the primary analysis, would be cross-validated on another employee sample.

METHOD

Sample and Measures

The sample for this study was selected from the production employee population of a large textile company in North Carolina. Representative job titles of this population include doffers, weavers, spooler tenders, card tenders, winders, fixers, and repairmen.

A time sample of two years was specified for the present investigation; the sample consisted of male production workers hired from January 1, 1964 to December 31, 1965. (It was assumed that employees hired during this period are representative of the current labor market of the company.) A separate analysis of the responses of female production workers was not attempted because of the small number of women terminating employment during the two year time period.

A second criteria specification stated that no person previously employed by this company was to be included in the sample. Such a restriction excluded a large number of second- and third-time returning personnel. Similarly, the inclusion of only those individuals who had terminated on a voluntary basis reduced the sample size. "Voluntary terminators" were defined as employees who resigned or quit their jobs for reasons which suggested dissatisfaction with their work. Such a restriction excluded those persons who were dismissed,

became ill, or were laid-off because of lack of work.

Another limitation placed on the sample specified that long-tenure personnel were those men employed for six consecutive months or more before termination. Short-tenure employees were those individuals who were employed for three consecutive months or less. Employees terminating during the intermediate time period, from three to six months, were not considered in this investigation. Furthermore, the tenure groups were designated to represent all of those men meeting the criterion specifications for whom Thurstone Temperament Schedule (referred to hereafter as Schedule) data were available.

Having established the criteria for selecting the two tenure groups, the Schedule answer pads were secured from test files. Score pads for 174 long-tenure and 116 short-tenure male employees were located. Other data obtained for each of these 290 men were raw scores on The Test of Learning Ability (Richardson, Bellows, Henry, & Co. Inc., 1947) and biographical data, consisting of the employee's age, educational level, and marital status.

Procedure

The two criterion groups were divided at random so that one-third of each group would constitute a holdout sample, to be used with the cross-validation analysis, and the remaining two-thirds, the primary group. (While the division of a sample into a primary and a holdout group is

a standard procedure in item analysis research, the percentage of employees to be included in each criterion group is somewhat arbitrary. England's suggestion of a ratio of two to one was the choice for the present investigation [England, 1961, Ch. 2].) The composition of the primary group, then, included 116 long-tenure and 78 short-tenure employees while the holdout group consisted of 58 long-tenure and 38 short-tenure employees.

The item analysis was conducted with the Schedule responses of members of the primary group, the holdout group data being set aside for future use in the cross-validation analysis. The three Schedule category responses ("Yes", "?", and "No") of each of the 140 questions were tallied and summed for the employees of each tenure group. The 420 response sums were then converted to percentages and the significance of the difference between percentages for the two tenure groups was obtained.

At the outset, these differences were approximated for statistical significance through the use of a nomograph prepared by Lawshe (1950, p. 267). Those items that approached the significance level of .10 or better, as identified by the nomograph, were evaluated more rigorously with Lawshe's critical ratio formula. By means of such an analysis, 30 items, varying in statistical significance from .01 to .10, were retained for a tenure scoring key. These items are listed in the Appendix in terms of their significance value and the tenure group which each item favors; the items also are classified under the seven Schedule scales.

Since an obtained significant difference between two employee groups may reflect chance rather than real response differences, a cross-validation analysis using the holdout personnel sample would, if the results were consistent with the primary findings, give support to this statistical approach in identifying potential tenure differences in job applicants. It was, therefore, hypothesized that the 30 primary Schedule items would have predictive value in selecting long-tenure employees from the holdout sample.

There are two general approaches for scoring responses in a cross-validation analysis, a weighted scoring system and a unit scoring system. In this study, both of these systems were utilized in scoring the responses of the two holdout groups. Using a weighted method modified from Scollay (1956, p. 333), the Schedule items significant at the .10 level were assigned a one-point weight while those significant at the .05, .02, and .01 levels received weights of two, three, and four units, respectively. Furthermore, these variable weights were given positive or negative values, depending on the direction of the response of the primary group. For example, question five of the Schedule: "Do you enjoy spending leisure time on physical work?" significantly differentiated between the two tenure groups as indicated in the Appendix. Thirty-four per cent of the short-tenure employees responded "No" on this question while only 22 per cent of the long-tenure personnel gave a "No" response, a difference which is significant at the .10 level of confidence. This item, therefore, was weighted -1 on the

scoring key. Items which significantly discriminated in favor of the long-tenure group received a positive score of +1, +2, +3, or +4. In this manner, a negative, positive, and total score (minus score from plus score transformed to positive score) could be obtained for each employee.

A variation of this weighting technique was adopted from England (1961, pp. 24-25). Scoring weights of 0, 1, and 2 were assigned to Schedule items in regard to the level of significance with which these items differentiated between the two criterion groups. For instance, a percentage difference of 11 to 14 points received a net weight of +4 if the difference favored the long-tenure group while a percentage difference of 4 to 6 points favoring the short-tenure group received a net weight of -2. Net weights were transformed to positive scores by assigning scoring weights of 0, 1, or 2 for net weights of -4 or less, -3 to +3, and +4 or more, respectively. A mean score, therefore, could be obtained for both criterion samples by summing the scoring weights of the significant responses for each individual within a sample.

The second general approach used a scoring key with directional unit weights. With such a system, a positive unit score was credited for each response which was identical to a significant response given by the long-tenure group. A negative unit score was given for each response corresponding to a significant response made by the short-tenure group. As in the variable weight scoring system, plus, minus, and total scores were recorded on each score

pad and the mean difference for each score category could be obtained for the two tenure groups.

RESULTS

In terms of biographical information (age, marital status, and education), there were no significant differences between the total sample of long- and short-tenure employees on thirteen of fourteen statistical comparisons. Table 1 shows that in one of the age categories, "20 to 25", there were significantly more short-tenure employees than there were long-tenure personnel ($p = .05$). Using the primary sample of long- and short-tenure employees, however, the age category "Under 20" provided the only comparison significant at the .05 level of confidence, while an analysis of the holdout sample produced no statistically significant difference between any of the fourteen biographical categories; Tables 2 and 3 present the data for these two comparisons.

Tables 4 and 5 represent the findings of the mean age analysis of the two criterion groups. No significant differences were found between the long- and short-tenure employees using both the total sample and the primary and holdout sample. That there is no statistically significant difference between the primary and holdout division of the two tenure groups, as indicated in Table 6, suggests that the two sample divisions are basically identical.

Table 7 shows the statistical comparison of scores

TABLE 1

Comparison of Biographical Information Between Total Long- and Short-Tenure Groups

Response Category	Number Responding		Percentage Responding		Omega Difference Between Groups	Critical Ratio	Obtained Significance Value
	Long-Tenure	Short-Tenure	Long-Tenure	Short-Tenure			
AGE:							
Under 20	78	41	45	35	.1447	1.701	N.S. (Not Significant)
20 - 25	42	43	24	37	.2006	2.358	.05
26 - 30	17	13	10	11	.0239	.281	N.S.
31 - 35	13	9	8	8	.0000		
36 - 40	12	6	7	5	.0597	.702	N.S.
Over 40	9	3	5	3	.0731	.859	N.S.
MARITAL STATUS:							
Single or Divorced	87	56	50	52	.0283	.330	N.S.
Married or Separated	86	54	50	48	.0283	.330	N.S.
EDUCATIONAL STATUS:							
Grades 1 - 4	1	0	1	0	.1416	1.666	N.S.
5 - 8	28	23	6	20	.0737	.867	N.S.
9 - 11	78	51	45	44	.0143	.168	N.S.
High School Graduate	59	36	34	31	.0453	.533	N.S.
Some College	7	5	4	4	.0000		
College Graduate	1	0	1	0	.1416	1.666	N.S.

TABLE 2

Comparison of Biographical Information Between Long- and Short-Tenure Primary Groups

Response Category	Number Responding		Percentage Responding		Omega Difference Between Groups	Critical Ratio	Obtained Significance Value
	Long-Tenure	Short-Tenure	Long-Tenure	Short-Tenure			
AGE:							
Under 20	53	24	46	31	.2189	2.114	.05
20 - 25	28	28	24	36	.1861	1.797	N.S.
26 - 30	11	11	10	14	.0868	.838	N.S.
31 - 35	8	8	7	10	.0868	.838	N.S.
36 - 40	10	4	9	5	.1120	1.082	N.S.
Over 40	5	2	4	3	.0389	.376	N.S.
MARITAL STATUS:							
Single or Divorced	59	36	51	48	.0142	.137	N.S.
Married or Separated	56	39	49	52	.0142	.137	N.S.
EDUCATIONAL STATUS:							
Grades 1 - 4	0	0					
5 - 8	18	17	16	22	.1085	1.048	N.S.
9 - 11	48	35	41	45	.0572	.552	N.S.
High School Graduate	44	22	38	29	.1350	1.304	N.S.
Some College	6	3	5	4	.0342	.330	N.S.
College Graduate	0	0					

TABLE 3

Comparison of Biographical Information Between Long- and Short-Tenure Holdout Groups

Response Category	Number Responding		Percentage Responding		Omega Difference Between Groups	Critical Ratio	Obtained Significance Value
	Long-Tenure	Short-Tenure	Long-Tenure	Short-Tenure			
AGE:							
Under 20	25	17	43	45	.0286	.194	N.S.
20 - 25	14	15	24	39	.2299	1.558	N.S.
26 - 30	8	2	14	5	.2215	1.501	N.S.
31 - 35	5	1	9	3	.1851	1.254	N.S.
36 - 40	2	2	3	5	.0731	.495	N.S.
Over 40	4	1	7	3	.1328	.900	N.S.
MARITAL STATUS:							
Single or Divorced	28	22	48	58	.0854	.579	N.S.
Married or Separated	30	15	52	39	.1285	.871	N.S.
EDUCATIONAL STATUS:							
Grades 1 - 4	1	0	2	0	.2007	1.360	N.S.
5 - 8	10	6	17	16	.0191	.129	N.S.
9 - 11	30	16	52	42	.0854	.579	N.S.
High School Graduate	15	14	26	37	.1680	1.138	N.S.
Some College	1	2	2	5	.1182	.801	N.S.
College Graduate	1	0	2	0	.2007	1.360	N.S.

TABLE 4

Comparison of Mean Age Differences Between Total Long- and Short-Tenure Groups

		Long-Tenure	Short-Tenure
N	(Number of employees)	173	115
M	(Mean)	23.890	23.627
σ	(Standard deviation)	7.656	6.540
σ_M	(Standard error)	.583	.612
σ_{dM}	(Standard error of a difference between means)	.844	
D_M	(Difference between means)	.273	
$\underline{t}$	(Test of a difference between means)	.323	
p	(Significance value)	N.S.	

TABLE 5

Comparison of Mean Age Differences Between Long- and Short-Tenure Primary and Holdout Groups

	Primary Group		Holdout Group	
	Long-Tenure	Short-Tenure	Long-Tenure	Short-Tenure
N	115	77	58	38
M	23.713	24.377	24.241	22.078
σ	7.595	6.665	7.738	5.993
σ_M	.708	.765	1.025	.985
σ_{dM}	1.042		1.422	
D_M	.664		2.163	
$\underline{t}$	.637		1.521	
p	N.S.		N.S.	

TABLE 6

Comparison of Mean Age Differences Between Primary and Holdout Long- and Short-Tenure Groups

	Long-Tenure Group		Short-Tenure Group	
	Primary	Holdout	Primary	Holdout
N	115	58	77	38
M	23.710	24.240	24.380	22.080
σ	7.595	7.737	6.665	5.993
σ_M	.711	1.024	.759	.985
σ_{d_M}	1.246		1.243	
D_M	.530		2.300	
$\underline{t}$	.425		1.850	
p	N.S.		N.S.	

TABLE 7

Comparison of Mean Scores on The Test of Learning Ability Between Total Long- and Short-Tenure Groups

	Long-Tenure		Short-Tenure
N	174		115
M	36.160		30.730
σ	15.833		11.159
σ_M	1.203		1.045
σ_{dM}		1.593	
D_M		5.430	
$\underline{t}$		3.408	
p		.05	

on The Test of Learning Ability. The mean score for the total long-tenure group was approximately five points higher than the mean score for the total short-tenure group, a difference which is significant at the .05 level. Similarly, Table 8 shows that the long-tenure primary group scored significantly higher than the short-tenure primary group on The Test of Learning Ability. However, as further indicated in Table 8, the mean mental ability scores for the two divisions of the holdout group was not statistically significant even though the difference favored the long-tenure sample. There were no significant differences between the primary and holdout samples of either tenure group in terms of mean scores on the mental ability test as indicated by the data in Table 9.

The application of the variable and unit weighted scoring systems to the Schedule responses of the cross-validation sample provides no statistically significant evidence that length of employment can be predicted in this group of textile workers with the scoring techniques employed. As shown in Table 10, neither positive, negative, nor total scores on the unit weighted scoring key were useful in establishing a significant mean difference between the two holdout criterion groups using the 30 Schedule items significant at the .01, .02, .05, and .10 levels. Similarly, non-significant data were obtained in an analysis of mean differences established with the 19 Schedule items significant at the .01, .02, and .05 levels; Table 11 presents the findings of this latter analysis.

TABLE 8

Comparison of Mean Scores on The Test of Learning Ability Between Long- and Short-Tenure Primary and Holdout Groups

	Primary Group		Holdout Group	
	Long-Tenure	Short-Tenure	Long-Tenure	Short-Tenure
N	116	77	58	38
M	37.707	31.403	33.069	29.368
σ	15.531	11.740	15.980	9.739
σ_M	1.448	1.348	2.117	1.601
σ_{dM}	1.979		2.654	
D_M	6.304		3.701	
$\underline{t}$	3.186		1.394	
p	.05		N.S.	

TABLE 9

Comparison of Mean Scores on The Test of Learning Ability Between Primary and Holdout Long- and Short-Tenure Groups

	Long-Tenure Group		Short-Tenure Group	
	Primary	Holdout	Primary	Holdout
N	116	58	77	38
M	37.700	33.070	31.400	29.370
σ	15.530	15.980	11.740	9.739
σ_M	1.448	2.116	1.346	1.600
σ_{dM}	2.563		2.090	
D_M	4.630		2.030	
$\underline{t}$	1.806		.971	
p	N.S.		N.S.	

TABLE 10

Comparison of Positive, Negative, and Total Mean Scores Between Tenure Holdout Groups Using a Unit Weighted Scoring Key Consisting of Schedule Items Significant at the .01, .02, .05, and .10 Levels

	Positive Scores		Negative Scores		Total Scores	
	Long-Tenure	Short-Tenure	Long-Tenure	Short-Tenure	Long-Tenure	Short-Tenure
N	58	38	58	38	58	38
M	4.210	4.660	4.520	4.920	6.690	6.760
σ	1.584	1.690	1.896	1.596	2.608	2.650
σ_M	.210	.278	.251	.262	.345	.436
σ_{dM}	.348		.363		.556	
D_M	.450		.400		.070	
$\underline{t}$	1.292		1.112		.132	
p	N.S.		N.S.		N.S.	

TABLE 11

Comparison of Positive, Negative, and Total Mean Scores Between Tenure Holdout Groups Using a Unit Weighted Scoring Key Consisting of Schedule Items Significant at the .01, .02, and .05 Levels

	Positive Scores		Negative Scores		Total Scores	
	Long-Tenure	Short-Tenure	Long-Tenure	Short-Tenure	Long-Tenure	Short-Tenure
N	58	38	58	38	58	38
M	1.603	2.026	3.000	3.131	4.603	4.921
σ	1.129	1.181	1.597	1.559	2.117	2.181
σ_M	.149	.194	.211	.256	.280	.358
σ_{dM}	.245		.332		.455	
D_M	.423		.131		.318	
t	1.727		.396		.698	
p	N.S.		N.S.		N.S.	

Tables 12 and 13 represent mean differences obtained between the holdout criterion groups when variable directional weighted scoring keys were applied to the Schedule responses. The data presented in Table 12 were obtained when the 30 items significant at the .01, .02, .05, and .10 levels and combined as a positive, negative, and total weighted key were used in scoring the responses of the criterion groups. In each of these comparisons, the obtained *t* value was not significant at the .05 level of confidence. Table 13 represents the results obtained with the application of a variable weighted scoring key consisting of the nineteen Schedule items significant at the .01, .02, and .05 level. Again, the items were scored for positive, negative, and total responses, and, in each analysis, the obtained *t* value was below the .05 level of confidence.

Using England's scoring procedure, with weights of 0, 1, and 2 assigned to the 30 significant Schedule items, the mean difference between the two groups, as evaluated by *t*, was not significant. The results of this analysis are presented in Table 14.

On the scale analysis, means of the seven Schedule scales were compared for the two tenure samples of the primary and holdout criterion groups. Table 15 shows that these comparisons afford no statistically significant differences at the .05 level between the long- and short-tenure groups on any of the seven scales. Similarly, as can be seen in Table 16, non-significant findings were obtained

TABLE 12

Comparison of Positive, Negative, and Total Mean Scores Between Criterion Holdout Groups Using Schedule Items Significant at the .01, .02, .05, and .10 Levels Combined as a Variable Weight Scoring Key

	Positive Scores		Negative Scores		Total Scores	
	Long-Tenure	Short-Tenure	Long-Tenure	Short-Tenure	Long-Tenure	Short-Tenure
N	58	38	58	38	58	38
M	6.741	7.631	8.241	9.368	11.534	12.263
σ	3.299	3.207	4.057	3.674	5.389	5.495
σ_M	.437	.527	.537	.604	.714	.903
σ_{dM}	.684		.808		1.151	
D_M	.890		1.127		.729	
t	1.300		1.394		.633	
p	N.S.		N.S.		N.S.	

TABLE 13

Comparison of Positive, Negative, and Total Mean Scores Between Criterion Holdout Groups Using Schedule Items Significant at the .01, .02, and .05 Levels Combined as a Variable Weight Scoring Key

	Positive Scores		Negative Scores		Total Scores	
	Long-Tenure	Short-Tenure	Long-Tenure	Short-Tenure	Long-Tenure	Short-Tenure
N	58	38	58	38	58	38
M	4.138	5.026	6.690	7.579	10.448	11.447
σ	3.082	2.709	3.869	3.788	5.055	5.509
σ_M	.408	.445	.512	.623	.670	.906
σ_{dM}	.604		.806		1.126	
D_M	.888		.889		.999	
$\underline{t}$	1.470		1.103		.887	
p	N.S.		N.S.		N.S.	

TABLE 14

Comparison of Mean Scores Between Long- and Short-Tenure Holdout Groups Using the England Scoring Procedure with Assigned Weights of 0, 1, and 2.

	Long-Tenure	Short-Tenure
N	58	38
M	8.706	9.310
σ	2.392	2.052
σ_M	.317	.337
σ_{dM}	.462	
D_M	.604	
$\underline{t}$	1.306	
p	N.S.	

TABLE 15

Comparison of Mean Differences Between Long- and Short-Tenure Primary and Holdout Groups on the Seven Scales of the Schedule

Primary Group

Scale	Tenure Group	N	M	σ	σ_M	σ_{d_M}	D_M	t	p
ACTIVE	Long	116	9.164	2.583	.241	.403	.018	.045	N.S.
	Short	77	9.182	2.822	.324				
VIGOROUS	Long	116	11.897	3.139	.293	.416	.377	.906	N.S.
	Short	77	11.520	2.582	.296				
IMPULSIVE	Long	116	11.603	3.079	.287	.451	.473	1.045	N.S.
	Short	77	11.130	3.038	.348				
DOMINANT	Long	116	9.388	4.333	.404	.579	.700	1.208	N.S.
	Short	77	8.688	3.615	.415				
STABLE	Long	116	11.681	3.217	.300	.466	.838	1.800	N.S.
	Short	77	12.519	3.107	.356				
SOCIABLE	Long	116	12.448	3.599	.335	.497	.032	.065	N.S.
	Short	77	12.480	3.197	.367				
REFLECTIVE	Long	116	7.388	2.947	.275	.425	.518	1.219	N.S.
	Short	77	6.870	2.825	.324				

Holdout Group

Scale	Tenure Group	N	M	σ	σ_M	σ_{d_M}	D_M	t	p
ACTIVE	Long	58	9.414	2.341	.310	.568	.809	1.422	N.S.
	Short	38	8.605	2.897	.476				
VIGOROUS	Long	58	11.086	2.440	.324	.605	.150	.249	N.S.
	Short	38	11.236	3.107	.511				
IMPULSIVE	Long	58	10.982	2.849	.377	.548	.088	.161	N.S.
	Short	38	10.894	2.414	.397				
DOMINANT	Long	58	8.275	4.024	.533	.911	.119	.130	N.S.
	Short	38	8.394	4.492	.739				
STABLE	Long	58	12.172	3.168	.442	.712	.909	1.276	N.S.
	Short	38	11.263	2.400	.559				
SOCIABLE	Long	58	11.672	3.318	.439	.527	.328	.620	N.S.
	Short	38	12.000	1.786	.294				
REFLECTIVE	Long	58	7.362	3.038	.402	.740	.217	.293	N.S.
	Short	38	7.578	3.781	.621				

TABLE 16

Comparison of Mean Differences Between Total Long- and Short-Tenure Groups on the Seven Scales of the Schedule

Scale	Tenure Group	N	M	σ	σ_M	σ_{dM}	D_M	$\underline{t}$	p
ACTIVE	Long	174	9.250	2.508	.191	.329	.260	.787	N.S.
	Short	115	8.990	2.860	.268				
VIGOROUS	Long	174	11.630	2.950	.224	.343	.200	.584	N.S.
	Short	115	11.430	2.770	.259				
IMPULSIVE	Long	174	11.400	3.019	.229	.352	.350	.995	N.S.
	Short	115	11.050	2.849	.267				
DOMINANT	Long	174	9.020	4.265	.324	.482	.430	.891	N.S.
	Short	115	8.590	3.817	.357				
STABLE	Long	174	11.840	3.209	.244	.391	.260	.708	N.S.
	Short	115	12.100	3.261	.305				
SOCIABLE	Long	174	12.190	3.526	.268	.376	.130	.346	N.S.
	Short	115	12.320	2.821	.264				
REFLECTIVE	Long	174	7.380	2.978	.226	.375	.280	.747	N.S.
	Short	115	7.100	3.191	.299				

when the total long-tenure group was contrasted with the total short-tenure employee group. The comparison of the primary and holdout samples, represented in Table 17, yielded no significant differences for either long- or short-tenure groups. It is assumed that the two divisions of the tenure groups are similar in terms of the Schedule scale scores.

TABLE 17

Comparison of Mean Differences Between Primary and Holdout Long- and Short-Tenure Groups on the Seven Scales of the Schedule

Long-Tenure Group

Scale	Tenure Group	N	M	σ	σ_M	σ_{d_M}	D_M	t	p
ACTIVE	Primary	116	9.160	2.583	.241	.392	.550	1.401	N.S.
	Holdout	58	9.410	2.342	.310				
VIGOROUS	Primary	116	11.900	3.139	.297	.436	.810	1.857	N.S.
	Holdout	58	11.090	2.444	.324				
IMPULSIVE	Primary	116	11.600	3.079	.287	.474	.620	1.308	N.S.
	Holdout	58	10.980	2.850	.377				
DOMINANT	Primary	116	9.390	4.333	.404	.669	1.110	1.660	N.S.
	Holdout	58	8.280	4.025	.533				
STABLE	Primary	116	11.680	3.217	.300	.516	.490	.950	N.S.
	Holdout	58	12.170	3.168	.420				
SOCIABLE	Primary	116	12.450	3.600	.335	.553	.780	1.411	N.S.
	Holdout	58	11.670	3.319	.439				
REFLECTIVE	Primary	116	7.390	2.947	.275	.487	.030	.061	N.S.
	Holdout	58	7.360	3.038	.402				

Short-Tenure Group

Scale	Tenure Group	N	M	σ	σ_M	σ_{d_M}	D_M	t	p
ACTIVE	Primary	77	9.180	2.822	.324	.576	.570	.990	N.S.
	Holdout	38	8.610	2.900	.476				
VIGOROUS	Primary	77	11.520	2.582	.301	.593	.280	.477	N.S.
	Holdout	38	11.240	3.107	.511				
IMPULSIVE	Primary	77	11.130	3.038	.348	.528	.240	.454	N.S.
	Holdout	38	10.890	2.415	.397				
DOMINANT	Primary	77	8.690	3.615	.415	.847	.300	.354	N.S.
	Holdout	38	8.390	4.493	.739				
STABLE	Primary	77	12.520	3.107	.356	.663	1.260	1.901	N.S.
	Holdout	38	11.260	3.400	.559				
SOCIABLE	Primary	77	12.480	3.197	.367	.470	.480	1.022	N.S.
	Holdout	38	12.000	1.786	.294				
REFLECTIVE	Primary	77	6.870	2.825	.324	.701	.710	1.012	N.S.
	Holdout	38	7.580	3.781	.621				

DISCUSSION

This study represents an attempt to establish a scoring system for the Thurstone Temperament Schedule which would facilitate the identification of applicants with response characteristics similar to long- or short-tenure employees. The statistical analysis of the data of the primary sample did indeed produce a number of Schedule items which significantly differentiated between the two tenure samples, suggesting that the groups do respond differently.

A critical test of the validity of empirically established response patterns, however, requires that items identified as statistically significant with one group of employees differentiate between criterion groups in a second and independent employee sample. Such an analysis, according to Katzell (1951, p. 18), should yield an unbiased estimate of the predictiveness of the instrument " . . . from which inference can be made as to its probable values in future samples." In the present investigation, a cross-validation analysis was attempted by applying the 30 items identified in the primary analysis to Schedule responses of a holdout employee sample. This analysis demonstrated that the primary items did not significantly differentiate between the two criterion holdout groups. More specifically, neither a positive, negative, and total unit weighted scoring system nor

a positive, negative, and total variable weighted scoring system would discriminate between the two tenure samples at the .05 level of confidence. Similarly, the England method, with weights of 0, 1, and 2 units, was unsuccessful in differentiating between the tenure groups. The inference is, therefore, that the Schedule response differences found between the long- and short-tenure primary groups were attributable to chance factors.

Unlike the Kuder Preference Record which successfully predicted long- and short-tenure male factory workers (Tiffin & Phelan, 1953), the Schedule lacks the sensitivity necessary to differentiate between textile production personnel using an under-three and over-six month employment period criterion. It is possible that the length of tenure employment is a variable which needs further investigation. A variation on the present categories, such as below and over three months or a three-month and a twelve-month period as short- and long-tenure employment intervals, respectively, may influence the findings on this type of analysis. A future study could be designed to systematically explore the effect of the length of the employment period in predicting tenure employment.

An analysis of a more homogeneous employee work group (e.g. spinners or weavers), similarly, might produce findings at variance with the present study. Such an analysis, according to Maier (1965, pp. 628-629), should maximize the possibility of significant findings by contrasting groups whose members are more likely to be similar in terms of the

variable under investigation. Unfortunately, however, the size of the tenure sample selected for the present investigation does not lend itself to a rigorous statistical analysis using this methodological alteration.

While no attempt was made to develop and validate a biographical information blank in the present study, it is interesting to note that in the sample description data there were no consistent differences on the biographical data comparisons between the two tenure groups. While significantly more short-tenure workers in the age group "20 to 25" were found in the total sample, the only statistically significant finding in the primary group comparison was in the age category "Under 20" in which long-tenure employees predominated. In the holdout comparison, none of the 14 categories significantly discriminated between the tenure groups nor were any significant differences found in the mean age comparisons for both total and primary and holdout samples. In view of the number of comparisons made in the biographical analysis, it is not unlikely that the two statistically significant categories cited above were the product of chance findings. This absence of consistent significant data, while supporting the non-significant data reported by Wickert (1951), stands in opposition to previously cited studies (Mosel & Wade, 1951; Dunnette & Maetzold, 1955; Kirchner & Dunnette, 1957; and Minor, 1958) in which the biographical information categories of age, education, and marital status are reported to predict long-tenure employment.

In summary, the data of the present investigation do not lend support to the use of the Thurstone Temperament Schedule in the selection of long-tenure production personnel in a textile company. Whether these findings generalize to other personality inventories or to other employment settings is undetermined. It would seem fair to conclude, however, that any personality inventory used for employee selection, unless its utility has been established by a validation analysis, is a questionable instrument of criterion prediction.

SUMMARY

Empirical investigations have demonstrated that employment tenure can be predicted by systematically analyzing the biographical information of job applicants. Similarly, long- and short-tenure industrial workers can be differentiated with various measures of interest. The present study examined the responses of two groups of employees, long- and short-tenure personnel, on a personality inventory, the Thurstone Temperament Schedule.

Two hundred-ninety male employees were selected from the production population of a textile company. Of this number, 174 men constituted a long-tenure criterion group: they had been employed by the company for six consecutive months or longer. The short-tenure group, consisting of 116 men, had terminated their employment voluntarily before completing three consecutive months of work. One-third of both of these primary groups was selected at random to provide a holdout sample for a cross-validation analysis. While there were no consistent significant differences between the long- and short-tenure employees in terms of biographical information (age, education, and marital status), the long-tenure personnel, on two statistical analyses, scored significantly higher on a mental ability test than did the short-tenure workers.

The item analysis of the responses of the primary

tenure groups produced 30 Schedule items which significantly differentiated between long- and short-tenure employees. These items, however, when combined as unit and variable weighted scoring systems and applied to the Schedule responses of the holdout groups, produced no statistically significant difference between the long- and short-tenure personnel. As the initial findings were not substantiated in the cross-validation analysis, it was suggested that the differences obtained in the primary analysis were attributable to chance factors.

Non-significant findings were similarly found in a long- and short-tenure total and primary and holdout group comparison of the seven scale scores of the Schedule.

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APPENDIX

Primary Tenure Group Comparison of the Schedule Responses Differentiating at the .10, .05, .02, and .01 Level of Confidence

Schedule Item	Response	Number Responding		Per Cent Responding		Omega Difference Between Tenure Groups *	Critical Ratio	Obtained Significance Value
		Long-Tenure	Short-Tenure	Long-Tenure	Short-Tenure			
5	No	24	26	22	34	.1899	1.8350	.10
13	?	19	5	16	5	.2630	2.5400	.02
18	Yes	69	58	60	75	.2278	2.2000	.05
18	No	37	14	32	18	.2299	2.2203	.05
26	Yes	4	8	3	10	.2083	2.0117	.05
39	?	22	7	19	9	.2069	1.9982	.05
45	?	3	0	3	0	.2458	2.3739	.02
47	Yes	24	4	21	6	.3227	3.1166	.01
58	?	16	4	14	5	.2220	2.1440	.05
61	Yes	102	74	89	96	.1933	1.8668	.10
68	No	41	18	35	23	.1878	1.8137	.10
71	?	12	19	10	25	.2863	2.7650	.01
71	No	77	34	66	48	.2020	1.9509	.10
72	No	18	5	17	6	.2506	2.4202	.02
86	?	40	14	35	18	.2756	2.6617	.01
89	Yes	88	50	77	66	.1730	1.6708	.10
89	?	14	16	12	21	.1729	1.6698	.10
91	No	58	50	50	65	.2155	2.0812	.05
96	No	29	30	25	39	.2134	2.0610	.05
100	No	19	27	17	35	.2941	2.8404	.01
105	No	62	53	54	70	.2343	2.2628	.05
110	Yes	30	12	27	16	.1908	1.8427	.10
111	?	14	17	12	22	.1902	1.8369	.10
113	Yes	59	28	51	36	.1865	1.8012	.10
121	?	1	5	1	6	.2088	2.0165	.05
126	Yes	21	25	19	33	.2275	2.1971	.05
126	?	35	13	31	17	.2340	2.2599	.05
130	?	53	25	46	34	.1736	1.6766	.10
131	Yes	55	24	48	32	.2329	2.2493	.05
134	?	1	4	1	5	.1773	1.7123	.10

* To test the significance of the difference between two percentages, they were first converted to Omega values using a table presented by Lawshe (1950, p. 265). The Omega difference was then multiplied by the formula $\sqrt{\frac{2N_1N_2}{N_1+N_2}}$ (used when samples differ in size) to produce a critical ratio.

Thurstone Temperament Schedule Items Significant at the .01, .02, .05, and .10 Levels Identified in the Primary Analysis

Item Number	Schedule Item and Scale Title	Significant Response	Tenure Group Favored
	Active		
58	Do you usually work fast?	?	Long
86	Do you like work that is slow and deliberate?	?	Long
113	Is your handwriting rather fast?	Yes	Long
	Vigorous		
5	Do you enjoy spending leisure time on physical work?	No	Short
61	Have you ever done any hunting?	Yes	Short
89	Do you like work in which there is vigorous activity?	Yes	Long
89	Do you like work in which there is vigorous activity?	?	Short
91	Have you ever been captain of a team?	No	Short
	Impulsive		
39	Are you frequently considered to be "happy-go-lucky"?	?	Long
68	Do you usually have a "ready answer"?	No	Long
96	In the morning, do you usually bound out of bed energetically?	No	Short
121	Do you spend much of your leisure time out-of-doors?	?	Short

Thurstone Temperament Schedule Items Significant at the .01, .02, .05, and .10 Levels Identified in the Primary Analysis

Item Number	Schedule Item and Scale Title	Significant Response	Tenure Group Favored
	Dominant		
13	Do you find it difficult to speak before an audience?	?	Long
71	Do you frequently keep in the background on social occasions?	?	Short
71	Do you frequently keep in the background on social occasions?	No	Long
72	Do you assume responsibilities without much hesitation?	No	Long
100	Do you like work in which you must influence others?	No	Short
126	Do you often wait and let others take the initiative?	Yes	Short
126	Do you often wait and let others take the initiative?	?	Long
	Stable		
18	Can you relax in a noisy room?	Yes	Short
18	Can you relax in a noisy room?	No	Long
45	Can you study with the radio on?	?	Long
47	Do you tend to become hungry quickly with a sudden pang?	Yes	Long
130	Are you generally regarded to be optimistic?	?	Long
131	Are you often annoyed to have to leave your work?	Yes	Long

Thurstone Temperament Schedule Items Significant at the .01, .02, .05, and .10 Levels Identified in the Primary Analysis

Item Number	Schedule Item and Scale Title	Significant Response	Tenure Group Favored
	Sociable		
105	Do you tend to join many organizations?	No	Short
134	Does it usually take a long time to get acquainted with you?	?	Short
	Reflective		
26	Are you considered to be absent-minded?	Yes	Short
110	Did you often play alone as a child?	Yes	Long
111	Do you like to invent new procedures and devices?	?	Short