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The selection of bank management trainees: a validation study

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THE SELECTION OF BANK MANAGEMENT TRAINEES: A VALIDATION STUDY

BY

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TABLE OF CONTENTS

PREFACE

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CHAPTER I

INTRODUCTION

Korman (1968) has reviewed the recent literature concerning the predictive validity of procedures used in higher level managerial selection. While Korman indicates that his review is not an exhaustive one, he has nevertheless covered the usual sources available to the typical researcher.

Korman's review follows Meehl's (1954) classification system which distinguishes not only the type of measuring instrument (test) used, but also the ways in which these instruments are utilized in prediction. The latter distinction is one between psychometric and judgmental prediction. Psychometric prediction involves statistical manipulation of data to yield quantified actuarial information, while judgmental prediction concerns the intuitive process of combining data to yield subjective clinical information.

Twelve studies of psychometric prediction using cognitive ability tests with upper level managerial samples are summarized. Of these, only two yield essentially positive results. Meyer (1956) found a correlation of .27 between Wonderlic scores and overall ratings of 142 supervisors.

However, since the raters were free to examine predictor scores while making their ratings, there is strong evidence that the criterion was contaminated. In an unpublished study, Laurent (1962) correlated ratings of managers with Miller Analogies Test and non-verbal ability test scores. With over 200 persons in each sample, he found correlations ranging from .18 to .29, all significant. The majority of the studies in this area, however, do not appear encouraging. While almost all of the correlations using cognitive ability tests are positive, only infrequently are they of sufficient magnitude to be statistically significant, much less practically significant.

Psychometric prediction based on objective personality and interest inventories yields roughly the same picture. Laurent (1962) used the Guilford-Zimmerman Temperament Survey (GZTS) to predict ratings of managers. The highest r obtained was .23 and only six of the 20 total r's computed were above .10. MacKinney and Wolins (1960) used the GZTS to predict criteria of tenure, level and rankings for supervisors. Three separate samples were employed and although significant correlations were found in each sample, the pattern of correlations was not consistent among samples. Studies using the Strong Vocational Interest Blank, the Minnesota Multiphasic Personality Inventory, the Bernreuter Personality Inventory, and the Edwards Personal Preference Schedule indicate a few scattered significant correlations, but nothing approaching a consistent pattern is found.

Published studies using leadership ability tests have been few. There is some evidence that the "Consideration" scale of the Leadership Opinion Questionnaire is predictive of managerial performance (Bass, 1956, 1958). Surprisingly, there are data to indicate that the best indicator of managerial success may be a projective device. Miner (1965) has reported a series of studies which indicate that the Miner Sentence Completion Scale can be a valuable predictive instrument. Although Miner's work has not yet been replicated by other researchers, he reports correlations ranging from .29 to .57 for a variety of performance criteria.

Korman's conclusions, based on the above findings as well as his review of judgmental prediction, are as follows:

1. Intelligence, as measured typically by verbal ability tests, is a fair predictor of first line supervisory performance but not of higher-level managerial performance. Restriction of range is probably the explanation for this finding.

2. Objective personality inventories and "leadership ability" tests have generally not shown predictive validity, with the exception of the projective measure of managerial motivation developed by Miner.

3. Personal history data as predictors are fair for first line supervisors, but less so for the higher-level individual.

4. "Judgmental" prediction methods, as exemplified particularly by executive assessment procedures and peer ratings, are generally better predictors than psychometric procedures, although allowance must be made for the generally small samples involved.

5. Little has been learned from selection research which can contribute to a theory of leadership behavior.

6. Changes in the orientation of predictive research are meeded.

In particular, Korman states that psychologists need to begin in-depth, systematic research rather than continuing with the present somewhat haphazard orientation now employed. We need to achieve the sophistication necessary to formulate and test meaningful research hypotheses in an orderly, scientific fashion.

The conclusion one is forced to accept is that, insofar as the prediction of managerial performance is concerned, the present state of the art in the testing industry is not well developed. There would appear to be several possible explanations for the lack of consistently demonstrated validity encountered in the prediction of managerial performance.

Criterion Problems

The most frequently cited difficulty associated with the making of predictions based on test data is that the things which tests are used to predict are often unreliable, invalid, contaminated, or so lacking in specificity as to be useless.

Criteria may be classified as either relatively objective or relatively subjective. The word "relatively" is used advisedly, as one can see when considering salary, for example, as a criterion. Salary would appear to be an objective criterion - it is a quantified ratio level measurement that is readily available in a personnel file. However, one must ask what factors enter into the decision to give an employee some specific salary or raise. Many times these factors

are subjective, reflecting supervisory ratings or personal influence. Salary increases may also come about as a result of routine annual salary adjustments having no relationship to job performance whatever. Simply because one has a quantified objective appearing measurement, he cannot then assume that he has a truely objective criterion, free from bias and contamination.

Production rate is also considered to be a relatively objective criterion, but in many cases any given individual's production rate may hinge simultaneously on the work output of several other people. Such factors as equipment differences or malfunction may add further irrelevant variance. The objective seeming production rate criterion is, then, contaminated and ceases to be a truely objective measure of job performance. Furthermore, such matters as production rate or quality of output are relevant only when the job is dealing with some tangible product, and this is not the case in the vast majority of managerial positions.

In the area of managerial performance, we are forced to derive some measure of work quality and quantity concerning not a tangible product, but a factorially complex set of behaviors collectively referred to simply as "job performance." To this date, little progress has been made in establishing clearly defined behavioral objectives for managerial performance. The recently developed management by objectives programs are a step in the right direction, but as yet they have made no radical changes in the availability of good criteria.

Dunnette (1963) has given a clear and constructive criticism of the search for criterion information. He states that we should "cease searching for single or composite measures of job success and proceed to undertake research which accepts the world of success dimensionality as it really is." Dunnette suggests that job success is such a multifaceted entity that any attempt to find a "distilled essence" measure of job success is pointless. Instead, we should concentrate on investigating narrower relationships between predictors and success components. In practice, Dunnette's suggestions are occasionally paid lip service while research continues blithely along its traditional path in search of the criterion.

Range Restriction

Range restriction limits the accuracy with which any measuring instrument is able to provide useful predictions. Next to criterion problems, perhaps, range restriction is the most frequently mentioned explanation for the lack of significant correlations and for the low magnitude of those correlations which do achieve statistical significance. Thorndike (1949, p. 171) has stated that "If any intelligent use is to be made of validity statistics from a restricted group, some statistical correction procedures are necessary to estimate what validity coefficients would have been obtained if it had been possible to obtain test and criterion data from a representative sample of all those to whom the selection devices were applied."

Perhaps the most frequently encountered form of range restriction occurs in the situation presented by Thorndike as Case 2. Here we are concerned with the correlation between variables A and B, and test A has been used as the basis for selecting the curtailed group which is subsequently to be measured on variable B. This situation is commonly encountered in personnel testing where variable A would represent some selection test and variable B might be a measure of job success taken for those individuals who were hired as a result of good performance on the selection test. To apply the correction for range restriction we must know the standard deviation of test A in both the general population and in the restricted group. The correction formula is given by:

$$ {}_{c}r_{12} = \frac{r_{12}\,(s_1 / s_2)}{\sqrt{1 - r_{12}^2 + r_{12}^2\,(s_1^2 / s_2^2)}} $$

Where: ${}_{c}r_{12}$ = unrestricted correlation between variables 1 & 2

r_{12} = restricted correlation between variables 1 & 2

s_1 = standard deviation of variable 1 in the unrestricted group

s_2 = standard deviation of variable 1 in the restricted group

The typical executive assessment, however, employs several tests which are combined in a subjective clinical fashion in making a selection decision. The above correction scheme is applicable only when the basis for restriction is a single test score. In the more common situation in which

test data are interpreted in a clinical fashion there appears to be no statistical procedure appropriate for correcting the indirect effects of range restriction.

Convincing evidence of the effect of range restriction on apparent validity has been given by Peterson and Wallace (1966). Using the Aptitude Index as a predictor of success for life insurance salesmen, the authors first reviewed the results of a validity study of the Aptitude Index that was conducted while the test was being used to select salesmen. The criterion of success used was survival on the job for 6 months and earnings of at least $700 in life insurance sales commissions. No evidence of predictive validity was found. The company which performed the study then stopped using the Aptitude Index as a selection device, but they agreed to continue administering it. At a later time another validity test was made to see if the test could in fact show validity when range restriction was not caused by the use of the test itself. A comparison of expectancy charts which were developed gave indication that the test was able to discriminate successful and unsuccessful life insurance salesmen to a degree indicative of practical significance, even though no statistical significance tests were performed.

Misuse of Tests

Especially since World War II, the number of industrial users of tests for selection, placement, and training purposes has increased at a rapid pace. Unfortunately, it would appear

that the general level of psychological sophistication necessary to permit optimum utilization of test data has not kept pace with usage. Although he presents a somewhat more emotional than reasoned case, Gross (1962) points out the blind faith which some companies have shown for any psychological test having some modicum of face validity. Indeed the popularity of testing has been detrimental in itself, as hundreds of tests have appeared on an already flooded market by corporate demand, with only marginal attempts at validation. The testing industry is still in a "shotgun" phase in which more emphasis is being placed on the rapid production of appropriately named and packaged tests than on the refinement of currently available measurement instruments. One is reminded of a statement by Buros (1961, p. xxiii): "At present, no matter how poor a test may be, if it is nicely packaged and if it promises to do all sorts of things which no test can do, the test will find many gullible buyers."

As is not uncommon in cases of such abuse, the federal government has found it necessary to institute certain controls and limitations on the testing industry. The issue of unfair discrimination by tests was met by the Civil Rights Act of 1964. More recently, the government has required certain test users to show evidence that the tests they use do in fact have validity for the purposes for which they are used.

Validation of tests in a business setting is usually done as an afterthought, and it is for this reason that many

published studies suffer design defects. The consultant is generally called in and told, "This is what we have been doing. Where do we stand?" Rigorous validation studies which carefully follow established procedures are few and far between. No investigations comparable to the present study in terms of depth, scope or technique were found in the literature.

RESEARCH OBJECTIVES

It is the goal of the present study to investigate the predictive validity of a test battery currently in use by a Richmond consulting firm to advise local banks about the suitability of applicants for positions as bank management trainees. The battery consists of the following tests:

1. SRA Verbal
2. Watson-Glaser Critical Thinking Appraisal
3. RBH Vocabulary Test
4. Judgment and Comprehension Test from the Flanagan Aptitude Classification Tests
5. RBH Test of Supervisory Judgment
6. Cardall Arithmetical Reasoning Test
7. How Well Do You Know Your Interests
8. How Well Do You Know Yourself

A description of the tests and a review of the literature related to the use of these tests follows.

TEST DESCRIPTIONS AND RELEVANT LITERATURE

SRA Verbal

The SRA Verbal (Thurstone and Thurstone, 1947) is an 84 item test of general ability. Thirty-six questions deal with quantitative (Q) problems, and the remaining 48 measure linguistic (L) ability. Separate scores are derived for L, Q, and total (T), although intercorrelations are high. Industrial norms in the test manual (Science Research Associates, 1967) list the L-Q intercorrelation as .72, L-T as .94, and Q-T as .94. A high T score is said to indicate adaptability and flexibility in comprehending and following instructions.

In industrial use the test demonstrates some validity, but the results are not consistent. Three studies are listed in the manual using samples of plant workers. Ratings were used in each case as criteria, and the studies appear to be testing concurrent validity. Correlations of .19, .20, and -.12 are reported, although no significance levels are given.

More recently a Data Brief (Science Research Associates, 1971) has been issued which lists the results of 20 concurrent validity studies using the SRA Verbal and a criterion of overall job ranking. Only ten of these studies found

significant ($p < .05$) correlations, the highest r being .33 for a sample of 55 chemical fermentation operators. No higher level managerial samples were tested.

Watson-Glaser Critical Thinking Appraisal

The Watson-Glaser Critical Thinking Appraisal (Watson and Glaser, 1951) is a power test of the ability to employ the various abilities involved in critical thinking, including inferences, recognition of assumptions, deductions, interpretations, and evaluation of arguments. The test is designed in part to furnish predictive information to be used in selection and classification procedures in occupations in which critical thinking plays an important part (Watson and Glaser, 1964). Although part scores can be shown for the five subtests, the authors recommend that only the total score be used in most instances. This recommendation is underscored by the fact that the median scale split-half reliability coefficient is .62 (Form Ym). Subtest intercorrelation coefficients range from .21 to .50, while the reliability of the total Ym score approximates .86.

The authors do present some discussion concerning content and construct validity, but they emphasize that predictive validity depends heavily on specific and often unique local conditions. They therefore suggest that validation be carried out at the local level.

Reviews of the Watson-Glaser Critical Thinking Appraisal (WGCTA) have been favorable. Hill (1959) questions the

accuracy of several of the keyed answers, but states that the overall test is of high quality and that it is a useful instrument for the measurement of critical thinking skills. Hovland (1959) concludes that the WGCTA, in comparison to other tests purporting to measure the same thing, is highly effective. Results of the use of the test for predicting managerial performance have not, however, been encouraging (Albrecht, Glaser, and Marks, 1964).

RBH Vocabulary Test

The Richardson, Bellows, and Henry Vocabulary Test (1951) is a 74 item test of vocabulary knowledge. It appears to be geared toward a rather high-level individual with good basic vocabulary skills, and as such it may be suitable for use in managerial assessment. No test manual is available and no published report concerning the use of the test in industry was found.

Judgment and Comprehension Test

The Flanagan Aptitude Classification Tests (FACT) was published in 1951. It is a multi-aptitude battery containing 14 subtests. The present investigation employs only test 8a, Judgment and Comprehension, a test of reading comprehension and practical judgment. The test format consists of six paragraphs, each followed by four multiple choice questions based primarily (but not exclusively) on information in that paragraph. Although the test instructions emphasize that

answers are to be chosen on the basis of information presented in the paragraph, the testee would be forced to omit at least one question (number 23) were he to adhere rigidly to that instruction.

The test mean is 15.2 with a standard deviation of 3.8, indicating a rather narrow spread of scores. The split-half reliability coefficient is a rather low .65 (Science Research Associates, 1954).

Carroll (1959) finds that the tests "factorial complexity would probably make score interpretations problematical." He further feels that the test probably does not warrent spending the time required to take it.

Test of Supervisory Judgment

The Richardson, Bellows, and Henry Test of Supervisory Judgment (1949) is a two part test of knowledge concerning supervisory practices and principles. Part I is primarily concerned with a theoretical knowledge of principles of supervision. A variety of situations is presented and the testee is asked to indicate both the best and the worst courses of action from four or five alternatives. Part II measures attitudes regarding interpersonal relationships as they relate to supervisory practices.

The test is an old one and has since been replaced by a revised test which eliminates Part II items. The only

available validity data are for the newer test, but the publishers indicate that the newer test is similar in content to the older Part I (Herring, 1971).

Spitzer and McNamara (1964) used the RBH Test of Supervisory Judgment in a concurrent validity study with first-line managers. They evaluated a variety of criteria, finding that salary corrected for length of service was the most satisfactory measure. Employing a cross-validation design, they found that the Supervisory Judgment Test correlated significantly for one sample ($r = .29$, $p < .05$) but not for the second ($r = .04$, $p > .05$).

In an unpublished study, Shell Oil Company (1971) evaluated the Supervisory Judgment Test in a battery of five other tests. The study was designed as a test of predictive validity (with selection based on the test battery results, however) for a sample of 58 refinery foremen. The criterion used was alternation ranking performed independently by two middle managers. The Supervisory Judgment Test correlated significantly with the criterion ($r = .26$, $p < .05$). In a multiple stepwise regression analysis and arithmetic reasoning test was the first entry ($R = .33$) and the Supervisory Judgment Test was the second ($R = .38$, $p < .05$). It should be noted, however, that these multiple regression coefficients were neither cross-validated nor corrected for bias.

These results suggest that the Supervisory Judgment Test, at least Part I, may be a useful predictor of performance in an industrial setting.

Arithmetical Reasoning Test

The Arithmetical Reasoning Test (Cardall, 1941) is a 15 item test "designed to measure the quantitative aspect of intelligence of the problem solving type" (Cardall, 1960). The author claims that the test distinguishes between those individuals who are able to comprehend the interrelationships among problem elements and those who mechanically proceed with computational details.

Although he presents neither references nor supporting statistics, Cardall claims that "Experimental evidence has indicated that this test is one of the most important single factors in academic prediction formulas for several technical and business colleges" (Cardall, 1960).

The test is available in two comparable forms, but the present study is concerned only with Form A. The Form A reliability is .981 (Kuder Richardson Formula 20) and validity coefficients as high as .60 are claimed by the author in situations involving carefully controlled ratings of bookkeeping and accounting employees.

Schaaf (1953) gives several criticisms of the Arithmetical Reasoning Test. He believes that the actual content of the test measures something other than what Cardall claims to measure. In particular, Schaaf states that computational skill, apart from quantitative reasoning, is quite necessary in order to do well on the test. Since computational facility is also necessary in the jobs for which Cardall claims

predictive validity for the test, Schaaf believes that it is, at least in part, the computational element which provides the basic predictability, not the reasoning element. Schaaf also states that the validity information presented by Cardall is essentially meaningless since no adequate description of the validation sample or procedure is given.

No published report of the industrial use of the test was found.

Guilford-Zimmerman Temperament Survey

The Guilford-Zimmerman Temperament Survey (GZTS) (Guilford and Zimmerman, 1949) yields ten scores: General Activity (G), Restraint (R), Ascendance (A), Sociability (S), Emotional Stability (E), Objectivity (O), Friendliness (F), Thoughtfulness (T), Personal Relations (P), and Masculinity (M). Of the three additional falsification scales, the present study uses only the Gross Falsification (GF) scale. Each of the ten traits is evaluated by "yes," "no," or "undecided" responses to 30 affirmative statements. The traits were identified by factor analytic procedures.

Reviews of the GZTS have been generally favorable. However, Saunders (1959) points out that scale reliabilities which average .80 are generally not sufficient to yield a valid prediction regarding an individual, especially when the predominant finding is that only one or two of the scales typically correlate with a given criterion. Saunders feels that to make specific recommendations or predictions from one

or two scales requires a higher scale reliability. Nevertheless, he feels that the GZTS has merit in personality research where specific clinical recommendations are not required.

As Stephenson (1953) has pointed out, the normative data and necessary corroborating information are adequate and well presented. Steenberg (1953) emphasizes the clarity of the scale descriptions although he takes exception to the test's provision for "undecided" answers to be marked. Steenberg opts for a dichotomous forced choice response pattern.

Herzberg (1954) has shown that the distributions of scores on the GZTS scales are significantly higher for individuals tested in an industrial setting than are the distributions of scores for college students or for vocational guidance clients. Guilford suggests that having exceptionally high scores on most of the traits is undesirable, but Herzberg's findings may make this analysis unrealistic and inaccurate in light of the marked negative skewness of the distribution of scores in the industrial population. The development of the GF score was a step toward correcting this incongruence.

Wagner and Sober (1964) found that the M scale score did contribute to a multiple regression equation (negatively), in addition to the School and College Ability Test (SCAT), for predicting academic success. Seven of the ten scales correlated with the criterion at the .05 level,

although the stepwise regression included the M scale only. Steps beyond this point yielded little additional predictability.

Other studies of the GZTS have shown significant correlations, but the results are inconsistent (MacKinney and Wollins, 1960; Laurent, 1962).

How Well Do You Know Your Interests

How Well Do You Know Your Interests (HWDYKYI) (Jenkins, 1957) yields scores on 53 diverse activities within ten vocational interest domains and sub-domains, ranging from farming or ranching to enjoying visual art, plus a masculinity/femininity scale. The 53 scores are derived from 120 total test items.

The test manual (Jenkins, 1957b) states that the present test items are the result of "about 3,000,000 correlations and over 1000 factor analyses." An individual raw score is said to be meaningful in itself, without comparison with normative data; that is, the raw scores have an ipsometric significance. Mention is made only of factorial validity, there having been no attempt to demonstrate either predictive or construct validity. The sole reference to use of the test is an unpublished doctoral thesis.

Reviews of HWDYKYI have been primarily negative. Doppelt (1959) feels that obtaining 53 scores from 120 items represents an overextension of data. He mentions the fact that necessary data for understanding the test are not given

and concludes that the measurement of interests based on responses to two items is "too hazardous to accept."

Dyer (1959) finds that the factorial validities yield little more than a measure of the internal consistency of each scale. However, he feels that the careful clinician may be able to find use for the test, although no research has been conducted to establish this recommendation.

Anderson (1965) presents a rather naive evaluation of HWDYKYI, stating that "the manual is well written and a high professional standard is set in the recommendations which are made in it." He feels that the test has definite clinical promise and probably is "a useful contribution to interest measurement."

Hills (1965) has given the most negative criticism of HWDYKYI. He points out disturbing discrepancies in the reporting of technical information and finds other examples of poor editing and carelessness in the preparation of the manual. He criticizes the fact that the test publisher (Executive Analysis Corporation) refuses to make available data that would facilitate interpretation of the test. The present author's request to examine that data was refused by the Director of the Executive Analysis Corporation, who stated that scale intercorrelations and stand standard deviations were not available for the test (Coleman, 1971). Hill concludes that until such time as Executive Analysis Corporation

sees fit to release further information, the test is suitable only for experimental purposes.

No published report of the use of the test was found.

How Well Do You Know Yourself

How Well Do You Know Yourself (HWDYKY) (Jenkins, 1959) was published primarily for personnel and guidance specialists "to meet the need to see normal people in essentially normal terms" (Jenkins, Coleman, and Fagin, 1959). The inventory gives scores on 17 traits, including irritability, practicality, punctuality, novelty-liking, vocational assurance, cooperativeness, ambitiousness, hypercriticalness, dejection, general morale, persistence, nervousness, seriousness, submissiveness, impulsiveness, dynamism, and emotional control. The manual reports that these scales represent primary factors derived by factor analytic procedures. In addition, two non-factorial scores are included, consistency and test objectivity. The manual presents no validity information for the inventory in its present form. However, three studies which used a broader form of the inventory which included all the current scales and items are reported. Only one of these studies has been published, the other two being doctoral dissertations. The statement is made that (!) "significant to very significant relationships" were found with six scales and a criterion of resistence to audiogenic stress. This finding is not stated to reflect validity, rather it is supposed to demonstrate "efficiency."

Cronback's (1965) review of HWFYKY generates little enthusiasm for the inventory. Cronbach states that the 17 factorial scores "are not in any significant way derived from the [original] factor analysis." Moreover, HWDYKY "is completely unvalidated with respect to practical decisions." Available normative data is exceedingly weak.

Gough (1965) reaches a similarly negative conclusion. He finds that the inventory is lacking in validity and reliability, and that the necessary scale intercorrelations are not reported.

Both Gough and Cronbach emphasize that HWDYKY is suited for use only by trained specialists who have the necessary knowledge to coordinate the somewhat tenuous findings of the inventory with other, more valid data.

No published report of the use of the test in industry was found.

CHAPTER II

METHOD AND PROCEDURE

PREDICTORS

As previously described, this investigation employed nine psychological tests, yielding a total of 93 scale scores. Each of these scales will now be listed, with appropriate descriptive information where necessary. For entries labeled "total score," the reader is referred to Chapter I for a description of that test. In all Tables, tests and scores are referred to by the number designation given below.

SRA Verbal

1. Linguistic score - proficiency in the use of language
2. Quantitative score - proficiency in perceiving and solving mathematical problems
3. Total score

Watson-Glaser Critical Thinking Appraisal

4. Total score

RBH Vocabulary Test

5. Total score

FACT Judgment and Comprehension Test

6. Total score

RBH Test of Supervisory Judgment

7. Part I score - theoretical knowledge of supervisory principles
8. Part II score - attitudes toward human relations in supervision

Cardall Arithmetical Reasoning Test

9. Total score

Guilford-Zimmerman Temperament Survey

10. General Activity
11. Restraint
12. Ascendance
13. Sociability
14. Emotional Stability
15. Objectivity
16. Friendliness
17. Thoughtfulness
18. Personal Relations
19. Masculinity
20. Gross Falsification

How Well Do You Know Your Interests

21. Numerical
22. Clerical
23. Retail Selling

How Well Do You Know Your Interests (cont.)

24. Outside Selling
25. Selling Real Estate
26. One Order Selling
27. Sales Complaints
28. Selling Intangibles
29. Buyer
30. Labor Management
31. Production Supervision
32. Business Management
33. Machine Operation
34. Repair and Construction
35. Machine Design
36. Farm or Ranch
37. Gardening
38. Hunting
39. Adventure
40. Social Service
41. Teaching Service
42. Medical Service
43. Nursing Service
44. Applied Chemistry
45. Basic Chem. Problems
46. Basic Biol. Problems
47. Basic Phys. Problems
48. Basic Psych. Problems
49. Philosophical

How Well Do You Know Your Interests (cont.)

50. Visual Art: Appreciative
51. Visual Art: Productive
52. Visual Art: Decorative
53. Amusement: Appreciative
54. Amusement: Productive
55. Amusement: Managerial
56. Literary: Appreciative
57. Literary: Productive
58. Musical: Appreciative
59. Musical: Performing
60. Musical: Composing
61. Sports: Appreciative
62. Sports: Participative
63. Domestic Service
64. Unskilled Labor
65. Disciplinary
66. Power Seeking
67. Propaganda
68. Self-Aggrandizing
69. Supervisory Initiative
70. Bargaining
71. Arbitrative
72. Persuasive
73. Disputatious
74. Masculinity/Femininity

How Well Do You Know Yourself

75. Irritability
76. Practicality
77. Punctuality
78. Novelty-loving
79. Vocational Assurance
80. Cooperativeness
81. Ambitiousness
82. Hypercriticalness
83. Dejection
84. General Morale
85. Persistence
86. Nervousness
87. Seriousness
88. Submissiveness
89. Impulsiveness
90. Dynamism
91. Emotional Control
92. Consistency
93. Test Objectivity

CRITERIA

A variety of criteria were selected for investigation. The first five of these were the result of factor analysis of a checklist of items referring to personal behavior, while the remainder have found fairly general use in traditional validation studies (although rarely combined in one study).

Of the following 11 criteria, only the first 8 were eventually retained for actual use, and these were selected only after preliminary analysis of the results had been completed.

1. Factor I score - Job Effectiveness
2. Factor II score - Interpersonal Relations
3. Factor III score - Clarity of Communications
4. Factor IV score - Energy and Punctuality
5. Factor V score - Decision Making Ability Under Pressure
6. Performance Rating
7. Promotability Rating
8. Salary Index
9. Number of Promotions
10. Number of Raises
11. Tenure

The criteria are described in detail in the Procedure section of this study.

RESEARCH DESIGN

By design, this investigation was a follow-up validation procedure involving simple and multiple correlates of job criteria. For each of the eight criteria there were 93 possible Pearson r correlation coefficients (a total of 744). In addition, eight multiple regression coefficients were obtained for predicting the eight criteria. It was planned to cross validate the obtained multiple regression weights with a hold-out sample, but this proved to be impossible due to missing

predictor and criterion information which created a marked reduction in the sample size.

SAMPLE

The initial sample consisted of over 250 present and terminated employees tested as bank management trainee applicants by a Richmond consulting firm. However, it was possible to include only 138 present employees in the study because of missing predictor and criterion information. There appeared to be no systematic reason for inclusion or exclusion of employees in the final sample, and it is assumed that the sample is representative of the population of interest. An inadequate sample size of employees who had been terminated for poor performance was available for study. Although no records were kept, virtually all of the employees were male Caucasians. A majority of the employees were college graduates. Their current job duties varied, but all were involved in some phase of bank management activity. The sample was restricted to those individuals who had been on the job at least 12 months. A few individuals who had been promoted to top-level management positions were not included because adequate criterion information was not available.

PROCEDURE

The first phase of the study consisted of collecting the criterion information on each employee. A 27 item checklist was prepared which contained descriptive

statements adapted from the test manuals. The following items were included:

1. Is slow in adapting to new methods.
2. Tends to procrastinate.
3. Can work well with almost everybody.
4. Follows instructions accurately.
5. Respects the opinions of others.
6. Can't take criticism without getting angry.
7. Can make good decisions quickly when necessary.
8. Often loses his temper.
9. Usually completes assignments according to schedule.
10. Is good at developing new ways to do a job.
11. Learns new assignments very quickly.
12. Can work rapidly when required to do so.
13. Lacks initiative.
14. Often makes the same mistake twice, doesn't profit from past experience.
15. Tends to avoid exerting leadership.
16. Tends to waste time on the job by excessive talking, doing trivial work.
17. Often criticizes others' work unnecessarily.
18. Rarely puts off doing necessary work until the last minute.
19. Tends to assume responsibility conscientiously.
20. Generally maintains good morale among his subordinates.
21. Can be relied on to solve complex problems with minimal supervision.
22. Has good judgment on most business related matters.
23. Is basically lazy.

24. His reports are usually very clear and understandable.
25. Needs close supervision to maintain his work output.
26. Often acts impulsively.
27. Tends to ignore personal problems of subordinates, is unsympathetic.

Fourteen of the items were stated in a positive fashion, and 13 were cast negatively. The ordering of positive and negative items in the list was random. Ratings were made on a 5 point scale ranging from "almost never" to "almost always," reflecting the frequency with which the employee emitted the behavior in question.

The ratings were performed by the employee's immediate supervisor except in a few cases in which the bank personnel manager did the rating. Raters were encouraged to solicit other opinions when it was felt that additional information could be obtained from someone else who knew well enough the employee in question.

In one bank, each supervisor rated a given employee on all items before proceeding to the next employee. In the other two banks, the smaller sample sizes permitted the raters to rate all employees on one item before moving on to the next item. This latter procedure was requested for the first bank, but practical considerations made it impossible to adhere to.

A 27 X 27 intercorrelation matrix of Pearson r's was computed on the completed ratings. Since the correlation

was computed between variables which were logically continuous in nature, but were forced into a five point rating scale, the coefficients were corrected for errors due to coarse grouping using a procedure outlined by Guilford (1965, pps. 352-353). The correction procedure involves dividing the obtained coefficient by a constant, the value of which depends on the coarseness of the grouping for each variable. For the limiting case where no grouping is involved, the correction factor is equal to 1.0. At the other extreme, when data are reduced to dichotomous classifications (where the point biserial r would actually be appropriate) the constant is equal to .667. In the present case the correction amounted to dividing the obtained coefficient by .891. The corrected intercorrelation matrix was then factor analyzed on an IBM 1620 computer using the program "Principle Axes Factor Analysis Using Hotelling's Iterative Procedure" (Teeples, 1965a). Values on the main diagonal were communality estimates as recommended by Horst (1965, p. 117). According to Horst, the use of communality estimates instead of unity in the main diagonal permits the intercorrelations to be accounted for by a smaller number of factors which in turn facilitates interpretation.

The obtained factor loadings were then rotated to simple structure using a varimax criterion. Rotation was performed using the program "Varimax Matrix Rotation" (Teeples, 1965b). Five interpretable factors were extracted and used as criteria. A description of these factors is

given in the Results section of this study. An individual's factor score was computed as the sum of the ratings on each of the items which had a rotated factor loading equal to or greater than .50 on the factor in question. The .50 factor loading criterion for inclusion of an item in a factor was chosen in view of the apparent homogeneity of the checklist items, which caused negative skewness in the distribution of factor loadings. The raw factor score was then converted to a z score based on a comparison of a given employee's score with the mean score for individuals in that bank. This conversion was done to compensate for an apparent difference in inter-bank rating styles.

The next criterion obtained was a forced distribution overall performance rating. In each bank, the personnel director assembled a committee of supervisors who jointly decided on the ratings. The rating procedure followed the recommendations of Lawshe and Balma (1966, pps. 43-46). Each employee's name was printed on a separate card, and the committee was given the following instruction: "Considering all factors, where does this employee rank in relation to other workers in terms of his on-the-job performance and competence in his present job (not how well you like him, but how good a job he's doing for the bank)." Cards were first sorted into three piles: poorer performers, average performers, and better performers. The distribution was then corrected as necessary so that 30% were in the "poorer" category, 40% in the "average" category, and

30% in the "better" category. Finally this distribution was corrected to five piles containing respectively 10%, 20%, 40%, 20%, and 10% of the cards. Numerical values on an ordinal scale from 1 to 5 were assigned to the categories, with "5" representing a superior rating.

The same forced distribution rating procedure was used to assess the employee's promotability. The raters were instructed: "Where does this employee rank in terms of his promotability to jobs of higher responsibility?"

The complete set of instructions given to individual raters and rating committee members is included as Appendix B. In addition to specific rating procedures, a discussion of some common difficulties associated with ratings (halo effect, response sets, and inadequate knowledge of ratees) was also presented in an attempt to reduce the biasing effects of these problems.

The final criterion selected was a measure of an employee's economic advancement developed by the author. This index was computed as follows:

$$S = \frac{P - I}{L}$$

Where: S = salary index

P = present monthly salary

I = initial monthly salary when hired

L = length of service in months

The resultant statistic is a measure of economic acceleration, being the average increase in monthly salary per month. To

compensate for inter-bank differences in salary schedules, this salary index was converted to a standard score based on a mean of 10 and a standard deviation of 1, obtained by comparing an individual's salary index with the mean index for other employees in that bank. Visual inspection of the salary index compared with monthly income and length of service suggests that the index neither favors nor penalizes the long-term employee whose initial salary was set during a time of less economic inflation, nor does it appear to distort the economic advancement of the new employee. (All individuals in the study had been employed at least one year, typically allowing at least two routine salary reviews.)

Additional information was obtained on each employee but not used in the analysis. This information included the number of raises received and the number of promotions/demotions received. If the employee had terminated, clarification was sought concerning the reasons for clarification (see Appendix B).

The 93 predictors were each correlated with each of the eight criteria. Bearing in mind Thorndike's admonition regarding inferences from restricted samples, it was decided to apply the correction for range restriction even though it is not strictly applicable in the present situation. This correction was restricted to the first 20 scores due to the unavailability of necessary data from the HWDYKYI and HWDYKY tests.

Multiple regression coefficients were then computed using the program "STRAP - Stepwise Regression Analysis Program" (Colville and Holmes, 1962). Due to program restrictions it was not possible to evaluate all 93 predictors for possible inclusion into any given multiple regression equation in one pass of the data. Instead, test scores 1 through 20 were first used separately as predictors for each of the eight criteria. By nature of the computer program, variables are entered into the regression equation in stepwise order of decreasing contribution. For each of the eight regression equations, the first five variables selected by the first pass of the stepwise analysis were retained for the second pass of the data, but for the second pass five additional variables were selected from test scores numbered 21 through 93. The latter variables were those five non-duplicated scores showing the highest absolute value for the Pearson r correlation with the criterion in question. Thus, ten selected variables were finally entered in the program to determine each regression equation.

In addition to the above inferential procedures, descriptive statistics were also computed for the sample data. These consisted of means, standard deviations, and cumulative percentile distributions. Pearson r inter-correlations were also computed for the eight criterion scores.

CHAPTER III

RESULTS

All tabular results are contained in Appendix A. Table I presents the Pearson r intercorrelation matrix of the checklist items, based on a sample size of 138. The correlations were corrected for errors due to coarse grouping. The intercorrelation of a variable with itself is taken to be the highest absolute value of that variable with any other variable (communality estimate). The relatively high values of the coefficients indicate that the checklist was a homogeneous measuring instrument.

The rotated factor loadings which resulted from the factor analysis are shown in Table II, along with the communalities. The trace of the matrix was found to be 19.91. Factor I accounted for 60.69% of the variance, and the addition of the remaining four factors accounted respectively for 81.21%, 88.95%, 94.91%, and 100.26%. Although it is highly unusual to find factor loadings greater than 1 and to account for greater than 100% of the variance (especially with such a small number of factors) these occurrences are not without precedent. Horst (1965, p. 125), although referring to a centroid factor analysis rather than the principal axes method used in the present study, states that the use of

communality estimates other than unity on the main diagonal of the intercorrelation matrix may give rise to such seemingly aberrant results as are obtained here. He further implies that interpretations involving estimated communalities are often clouded.

Selecting those items which have factor loadings greater than or equal to .50 yields the following grouping of items (at this point all checklist items and all factors were manipulated to yield positive statements and positive factor loadings to facilitate interpretation):

Factor I

Loading	Item	
.813	1.	Is (not) slow in adapting to new methods.
.734	4.	Follows instructions accurately.
.584	9.	Usually completes assignments according to schedule.
.741	10.	Is good at developing new ways to do a job.
.867	11.	Learns new assignments very quickly.
.604	12.	Can work rapidly when required to do so.
.660	13.	(Does not) lack initiative.
.726	14.	(Rarely) makes the same mistake twice, (profits) from past experience.
.695	15.	(Does not) tend to avoid exerting leadership.
.959	21.	Can be relied upon to solve complex problems with minimal supervision.
.756	22.	Has good judgment on most business related matters.
.733	25.	(Does not) need close supervision to maintain his work output.

Factor I is a group factor reflecting the tendency to do a job well with little supervision. The individual who scores high on this factor adapts easily to changing situations and demonstrates good personal initiative. This factor may be referred to as "Job Effectiveness."

Factor II

Loading	Item
.770	3. Can work well with almost everyone.
.816	5. Respects the opinions of others.
.796	6. (Can) take criticism without getting angry.
.840	8. (Rarely) loses his temper.
.871	17. (Rarely) criticizes others' work unnecessarily.
.660	20. Generally maintains good morale among his subordinates.
.738	26. (Rarely) acts impulsively.
.602	27. (Does not) tend to ignore personal problems of subordinates, is sympathetic.

This factor suggests interpersonal relations skills as well as emotional control. The high scoring individual here is one who can generally maintain an even disposition and tends to get along well with others. Factor II, then, is considered to represent "Interpersonal Relations."

Factor III

Loading	Item
1.181	24. His reports are usually very clear and understandable.

Factor III is specific to one item, with a factor loading above unity. No other item even remotely approached the criterion for inclusion in this factor. Factor III is called "Clarity of Communications."

Factor IV

Loading	Item
.561	2. (Does not) tend to procrastinate.
.515	9. Usually completes assignments according to schedule.
.587	13. (Does not) lack initiative.
.635	23. (Is not) basically lazy.

The individual who scores high on Factor IV is an energetic and punctual individual. This factor is called "Energy and Punctuality."

Factor V

Loading	Item
1.168	7. Can make good decisions quickly when necessary.

Like Factor III, Factor V represents a specific factor loading above unity and only on one item. Factor V is called "Decision Making Ability Under Pressure."

Table III shows the means and standard deviations of the factor scores separately for each bank. All individual scores were converted to z scores based on these mean values.

The criterion intercorrelations (Pearson r's) are shown in Table IV. The moderately high magnitude of the intercorrelations suggests considerable overlap among the criteria.

Tables V - XII give the Pearson r correlation coefficients between each of the 93 predictors and the eight criteria. The correlations in Tables VII, IX, X, and XII were corrected for errors due to coarse grouping, in each case the correction being to divide the obtained coefficient by .943 (Guilford, ,965, p. 353). In each case, coefficients which exceed the critical significance value at the .05 level are indicated by an asterisk. In those instances in which previous research had indicated some basis for doing so, several of the correlations were evaluated by a one-tailed test. For ease of interpretation, those correlations which reached significance with each criteria are shown in Tables XIII - XX, arranged in order of decreasing magnitude. Tables V - XX also include, where it was possible to compute, the Pearson r corrected for range restriction (r_c). It should be kept in mind that r_c probably represents an overestimate, and extreme caution should be used in interpreting these values.

The multiple regression equations for each of the eight criteria are shown in Tables XXI - XXVIII. Included in the tables are the standard errors of the regression weights and the standard error of the estimate. The shrunken multiple regression coefficients and the unbiased standard errors of estimate are also given.

Table XXIX contains the sample means and standard deviations for test scores 1 through 20. The published general population means and standard deviations are also shown for comparative purposes. (For the Cardall Arithmetical Reasoning Test, number 9, the population values were derived indirectly from the published percentile distribution.) Table XXX shows the means and standard deviations for HWDYKYI, scores 21 - 74, and Table XXXI gives the same information for HWDYKY, scores 75 - 93. Population values were not available for these two tables.

Percentile distributions for test scores 1 - 9 are given in Tables XXXII - XXXIX.

CHAPTER IV

DISCUSSION

Of the 943 Pearson r correlations computed between predictors and criteria, 40 were significant at the .05 level. When the correction for range restriction was applied, a total of 63 significant correlations were found. Since probability laws would predict only 37 of the correlations to exceed the critical significance value by chance sampling, it can be concluded that there are at least some significant correlations in the test battery, but the "true" number is quite likely less than the maximum indicated of 63. There is, unfortunately, no way to determine which of the correlations are significant and which exceed the significance level by chance, except by replication based on sampling from the same population.

All eight of the shrunken multiple correlation coefficients were significant at the .05 level, and this fact would suggest the advisability and even necessity of using a test battery approach to prediction as opposed to the use of a single test score. The appearance of predictors which in terms of content validity seem spurious (such as interest in visual art predicting decision making ability and music appreciation

predicting performance rating) do not minimize the importance of the use of a test battery, rather it underscores Korman's (1968) conclusion that the results of a test battery are best utilized by a clinical, not statistical, evaluation.

Recalling Dunnette's (1963) warning against attempting to find a "distilled essence" of job success, it seems inadvisable to deal with the question of pointing out the "best" tests in the battery. One must ask, "'best' for what purpose?" However, it should be pointed out that the following tests made no contribution to any of the multiple regression equations:

Watson-Glaser Critical Thinking Appraisal
RBH Vocabulary Test
FACT Judgment and Comprehension Test

The lack of contribution of these tests is not prima facie evidence that the tests have no validity, it simply means that any variance accounted for by these tests may be better accounted for by other variables, due to high intercorrelations.

Whether or not the present findings constitute what Korman (1968) considers to be random scatterings of significant Pearson r's is questionable. It is the present author's personal contention that no great confidence should be placed in the unreplicated results of a single study employing factor analytic or correlational techniques, especially when the sample available for study is small and highly restricted.

Nevertheless, it can be tentatively stated that the results of this study are, in general, more positive and favorable than are typically found in validation research. While the indices of forecasting efficiency shown in conjunction with the multiple regression data are low in an absolute sense, Guilford (1965, pps. 378-379) has indicated that "It is probable that the efficiency of predictions based on the average unsystematic interview is less than 5 per cent."

SUGGESTIONS FOR FURTHER RESEARCH

The first task in subsequent research should be replication of the findings in this study, with sampling from the same population. Cross-validation of the multiple regression data is quite necessary before confidence can be placed in the obtained regression weights. A meaningful addition to the correlational approach to validation would be the comparison of test scores for individuals rating high versus low on the criteria by an analysis of variance technique.

Already in the planning stage is a study designed to validate the assessment reports written on the basis of the test battery data. In light of previous research, this approach should find correlations even higher than the multiple regression coefficients obtained in the present study.

CHAPTER V

SUMMARY

The purpose of the present study was to investigate the predictive validity of a battery of nine tests used to assess the suitability of applicants for positions as bank management trainees. Pearson r correlation coefficients were computed between 93 test scale scores and eight criteria, including five criteria developed by factor analysis of a behavioral checklist, two forced distribution ratings on overall performance and promotability, and a salary index reflecting economic acceleration, with a sample of 138 present employees who had been tested earlier. Forty significant correlations (.05 level) were found, with an additional 23 added when correction for range restriction was employed. Eight multiple regression equations were developed for the eight criteria, and all were significant at the .05 level.

The results were interpreted as providing tentative evidence of the predictive validity for the test battery in general, and the tests which showed no contribution to the multiple regression analysis were noted.

APPENDICES

APPENDIX A

STATISTICAL TABLES

TABLE I

CHECKLIST ITEM INTERCORRELATIONS

(Corrected for Errors Due To Coarse Grouping - Decimals Omitted)

Item	Item	r	Item	Item	r	Item	Item	r
1	1	801	2	1	536	3	1	-179
1	2	536	2	2	757	3	2	-164
1	3	-179	2	3	-164	3	3	709
1	4	-664	2	4	-516	3	4	364
1	5	-314	2	5	-357	3	5	583
1	6	290	2	6	394	3	6	-673
1	7	-732	2	7	-510	3	7	188
1	8	191	2	8	300	3	8	-699
1	9	-600	2	9	-757	3	9	287
1	10	-801	2	10	-417	3	10	067
1	11	-726	2	11	-416	3	11	173
1	12	-589	2	12	-580	3	12	168
1	13	716	2	13	638	3	13	-158
1	14	644	2	14	505	3	14	-217
1	15	702	2	15	491	3	15	-083
1	16	517	2	16	750	3	16	-348
1	17	218	2	17	345	3	17	-618
1	18	-243	2	18	-260	3	18	158
1	19	-520	2	19	-465	3	19	473
1	20	-330	2	20	-284	3	20	709
1	21	-738	2	21	-497	3	21	122
1	22	-608	2	22	-477	3	22	273
1	23	514	2	23	561	3	23	-366
1	24	-605	2	24	-326	3	24	134
1	25	700	2	25	652	3	25	-229
1	26	162	2	26	279	3	26	-534
1	27	195	2	27	281	3	27	-476

TABLE I
(Continued)

Item	Item	r	Item	Item	r	Item	Item	r
4	1	-664	5	1	-314	6	1	290
4	2	-516	5	2	-357	6	2	394
4	3	364	5	3	583	6	3	-673
4	4	729	5	4	383	6	4	-365
4	5	383	5	5	747	6	5	-740
4	6	-365	5	6	-740	6	6	746
4	7	621	5	7	250	6	7	-232
4	8	-303	5	8	-659	6	8	736
4	9	573	5	9	291	6	9	-281
4	10	517	5	10	130	6	10	-132
4	11	664	5	11	165	6	11	-162
4	12	469	5	12	191	6	12	-308
4	13	-583	5	13	-212	6	13	232
4	14	-581	5	14	-395	6	14	355
4	15	-546	5	15	-163	6	15	258
4	16	-550	5	16	-529	6	16	544
4	17	-332	5	17	-747	6	17	746
4	18	164	5	18	-210	6	18	-181
4	19	495	5	19	396	6	19	-377
4	20	413	5	20	492	6	20	-525
4	21	729	5	21	265	6	21	-182
4	22	611	5	22	490	6	22	-376
4	23	-445	5	23	-343	6	23	303
4	24	667	5	24	266	6	24	-133
4	25	-637	5	25	-246	6	25	305
4	26	-404	5	26	-613	6	26	507
4	27	-211	5	27	-524	6	27	532

TABLE I
(Continued)

Item	Item	r	Item	Item	r	Item	Item	r
7	1	-732	8	1	191	9	1	-600
7	2	-510	8	2	300	9	2	-757
7	3	188	8	3	-699	9	3	287
7	4	621	8	4	-303	9	4	573
7	5	250	8	5	-659	9	5	291
7	6	-232	8	6	736	9	6	-281
7	7	790	8	7	-156	9	7	567
7	8	-156	8	8	775	9	8	-247
7	9	567	8	9	-247	9	9	801
7	10	633	8	10	-018	9	10	522
7	11	723	8	11	-036	9	11	503
7	12	617	8	12	-079	9	12	513
7	13	-631	8	13	122	9	13	-641
7	14	-658	8	14	293	9	14	-522
7	15	-646	8	15	136	9	15	-548
7	16	-561	8	16	400	9	16	-651
7	17	-171	8	17	775	9	17	-305
7	18	206	8	18	-277	9	18	307
7	19	375	8	19	-315	9	19	452
7	20	310	8	20	-578	9	20	300
7	21	790	8	21	-151	9	21	543
7	22	708	8	22	-246	9	22	508
7	23	-328	8	23	261	9	23	-558
7	24	-699	8	24	-105	9	24	602
7	25	-672	8	25	202	9	25	-767
7	26	-217	8	26	639	9	26	-296
7	27	-264	8	27	452	9	27	-266

TABLE I
(Continued)

Item	Item	r	Item	Item	r	Item	Item	r
10	1	-801	11	1	-726	12	1	-589
10	2	-417	11	2	-416	12	2	-580
10	3	067	11	3	173	12	3	168
10	4	517	11	4	664	12	4	469
10	5	130	11	5	165	12	5	191
10	6	-132	11	6	-162	12	6	-308
10	7	633	11	7	723	12	7	617
10	8	-018	11	8	-036	12	8	-079
10	9	522	11	9	503	12	9	513
10	10	801	11	10	677	12	10	537
10	11	677	11	11	801	12	11	673
10	12	537	11	12	673	12	12	-709
10	13	-712	11	13	-577	12	13	-709
10	14	-472	11	14	-685	12	14	-428
10	15	-645	11	15	-625	12	15	-660
10	16	-437	11	16	-388	12	16	-508
10	17	022	11	17	-029	12	17	063
10	18	284	11	18	250	12	18	156
10	19	424	11	19	457	12	19	550
10	20	202	11	20	259	12	20	332
10	21	729	11	21	801	12	21	528
10	22	594	11	22	674	12	22	503
10	23	-449	11	23	-345	12	23	-429
10	24	471	11	24	637	12	24	379
10	25	-674	11	25	-669	12	25	-652
10	26	002	11	26	-040	12	26	046
10	27	-214	11	27	-264	12	27	-178

TABLE I
(Continued)

Item	Item	r	Item	Item	r	Item	Item	r
13	1	716	14	1	644	15	1	702
13	2	638	14	2	505	15	2	491
13	3	-158	14	3	-217	15	3	-083
13	4	-583	14	4	-581	15	4	-546
13	5	-212	14	5	-395	15	5	-163
13	6	232	14	6	355	15	6	258
13	7	-631	14	7	-658	15	7	-646
13	8	122	14	8	293	15	8	136
13	9	-641	14	9	-522	15	9	-548
13	10	-712	14	10	-472	15	10	-645
13	11	-577	14	11	-685	15	11	-625
13	12	-709	14	12	-428	15	12	-660
13	13	816	14	13	471	15	13	795
13	14	471	14	14	729	15	14	473
13	15	795	14	15	473	15	15	795
13	16	651	14	16	647	15	16	536
13	17	118	14	17	388	15	17	159
13	18	-212	14	18	-244	15	18	-152
13	19	-500	14	19	-467	15	19	-463
13	20	-300	14	20	-304	15	20	-280
13	21	-642	14	21	-729	15	21	-643
13	22	-648	14	22	-683	15	22	-607
13	23	719	14	23	302	15	23	536
13	24	-426	14	24	-556	15	24	-467
13	25	816	14	25	666	15	25	716
13	26	073	14	26	331	15	26	020
13	27	247	14	27	350	15	27	179

TABLE I
(Continued)

Item	Item	r	Item	Item	r	Item	Item	r
16	1	517	17	1	218	18	1	-243
16	2	750	17	2	345	18	2	-260
16	3	-348	17	3	-618	18	3	158
16	4	-550	17	4	-332	18	4	164
16	5	-529	17	5	-747	18	5	-210
16	6	544	17	6	746	18	6	-181
16	7	-561	17	7	-171	18	7	206
16	8	400	17	8	775	18	8	-277
16	9	-651	17	9	-305	18	9	307
16	10	-437	17	10	022	18	10	284
16	11	-388	17	11	-029	18	11	250
16	12	-508	17	12	-063	18	12	156
16	13	651	17	13	118	18	13	-212
16	14	647	17	14	388	18	14	-244
16	15	536	17	15	159	18	15	-152
16	16	750	17	16	538	18	16	-291
16	17	538	17	17	775	18	17	-103
16	18	-291	17	18	-103	18	18	387
16	19	-462	17	19	-355	18	19	387
16	20	-370	17	20	-562	18	20	086
16	21	-547	17	21	-154	18	21	-151
16	22	-635	17	22	-383	18	22	164
16	23	629	17	23	356	18	23	-240
16	24	-346	17	24	-204	18	24	074
16	25	691	17	25	193	18	25	-235
16	26	445	17	26	630	18	26	-052
16	27	373	17	27	514	18	27	-130

TABLE I
(Continued)

Item	Item	r	Item	Item	r	Item	Item	r
19	1	-520	20	1	-330	21	1	-738
19	2	-465	20	2	-284	21	2	-497
19	3	473	20	3	709	21	3	122
19	4	495	20	4	413	21	4	729
19	5	396	20	5	492	21	5	265
19	6	-377	20	6	-525	21	6	-182
19	7	375	20	7	310	21	7	790
19	8	-315	20	8	-578	21	8	-151
19	9	452	20	9	300	21	9	543
19	10	424	20	10	202	21	10	729
19	11	457	20	11	259	21	11	801
19	12	550	20	12	332	21	12	528
19	13	-500	20	13	-300	21	13	-642
19	14	-467	20	14	-304	21	14	-729
19	15	-463	20	15	-280	21	15	-643
19	16	-462	20	16	-370	21	16	-547
19	17	-355	20	17	-562	21	17	-154
19	18	387	20	18	086	21	18	-151
19	19	-595	20	19	516	21	19	436
19	20	516	20	20	709	21	20	242
19	21	436	20	21	242	21	21	801
19	22	525	20	22	362	21	22	730
19	23	595	20	23	-323	21	23	-444
19	24	297	20	24	189	21	24	666
19	25	-480	20	25	-400	21	25	-753
19	26	-190	20	26	-438	21	26	-334
19	27	-377	20	27	-579	21	27	-172

TABLE I
(Continued)

Item	Item	r	Item	Item	r	Item	Item	r
22	1	-608	23	1	514	24	1	-605
22	2	-477	23	2	561	24	2	-326
22	3	273	23	3	-366	24	3	134
22	4	611	23	4	-445	24	4	667
22	5	490	23	5	-343	24	5	266
22	6	-376	23	6	303	24	6	-133
22	7	708	23	7	-328	24	7	-699
22	8	-246	23	8	261	24	8	-105
22	9	508	23	9	-558	24	9	602
22	10	594	23	10	-449	24	10	471
22	11	674	23	11	-345	24	11	637
22	12	503	23	12	-429	24	12	379
22	13	-648	23	13	719	24	13	-426
22	14	-683	23	14	302	24	14	-556
22	15	-607	23	15	536	24	15	-467
22	16	-635	23	16	629	24	16	-346
22	17	-383	23	17	356	24	17	-204
22	18	164	23	18	-240	24	18	074
22	19	525	23	19	-595	24	19	297
22	20	362	23	20	-323	24	20	189
22	21	730	23	21	-444	24	21	666
22	22	708	23	22	-551	24	22	590
22	23	-551	23	23	719	24	23	-239
22	24	590	23	24	-239	24	24	699
22	25	-648	23	25	629	24	25	-523
22	26	-376	23	26	213	24	26	-242
22	27	-436	23	27	342	24	27	-229

TABLE I
(Continued)

Item	Item	r	Item	Item	r	Item	Item	r
25	1	700	26	1	162	27	1	195
25	2	652	26	2	279	27	2	281
25	3	-229	26	3	-534	27	3	-476
25	4	-637	26	4	-404	27	4	-211
25	5	-246	26	5	-613	27	5	-524
25	6	305	26	6	507	27	6	532
25	7	-672	26	7	-217	27	7	-264
25	8	202	26	8	639	27	8	452
25	9	-767	26	9	-296	27	9	-266
25	10	-674	26	10	002	27	10	-214
25	11	-669	26	11	-040	27	11	-264
25	12	-652	26	12	046	27	12	-178
25	13	816	26	13	073	27	13	247
25	14	666	26	14	331	27	14	350
25	15	716	26	15	020	27	15	179
25	16	691	26	16	445	27	16	373
25	17	193	26	17	630	27	17	514
25	18	-235	26	18	-052	27	18	-130
25	19	-480	26	19	-190	27	19	-377
25	20	-400	26	20	-438	27	20	-579
25	21	-753	26	21	-334	27	21	-172
25	22	-648	26	22	-376	27	22	-436
25	23	629	26	23	213	27	23	342
25	24	-523	26	24	-242	27	24	-229
25	25	816	26	25	239	27	25	262
25	26	239	26	26	639	27	26	431
25	27	262	26	27	431	27	27	579

TABLE II

ROTATED FACTOR LOADINGS
(Decimals Omitted)

Item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	h^2
1	813	137	-067	280	-065	767
2	447	267	-086	561	-100	602
3	-028	-770	005	-183	010	627
4	-734	-333	122	-135	-029	682
5	-215	-816	063	027	014	717
6	088	796	-037	215	-096	619
7	-491	-149	-018	-221	1.168	1.674
8	-018	840	-020	152	-031	731
9	-584	-226	112	-515	-081	676
10	-741	060	092	-307	145	677
11	-867	-028	089	-112	088	781
12	-604	-039	-004	-462	124	594
13	660	047	-083	587	-138	808
14	726	335	-085	058	-085	656
15	695	032	-051	419	-112	676
16	477	463	-066	463	-121	676
17	049	871	-049	112	025	776
18	-061	-065	-044	-483	-004	244
19	-360	-355	114	-472	108	503
20	-186	-660	011	-208	080	520
21	-959	-140	075	037	072	951
22	-756	-351	046	-153	049	722
23	324	269	-052	635	-110	615
24	-381	-117	1.181	-091	-016	1.562
25	733	160	-120	454	-117	797
26	153	738	-066	-104	014	582
27	173	602	-001	146	-006	413
Cumulative % Variance Accounted For	60.69	81.21	88.95	94.91	100.26	

TABLE III

FACTOR SCORE MEANS AND STANDARD DEVIATIONS

First Bank

	Mean	Standard Deviation	N
Factor 1	46.47	7.86	83
Factor 2	32.95	4.99	83
Factor 3	3.81	.94	83
Factor 4	16.11	2.72	83
Factor 5	3.55	.78	83

Second Bank

	Mean	Standard Deviation	N
Factor 1	38.00	7.40	27
Factor 2	24.89	4.19	27
Factor 3	3.30	.60	27
Factor 4	12.70	2.71	27
Factor 5	3.22	.57	27

Third Bank

	Mean	Standard Deviation	N
Factor 1	47.38	8.68	29
Factor 2	33.79	5.53	29
Factor 3	3.76	.77	29
Factor 4	16.59	3.00	29
Factor 5	3.76	.90	29

TABLE IV

CRITERION INTERCORRELATIONS

Criterion	Criterion	r	N
1	2	.14	136
1	3	.62	136
1	4	.78	136
1	5	.76	136
1	6	.70	136
1	7	.68	136
1	8	.47	106
2	3	.10	139
2	4	.17	139
2	5	.15	139
2	6	.43	139
2	7	.34	139
2	8	-.01	108
3	4	.39	139
3	5	.61	139
3	6	.44	139
3	7	.38	139
3	8	.17	108
4	5	.52	139
4	6	.61	139
4	7	.51	139
4	8	.34	108
5	6	.56	139
5	7	.60	139
5	8	.40	108
6	7	.67	139
6	8	.44	108
7	8	.53	108

TABLE V

CORRELATIONS WITH FACTOR I

"Job Effectiveness"

(decimals omitted)

Score	r	r_c	N	Score	r	r_c	N	Score	r	r_c	N
1	11	15*	138	32	01		123	63	07		123
2	12	17*	138	33	-09		123	64	00		123
3	13	18*	138	34	-10		123	65	-09		123
4	03	05	119	35	-10		123	66	06		123
5	05	06	117	36	-02		123	67	09		123
6	-14	-23*	89	37	-01		123	68	03		123
7	12	23*	113	38	-12		123	69	-05		123
8	32*	44*	113	39	-20**		123	70	-06		123
9	13	15	107	40	-03		123	71	14		123
10	-05	-05	138	41	-02		123	72	01		123
11	02	03	138	42	11		123	73	06		123
12	04	05	138	43	07		123	74	-04		123
13	04	07	138	44	03		123	75	13		97
14	02	03	138	45	-04		123	76	01		97
15	05	07	138	46	-03		123	77	16		97
16	03	04	138	47	-09		123	78	-09		97
17	-16	-19**	138	48	03		123	79	03		97
18	02	02	138	49	05		123	80	04		97
19	-12	-12	138	50	-13		123	81	-03		97
20	-04		136	51	-08		123	82	08		97
21	-09		123	52	-06		123	83	02		97
22	-11		123	53	-09		123	84	-08		97
23	02		123	54	04		123	85	-05		97
24	-12		123	55	03		123	86	-07		97
25	-17		123	56	-04		123	87	00		97
26	00		123	57	10		123	88	-03		97
27	01		123	58	-09		123	89	01		97
28	-07		123	59	-01		123	90	-08		97
29	03		123	60	-04		123	91	-03		97
30	13		123	61	10		123	92	-24**		97
31	-01		123	62	-07		123	93	05		97

* $p \leq .05$, 1 tailed test
** $p \leq .05$, 2 tailed test

TABLE VI

CORRELATIONS WITH FACTOR II

"Interpersonal Relations"

(decimals omitted)

Score	r	r_c	N	Score	r	r_c	N	Score	r	r_c	N
1	06	08	138	32	06		123	63	-07		123
2	-01	-01	138	33	04		123	64	10		123
3	03	04	138	34	09		123	65	16		123
4	05	09	119	35	03		123	66	11		123
5	01	01	117	36	15		123	67	01		123
6	05	09	89	37	07		123	68	12		123
7	01	02	113	38	06		123	69	11		123
8	04	06	113	39	03		123	70	-09		123
9	04	05	107	40	03		123	71	17		123
10	00	00	138	41	-09		123	72	-05		123
11	07	10	138	42	19**		123	73	07		123
12	-01	-01	138	43	07		123	74	12		123
13	03	05	138	44	04		123	75	04		97
14	05	08	138	45	13		123	76	13		97
15	00	00	138	46	01		123	77	12		97
16	-10	-11	138	47	-06		123	78	07		97
17	-06	-07	138	48	03		123	79	05		97
18	03	04	138	49	-02		123	80	24**		97
19	03	03	138	50	-06		123	81	00		97
20	-05		136	51	04		123	82	19		97
21	-01		123	52	00		123	83	13		97
22	10		123	53	-09		123	84	03		97
23	07		123	54	04		123	85	10		97
24	09		123	55	-01		123	86	05		97
25	06		123	56	-10		123	87	18		97
26	09		123	57	00		123	88	07		97
27	18**		123	58	-19**		123	89	-04		97
28	03		123	59	-07		123	90	02		97
29	00		123	60	-05		123	91	-14		97
30	17		123	61	01		123	92	-01		97
31	25**		123	62	16		123	93	03		97

** $p < .05$, 2 tailed test

TABLE VII

CORRELATIONS WITH FACTOR III

"Clarity of Communications"

(decimals omitted)

Score	r	r_c	N	Score	r	r_c	N	Score	r	r_c	N
1	13	17*	138	32	-06		123	63	-06		123
2	11	16*	138	33	-19**		123	64	00		123
3	12	18*	138	34	-15		123	65	-07		123
4	07	12	119	35	-09		123	66	19**		123
5	14	18*	117	36	10		123	67	13		123
6	-04	-06	89	37	-02		123	68	03		123
7	03	06	113	38	-11		123	69	-11		123
8	17*	24*	113	39	-14		123	70	-07		123
9	13	15	107	40	04		123	71	14		123
10	-11	-13	138	41	00		123	72	04		123
11	02	03	138	42	06		123	73	11		123
12	00	00	138	43	-07		123	74	-02		123
13	-06	-10	138	44	-05		123	75	09		97
14	03	05	138	45	-06		123	76	00		97
15	07	09	138	46	-06		123	77	-01		97
16	00	00	138	47	-02		123	78	-03		97
17	-11	-13	138	48	02		123	79	-04		97
18	10	12	138	49	14		123	80	02		97
19	-09	-09	138	50	-03		123	81	01		97
20	-04		136	51	-17		123	82	19		97
21	01		123	52	-16		123	83	05		97
22	-10		123	53	-04		123	84	00		97
23	-12		123	54	09		123	85	-11		97
24	-10		123	55	00		123	86	-03		97
25	-10		123	56	16		123	87	06		97
26	-12		123	57	10		123	88	-13		97
27	07		123	58	-02		123	89	00		97
28	00		123	59	-12		123	90	-07		97
29	00		123	60	-02		123	91	-02		97
30	13		123	61	-13		123	92	-19		97
31	-10		123	62	-15		123	93	-10		97

* $p \leq .05$, 1 tailed test
** $p \leq .05$, 2 tailed test

TABLE VIII

CORRELATIONS WITH FACTOR IV

"Energy and Punctuality"

(decimals omitted)

Score	r	$_{c}r$	N	Score	r	$_{c}r$	N	Score	r	$_{c}r$	N
1	-08	-10	138	32	12		123	63	12		123
2	-05	-06	138	33	02		123	64	-03		123
3	-07	-09	138	34	-02		123	65	01		123
4	-07	-11	119	35	-06		123	66	03		123
5	-11	-13	117	36	06		123	67	12		123
6	-19*	-31*	89	37	04		123	68	-01		123
7	02	04	113	38	-04		123	69	03		123
8	14	20*	113	39	-09		123	70	00		123
9	-04	-04	107	40	07		123	71	19**		123
10	-01	-01	138	41	-04		123	72	00		123
11	03	04	138	42	11		123	73	-07		123
12	08	11	138	43	03		123	74	00		123
13	14	25**	138	44	04		123	75	06		97
14	03	05	138	45	-02		123	76	13		97
15	-02	-02	138	46	-07		123	77	19		97
16	02	02	138	47	-10		123	78	-11		97
17	-11	-11	138	48	01		123	79	07		97
18	01	01	138	49	-03		123	80	13		97
19	-18**	-18**	138	50	-16		123	81	-06		97
20	-01		136	51	05		123	82	-01		97
21	-04		123	52	02		123	83	02		97
22	01		123	53	-18**		123	84	-11		97
23	10		123	54	-03		123	85	11		97
24	-04		123	55	06		123	86	-11		97
25	-13		123	56	-15		123	87	11		97
26	03		123	57	13		123	88	08		97
27	06		123	58	-19**		123	89	08		97
28	-02		123	59	-05		123	90	11		97
29	06		123	60	-09		123	91	02		97
30	19**		123	61	10		123	92	-19		97
31	10		123	62	-09		123	93	01		97

* $p < .05$, 1 tailed test

** $p < .05$, 2 tailed test

TABLE IX

CORRELATIONS WITH FACTOR V

"Decision Making Ability Under Pressure"

(decimals omitted)

Score	r	$_c$r	N	Score	r	$_c$r	N	Score	r	$_c$r	N
1	12	16*	138	32	-01		123	63	04		123
2	14	20*	138	33	-02		123	64	07		123
3	15*	21*	138	34	-12		123	65	-02		123
4	05	08	119	35	-15		123	66	14		123
5	09	11	117	36	02		123	67	04		123
6	02	03	89	37	05		123	68	03		123
7	10	19*	113	38	-10		123	69	-05		123
8	31*	43*	113	39	-20**		123	70	-14		123
9	22*	26*	107	40	01		123	71	03		123
10	-06	-06	138	41	05		123	72	-12		123
11	-04	-05	138	42	16		123	73	06		123
12	-09	-11	138	43	01		123	74	-04		123
13	-05	-08	138	44	01		123	75	06		97
14	00	00	138	45	-03		123	76	00		97
15	00	00	138	46	-03		123	77	02		97
16	11**	13**	138	47	-01		123	78	-12		97
17	-18	-22	138	48	-02		123	79	-02		97
18	-04	-04	138	49	06		123	80	04		97
19	00	00	138	50	-18**		123	81	-07		97
20	-12		136	51	-10		123	82	13		97
21	-11		123	52	-10		123	83	16		97
22	03		123	53	-03		123	84	-01		97
23	-01		123	54	13		123	85	-11		97
24	-09		123	55	04		123	86	05		97
25	-19**		123	56	-02		123	87	02		97
26	00		123	57	05		123	88	-01		97
27	09		123	58	-05		123	89	-05		97
28	-12		123	59	02		123	90	-09		97
29	03		123	60	01		123	91	03		97
30	13		123	61	10		123	92	-14		97
31	00		123	62	-05		123	93	03		97

* $p < .05$, 1 tailed test
**$p < .05$, 2 tailed test

TABLE X

CORRELATIONS WITH PERFORMANCE RATING

(decimals omitted)

Score	r	$_c$r	N	Score	r	$_c$r	N	Score	r	$_c$r	N
1	09	12	138	32	05		123	63	-02		123
2	06	09	138	33	00		123	64	09		123
3	09	13	138	34	04		123	65	00		123
4	13	21*	119	35	06		123	66	10		123
5	01	01	117	36	11		123	67	00		123
6	-02	-02	89	37	-03		123	68	09		123
7	09	17*	113	38	-03		123	69	-02		123
8	19*	27*	113	39	-04		123	70	-10		123
9	29*	33*	107	40	-02		123	71	16		123
10	00	00	138	41	-05		123	72	-07		123
11	09	13	138	42	19**		123	73	-01		123
12	-05	-06	138	43	13		123	74	11		123
13	00	00	138	44	10		123	75	16		97
14	-01	-01	138	45	22**		123	76	12		97
15	02	03	138	46	10		123	77	05		97
16	00	00	138	47	00		123	78	-03		97
17	-13	-15	138	48	00		123	79	-03		97
18	03	04	138	49	05		123	80	13		97
19	01	01	138	50	-15		123	81	-03		97
20	-13		138	51	01		123	82	16		97
21	01		123	52	-13		123	83	07		97
22	-07		123	53	-17		123	84	00		97
23	00		123	54	11		123	85	00		97
24	-03		123	55	11		123	86	07		97
25	-10		123	56	-11		123	87	12		97
26	05		123	57	05		123	88	05		97
27	04		123	58	-21**		123	89	00		97
28	-07		123	59	-04		123	90	-01		97
29	13		123	60	05		123	91	00		97
30	14		123	61	07		123	92	-12		97
31	13		123	62	00		123	93	16		97

*$p < .05$, 1 tailed test
**$p < .o5$, 2 tailed test

TABLE XI

CORRELATIONS WITH PROMOTABILITY RATING

(decimals omitted)

Score	r	r_c	N	Score	r	r_c	N	Score	r	r_c	N
1	11	15*	138	32	15		123	63	-05		123
2	05	07	138	33	-12		123	64	05		123
3	10	14	138	34	10		123	65	-01		123
4	07	12	119	35	00		123	66	12		123
5	10	13	117	36	-03		123	67	04		123
6	-10	-16	89	37	-05		123	68	06		123
7	14	26*	113	38	-07		123	69	00		123
8	34*	46*	113	39	-19**		123	70	-06		123
9	14	16	107	40	-12		123	71	12		123
10	04	05	138	41	-01		123	72	-07		123
11	07	10	138	42	23**		123	73	10		123
12	06	08	138	43	12		123	74	-01		123
13	12	21**	138	44	06		123	75	10		97
14	05	08	138	45	07		123	76	10		97
15	08	10	138	46	-03		123	77	12		97
16	03	04	138	47	-17		123	78	-02		97
17	-24**	29**	138	48	-13		123	79	11		97
18	02	02	138	49	-04		123	80	17		97
19	04	04	138	50	-11		123	81	10		97
20	-07		136	51	-04		123	82	12		97
21	00		123	52	-04		123	83	16		97
22	-02		123	53	-13		123	84	-08		97
23	01		123	54	09		123	85	05		97
24	00		123	55	09		123	86	03		97
25	-10		123	56	-14		123	87	03		97
26	09		123	57	00		123	88	03		97
27	07		123	58	-17		123	89	03		97
28	-06		123	59	-05		123	90	02		97
29	01		123	60	00		123	91	-10		97
30	10		123	61	04		123	92	-21**		97
31	13		123	62	-02		123	93	16		97

* $p \leq .05$, 1 tailed test
** $p \leq .05$, 2 tailed test

TABLE XII

CORRELATIONS WITH SALARY INDEX

(decimals omitted)

Score	r	r_c	N	Score	r	r_c	N	Score	r	r_c	N
1	20*	26*	107	32	00		95	63	-09		95
2	25*	35*	107	33	-03		95	64	-17		95
3	27*	37*	107	34	-07		95	65	-01		95
4	16	27*	94	35	11		95	66	05		95
5	15	19*	92	36	-06		95	67	11		95
6	03	05	67	37	-07		95	68	08		95
7	22*	40*	88	38	-09		95	69	03		95
8	09	13	88	39	-12		95	70	-07		95
9	27*	31*	86	40	-04		95	71	06		95
10	13	16	107	41	-08		95	72	-06		95
11	02	03	107	42	-03		95	73	-01		95
12	-03	-03	107	43	04		95	74	00		95
13	00	00	107	44	04		95	75	04		71
14	12	19	107	45	07		95	76	04		71
15	04	05	107	46	04		95	77	10		71
16	00**	00**	107	47	-08		95	78	-04		71
17	-20**	-24**	107	48	-18		95	79	12		71
18	09	11	107	49	-17		95	80	03		71
19	01	01	107	50	-11		95	81	-02		71
20	05		107	51	01		95	82	-06		71
21	07		95	52	-11		95	83	-14		71
22	-05		95	53	-07		95	84	08		71
23	07		95	54	13		95	85	-05		71
24	07		95	55	17		95	86	-13		71
25	-04		95	56	-17		95	87	-14		71
26	09		95	57	-04		95	88	-17		71
27	05		95	58	-15		95	89	11		71
28	09		95	59	-08		95	90	15		71
29	05		95	60	01		95	91	00		71
30	13		95	61	07		95	92	-34**		71
31	08		95	62	-07		95	93	-17		71

* $p \leq .05$, 1 tailed test
** $p \leq .05$, 2 tailed test

TABLE XIII

SIGNIFICANT CORRELATIONS WITH FACTOR I

"Job Effectiveness"

(Decimals Omitted)

Score	Description	r	r_c	N
8	Sup. Judg. Part II	32*	44*	113
92	HWDYKY "Consistency"	-24**		92
39	HWDYKYI "Adventure"	-20**		123
17	GZTS "Thoughtfulness"	-16	-19**	138
6	FACT Judg. and Comp.	-14	-23**	89
3	SRA Total	13	18*	138
7	Sup. Judg. Part I	12	23*	113
2	SRA Q	12	17*	138
1	SRA L	11	15*	138

*$p < .05$, 1 tailed test

**$p < .05$, 2 tailed test

TABLE XIV

SIGNIFICANT CORRELATIONS WITH FACTOR II

"Interpersonal Relations"

(Decimals Omitted)

Score	Description	r	r_c	N
31	HWDYKYI "Production Sup."	25**		123
80	HWDYKY "Cooperativeness"	24**		97
58	HWDYKYI "Musical : Apprec."	-19**		123
42	HWDYKYI "Medical Service"	19**		123
27	HWDYKYI "Sales Complaints"	18**		123

*$p < .05$, 2 tailed test

TABLE XV

SIGNIFICANT CORRELATIONS WITH FACTOR III

"Clarity of Communications"

(Decimals Omitted"

Score	Description	r	r_c	N
66	HWDYKYI "Power Seeking"	19**		123
33	HWDYKYI "Machine Operation"	-19**		123
8	Sup. Judg. Part II	17*	24*	113
5	RBH Vocabulary	14	18*	117
3	SRA Total	12	18*	138
1	SRA L	13	17*	138
2	SRA Q	11	16*	138

*$p < .05$, 1 tailed test

**$p < .05$, 2 tailed test

TABLE XVI

SIGNIFICANT CORRELATIONS WITH FACTOR IV

"Energy and Punctuality"

(Decimals Omitted)

Score	Description	r	r_c	N
71	HWDYKYI "Arbitrative"	19**		123
58	HWDYKYI "Musical : Apprec."	-19**		123
30	HWDYKYI "Labor Management"	19**		123
6	FACT Judg. and Comp.	-19**	-31**	89
53	HWDYKYI "Amusement : Apprec."	-18**		123
19	GZTS "Masculinity"	-18**	-18**	138
13	GZTS "Sociability"	14	25**	138
8	Sup. Judg. Part II	14	20*	113

*$p < .05$, 1 tailed test

**$p < .05$, 2 tailed test

TABLE XVII

SIGNIFICANT CORRELATIONS WITH FACTOR V

"Decision Making Ability Under Pressure"

(Decimals Omitted)

Score	Description	r	r_c	N
8	Sup. Judg. Part II	31*	43*	113
9	Arithmetical Reasoning	22*	26*	107
39	HWDYKYI "Adventure"	-20**		123
25	HWDYKYI "Selling Real Estate"	-19**		123
50	HWDYKYI "Visual Art : Apprec."	-18**		123
17	GZTS Thoughtfulness	-18**	-22**	138
3	SRA Total	15*	21*	138
2	SRA Q	14	20*	138
1	SRA L	12	16*	138
7	Sup. Judg. Part I	10	19*	113

*$p < .05$, 1 tailed test

**$p < .05$, 2 tailed test

TABLE XVIII

SIGNIFICANT CORRELATIONS WITH PERFORMANCE

(Decimals Omitted)

Score	Description	r	r_c	N
9	Arithmetical Reasoning	29*	33*	107
45	HWDYKYI "Basic Chem. Probs."	22**		123
58	HWDYKYI "Musical : Apprec."	-21**		123
42	HWDYKYI "Medical Service"	19**		123
8	Sup. Judg. Part II	19*	27*	113
4	Watson-Glaser Crit. Think.	13	21*	119
7	Sup. Judg. Part I	09	17*	113

*$p < .05$, 1 tailed test

**$p < .05$, 2 tailed test

TABLE XIX

SIGNIFICANT CORRELATIONS WITH PROMOTABILITY

"Decimals Omitted)

Score	Description	r	r_c	N
8	Sup. Judg. Part II	34*	46*	113
17	GZTS "Thoughtfulness"	-24**	-29**	138
42	HWDYKYI "Medical Service"	23**		123
92	HWDYKY "Consistency"	-21**		97
39	HWDYKYI "Adventure"	-19**		123
7	Sup. Judg. Part I	14	26*	113
13	GZTS "Sociability"	12	21**	138
1	SRA L	11	15*	138

*$p < .05$, 1 tailed test

**$p < .05$, 2 tailed test

TABLE XX

SIGNIFICANT CORRELATIONS WITH SALARY INDEX

(Decimals Omitted)

Score	Description	r	r_c	N
92	HWDYKY "Consistency"	-34**		71
9	Arithmetical Reasoning	27*	31*	86
3	SRA Total	27*	37*	107
2	SRA Q	25*	35*	107
7	Sup. Judg. Part I	22*	40*	88
17	GZTS "Thoughtfulness"	-20**	-24**	107
1	SRA L	20*	26*	107
4	Watson-Glaser Crit. Think.	16	27*	94
5	RBH Vocabulary	15	19*	92

*$p < .05$, 1 tailed test

**$p < .05$, 2 tailed test

TABLE XXI

MULTIPLE REGRESSION DATA FOR FACTOR I

"Job Effectiveness"

Score	Description	Coefficient	Error of Coefficient
92	HWDYKY 'Consistency'	-.180	.062
8	Sup. Judg. II	.054	.023

Pure Constant = -1.833

R^2 = .196

R = .443*

Standard Error of Estimate = .915

$_cR^2$ = .185

$_cR$ = .430*

Corrected Standard Error of Estimate = .922

Index of Forecasting Efficiency = 9.7%

N = 74

*$p < .05$

TABLE XXII

MULTIPLE REGRESSION DATA FOR FACTOR II

"Interpersonal Relations"

Score	Description	Coefficient	Error of Coefficient
80	HWDYKY 'Cooperativeness'	.118	.045
3	SRA total score	.023	.011

Pure Constant = -4.114

R^2 = .127

R = .356*

Standard Error of Estimate = .914

$_cR^2$ = .115

$_cR$ = .339*

Corrected Standard Error of Estimate = .920

Index of Forecasting Efficiency = 5.9%

N = 75

*$p < .05$

TABLE XXIII

MULTIPLE REGRESSION DATA FOR FACTOR III

"Clarity of Communications"

Score	Description	Coefficient	Error of Coefficient
1	SRA 'L'	.035	.016
92	HWDYKY 'Consistency'	-.216	.054
82	HWDYKY 'Hypercriticalness'	.113	.036
33	HWDYKYI 'Machine Oper.'	-.135	.052

Pure Constant = -.471

R^2 = .429

R = .655*

Standard Error of Estimate = .646

${}_cR^2$ = .390

${}_cR$ = .624*

Corrected Standard Error of Estimate = .668

Index of Forecasting Efficiency = 21.9%

N = 63

*$p < .05$

TABLE XXIV

MULTIPLE REGRESSION DATA FOR FACTOR IV

"Energy and Punctuality"

Score	Description	Coefficient	Error of Coefficient
30	HWDYKYI 'Labor Mngmnt.'	.187	.079
58	HWDYKYI 'Music Apprec.'	-.155	.049
92	HWDYKY 'Consistency'	-.129	.058
19	G-Z 'M' scale	-.056	.027

Pure Constant = 1.094

R^2 = .285

R = .534*

Standard Error of Estimate = .832

${}_cR^2$ = .254

${}_cR$ = .504*

Corrected Standard Error of Estimate = .850

Index of Forecasting Efficiency = 13.6%

N = 74

*$p < .05$

TABLE XXV

MULTIPLE REGRESSION DATA FOR FACTOR V

"Decision Making Ability Under Pressure"

Score	Description	Coefficient	Error of Coefficient
39	HWDYKYI 'Adventure'	-.148	.066
50	HWDYKYI 'Visual Art Appr.'	-.097	.046
1	SRA total score	.025	.012

Pure Constant = -.065

R^2 = .162

R = .402 *

Standard Error of Estimate = .905

$_cR^2$ = .137

$_cR$ = .370 *

Corrected Standard Error of Estimate = .919

Index of Forecasting Efficiency = 7.1%

N = 69

*$p < .05$

TABLE XXVI

MULTIPLE REGRESSION DATA FOR PERFORMANCE RATING

Score	Description	Coefficient	Error of Coefficient
58	HWDYKYI 'Music Apprec.'	-.166	.054
9	Arithmetical Reasoning	.118	.038
19	G-Z 'M' scale	-.068	.030

Pure Constant = 4.010

R^2 = .185

R = .430*

Standard Error of Estimate = 1.013

${}_cR^2$ = .167

${}_cR$ = .409*

Corrected Standard Error of Estimate = 1.024

Index of Forecasting Efficiency = 8.7%

N = 93

*$p < .05$

TABLE XXVII

MULTIPLE REGRESSION DATA FOR PROMOTABILITY RATING

Score	Description	Coefficient	Error of Coefficient
8	Sup. Judg. II	.088	.022
42	HWDYKYI 'Medical Service'	.317	.071
13	G-Z 'S' scale	.074	.028
92	HWDYKY 'Consistency'	-.148	.062
20	G-Z 'GF' scale	-.088	.029
19	G-Z 'M' scale	-.077	.029
17	G-Z 'T' scale	-.061	.025

Pure Constant = 1.190

R^2 = .434

R = .659*

Standard Error of Estimate = .800

$_cR^2$ = .379

$_cR$ = .616*

Corrected Standard Error of Estimate = .838

Index of Forecasting Efficiency = 21.2%

N = 69

*$p < .05$

TABLE XXVIII

MULTIPLE REGRESSION DATA FOR SALARY INDEX

Score	Description	Coefficient	Error of Coefficient
3	SRA total score	.044	.014
92	HWDYKY 'Consistency'	-.208	.084

Pure Constant = 8.295

R^2 = .266

R = .516*

Standard Error of Estimate = .910

${}_cR^2$ = .251

${}_cR$ = .501*

Corrected Standard Error of Estimate = .919

Index of Forecasting Efficiency = 13.5%

N = 50

*$p < .05$

TABLE XXIX

MEANS AND STANDARD DEVIATIONS FOR

TEST SCORES ONE THROUGH TWENTY

	Sample			General Population	
Score	Mean	S. D.	N	Mean	S.D.
1	35.64	5.67	138	24.71	7.60
2	25.50	4.52	138	18.79	6.44
3	61.16	9.11	138	43.48	13.07
4	79.02	6.68	119	61.80	11.40
5	47.73	9.02	117	45.26	11.45
6	20.93	2.21	89	15.20	3.80
7	83.64	6.15	113	77.34	11.87
8	44.95	4.69	113	40.51	6.77
9	7.79	2.83	107	4.55	3.32
10	19.22	4.56	138	17.00	5.64
11	20.66	3.47	138	16.90	4.94
12	20.74	4.38	138	15.90	5.84
13	24.46	3.89	138	18.20	6.97
14	22.64	3.89	138	16.90	6.15
15	21.78	3.81	138	17.90	4.98
16	16.68	4.28	138	13.80	5.07
17	19.62	4.04	138	18.40	5.11
18	22.82	4.29	138	16.70	5.05
19	20.93	3.70	138	19.90	3.97
20	14.48	4.16	136	n.a.	n.a.

TABLE XXX

SAMPLE MEANS AND STANDARD DEVIATIONS FOR

HOW WELL DO YOU KNOW YOUR INTERESTS : SCORES 21 - 74

Score	Mean	S. D.	N
21	6.91	1.42	123
22	4.62	1.51	123
23	4.56	1.67	123
24	4.69	1.79	123
25	5.63	1.85	123
26	2.50	1.68	123
27	5.03	1.50	123
28	5.17	1.59	123
29	5.77	1.68	123
30	6.98	1.61	123
31	5.10	1.75	123
32	8.64	1.18	123
33	3.76	1.61	123
34	6.02	1.76	123
35	5.95	1.87	123
36	4.39	2.16	123
37	5.01	1.99	123
38	4.40	2.06	123
39	7.16	1.69	123
40	7.36	1.16	123
41	5.00	1.66	123
42	2.91	1.62	123
43	2.20	1.52	123
44	3.65	1.60	123
45	4.67	2.05	123
46	4.13	2.19	123
47	5.81	1.89	123
48	6.45	1.69	123
49	6.35	2.15	123
50	5.80	1.11	123
51	4.42	1.82	123
52	4.94	2.00	123
53	5.22	1.88	123
54	4.78	1.94	123
55	5.41	2.04	123

TABLE XXX

(cont.)

Score	Mean	S. D.	N
56	6.30	1.89	123
57	5.80	1.72	123
58	5.72	1.89	123
59	4.54	2.05	123
60	4.96	2.31	123
61	8.17	1.71	123
62	6.99	1.63	123
63	2.59	1.60	123
64	2.82	1.45	123
65	5.41	1.72	123
66	6.92	2.24	123
67	5.92	1.65	123
68	5.98	1.46	123
69	8.12	1.11	123
70	7.07	1.58	123
71	7.07	1.44	123
72	7.34	1.44	123
73	4.76	1.47	123
74	12.29	3.70	123

TABLE XXXI

SAMPLE MEANS AND STANDARD DEVIATIONS FOR

HOW WELL DO YOU KNOW YOURSELF : SCORES 75 - 93

Score	Mean	S. D.	N
75	9.81	2.46	97
76	18.20	2.61	97
77	20.54	2.86	97
78	22.96	3.31	97
79	22.99	3.02	97
80	23.38	2.44	97
81	17.41	3.80	97
82	11.98	2.69	97
83	4.46	2.21	97
84	18.68	2.67	97
85	20.27	2.97	97
86	7.14	2.82	97
87	17.80	3.43	97
88	14.13	2.76	97
89	9.10	3.04	97
90	20.28	2.92	97
91	18.79	2.91	97
92	3.79	1.87	97
93	25.25	3.36	97

TABLE XXXII

PERCENTILE DISTRIBUTION FOR THE SRA 'L' SCALE

Score	Percentile
15	1
20	1
22	3
23	4
24	4
27	6
28	9
29	12
30	17
31	22
32	29
33	33
34	43
35	48
36	52
37	59
38	67
39	75
40	80
41	82
42	88
43	92
44	97
45	99
47	99

N = 138

TABLE XXXIII

PERCENTILE DISTRIBUTION FOR THE SRA 'Q' SCALE

Score	Percentile
14	1
17	2
18	4
19	9
20	13
21	20
22	25
23	33
24	43
25	49
26	55
27	69
28	75
29	81
30	88
31	93
32	96
33	98
34	99
35	99

N = 138

TABLE XXXIV

PERCENTILE DISTRIBUTION FOR THE SRA 'TOTAL' SCALE

Score	Percentile
35	1
39	1
40	3
42	4
43	5
46	6
47	7
48	8
49	9
50	10
51	14
52	15
53	17
54	24
55	28
56	33
57	36
58	39
59	45
60	46
61	50
62	52
63	58
64	61
65	64
66	69
67	74
68	76
69	80
70	83
71	86
72	88
73	93
74	96
75	96
76	98
78	99
79	99
81	99

N = 138

TABLE XXXV

PERCENTILE DISTRIBUTION FOR THE

WATSON-GLASER CRITICAL THINKING APPRAISAL

Score	Percentile
59	1
65	3
66	4
67	6
68	9
69	10
70	13
71	14
72	17
73	20
74	24
75	29
76	31
77	37
78	44
79	48
80	58
81	62
82	67
83	76
84	79
85	83
86	86
87	90
88	93
89	96
90	97
91	99
94	99

N = 118

TABLE XXXVI

PERCENTILE DISTRIBUTION FOR THE

RBH VOCABULARY TEST

Score	Percentile
26	1
27	2
32	5
33	8
34	10
35	11
36	14
37	16
39	18
40	21
41	24
42	31
43	36
45	40
46	41
47	44
48	52
49	56
50	62
51	66
52	70
53	72
54	75
55	77
56	79
57	83
58	89
59	92
60	94
62	95
63	97
64	97
65	99
67	99

N = 117

TABLE XXXVII

PERCENTILE DISTRIBUTION FOR THE

FACT JUDGMENT AND COMPREHENSION TEST

Score	Percentile
7	1
18	10
19	22
20	34
21	51
22	82
23	96
24	99

N = 89

TABLE XXXVIII

PERCENTILE DISTRIBUTION FOR THE

SUPERVISORY JUDGMENT TEST PART I

Score	Percentile
71	1
72	3
73	4
74	6
75	8
76	12
77	14
78	19
79	25
80	34
81	42
82	47
83	53
84	60
85	66
86	70
87	74
88	77
89	83
90	87
92	88
93	91
94	93
95	96
96	98
98	99
99	99

N = 112

TABLE XXXIX

PERCENTILE DISTRIBUTION FOR THE

SUPERVISORY JUDGMENT TEST PART II

Score	Percentile
33	2
34	3
35	4
36	7
37	9
38	10
39	11
40	15
41	24
42	29
43	35
44	44
45	52
46	59
47	66
48	75
49	81
50	89
51	93
52	97
53	99
54	99

N = 112

TABLE XL

PERCENTILE DISTRIBUTION FOR THE

CARDALL ARITHMETICAL REASONING TEST

Score	Percentile
2	1
3	5
4	12
5	25
6	37
7	47
8	64
9	72
10	77
11	88
12	95
13	98
14	99

N = 107

APPENDIX B

RATING PROCEDURES

RATING PROCEDURES

Your cooperation in this validation study is greatly appreciated. We believe the results will be of mutual benefit by increasing the effectiveness of our personnel assessments.

Since several banks are participating in this study and the results will be analyzed both individually and collectively, it is essential that comparable rating procedures be employed in each institution; that each rater knows precisely what he should be doing; and that any confusion or lack of communication be cleared up before it causes a problem.

The overall research design is as follows. We have test data on each individual to be rated. These data consist of both total test scores and sub-scale scores. The scores will be correlated with several different criteria using both simple correlation (pairing one test score with one criterion) and multiple correlation (pairing several test scores with one criterion). The checklist ratings that you give will be subjected to a fairly high-powered statistical procedure known as factor analysis, which will reduce the twenty-seven items into more general factors containing several items each. These individual factor scores, in addition to the overall score, will be used as criteria. Other criteria include salary increases, number of promotions, tenure, an overall performance rating (global rating) and a rating on promotability.

To obtain these criteria, the following information is necessary for each person. You are asked to give information only on those employees hired before July 1, 1969.

1. Month and year of employment. If an individual worked for the bank previously, left, and then came back, the date given should be for the most recent employment.

2. Salary when employed. Do not include value of fringe benefits.

3. Present salary

4. Number of raises

5. Month and year of last salary increase

6. Normal time interval between raises for persons in his position. (How often do you review employee's salary for possible raise?)

7. Number of times employee has been promoted. This refers only to verticle promotion, not "lateral promotion." If employee has been demoted, count this as "minus one promotions."

8. If terminated, month and year of termination. We also need some clarification of why the employee terminated. The data sheet asks, "Concerning this employee's termination: (Check as many spaces as are applicable)

   1.___Fired, or asked to leave.

   2.___Not fired, but glad he left.

   3.___Took a better job elsewhere.

   4.___Would rehire him.

   5.___Would not rehire him.

   6.___Termination related to poor job performance.

   7.___Termination not related to poor job performance."

9. Checklist ratings - Each data sheet has an item to be rated on a 5 point scale. The rating is made by circling the scale number which is most appropriate. The rating on each scale and for each employee should be a judgment of how frequently the employee exhibits the particular behavior in question.

In order to obtain reliable and valid ratings, it will be beneficial for you to be aware of some potential problems that can arise in the rating process. Past research has indicated that familiarity with these sources of rating bias helps to reduce their detrimental effect and permits more accurate employee evaluation.

a. Halo effect - The "halo effect" occurs when a rater marks an individual similarly on all factors as a result of a favorable overall impression. When the "halo effect" is operating, ratings on the factors are not independent of each other when they actually should be. Of course, the "halo effect" can also operate in a reverse direction; i.e., all ratings may tend to be low because the rater has an overall negative impression of the person being rated. In

order to minimize the possibility of a significant "halo effect" it was decided to ask you to rate all employees on a single factor before moving on to the second factor. As you are rating, please do not look back to previous ratings for the same individual on other factors. Each time you decide on a rating, it should be an independent judgment of the particular individual solely in terms of the particular factor in question.

b. Response set - Some raters have a tendency to rate all persons in the middle of the scale. Other's rate by using only the extreme categories. You should make every attempt to spread your ratings throughout the entire scale.

c. Insufficient information - It may be difficult for you to rate every person, but if you rate an individual on one factor, you should rate him on all factors. Due to the nature of the statistical precedures that will be applied to the ratings, incomplete information on any individual requires that the individual be discarded from the subject pool. If you do not believe that you have enough information to rate a person, try to find someone else who can. Failing that, you should simply draw a line through the person's name. It is quite acceptable, even preferable, for two or more persons to decide jointly on the scale ratings. Research has shown that such "panel judgments" help in counterbalancing individual differences between raters. The only restriction is that all persons participating in the rating should be roughly equivalent in terms of their familiarity with the person being rated.

10. Global performance rating - This procedure is used to obtain a distribution of employees grouped in terms of their overall job performance. The questionnaire asks:

"Considering all factors, where does this employee rank in relation to other workers in terms of his on-the-job performance and competence in his present job (not how well you like him, but how good a job he's doing for the bank)."

poorest 10% next 20% middle 40% next 20% best 10%

To rate the employee, the following steps are carried out. Sort the index cards with the employees' names into three piles:

1. Poorer performers, average performers, and better performers.

2. Correct the distribution so that 30% of the cards are in the poorer category, 40% in the average category, and 30% in the superior category.

3. Now take the cards in the superior category, and sort out the best of these; then take the cards in the poorer category and sort out the poorest of these until your distribution has five piles like this:

poorest 10% next 20% middle 40% next 20% best 10%

As an example, suppose you are sorting 100 employees and after the first sort you have the following:

poorer 20% middle 35% better 45%

You now need to correct this distribution to a 30, 40, 30 split by picking 15 lowest people from the "better" pile and placing them in the middle pile. Then take the 10 lowest cards from the "middle" pile and place them in the poorer pile. You now have a 30, 40, 30 split. Identify the 10 best people in the upper pile and then the 10 lowest people in the lower pile and you have achieved the desired 10, 20, 40, 20, 10 split. When you have finished, place the cards in the appropriate envelope so they won't be mixed up. You do not need to try to rank order the employees within each final classification. All we need is to be able to identify which group the employee is in, not his rank within that group.

11. Global promotability rating - This procedure is used to identify those employees with good potential for development. The questionnaire asks:

"Where does this employee rank in terms of his promotability to jobs of higher responsibility?" (Note that an individual may be doing an excellent job at his present level, but has little potential for greater responsibility. Also, an individual may not be doing particularly well in his present job because it isn't sufficiently challenging, but he might have good potential for higher responsibility.)

poorest 10% next 20% middle 40% next 20% best 10%

The rating is done in exactly the same way as the performance rating and you are provided with a separate set of cards.

Note: Both of the global ratings should be done after you have completed the checklist ratings for everyone, not before. This is requested to avoid a "halo effect."

When deciding upon checklist ratings to be given, you should try to remain as objective as possible in your evaluation. Don't just think back over the last week's performance, but make your rating reflect the employee's performance over the entire length of time he has been working. (The two global ratings are an exception - they should reflect current performance and promotability.)

One final note. Rating is not an easy procedure. If it were, the technique would probably be of little value. Ratings are meaningful only if you give them your full conscientious consideration. The ratings will not affect in any way your employee's status; they are for research purposes only. If, after reading these instructions, you have any question at all concerning procedure or interpretation of items, or if you would like more detailed explanation of the study as a whole, please do not hesitate to call me.

Thanks again for your cooperation.

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James Gordon Overton was born on July 13, 1945 in Charlottesville, Virginia. He later moved to Richmond and attended public schools there with the exception of one year spent at Christchurch School, Christchurch, Virginia. He was graduated from John Marshall High School in June, 1963, and subsequently enrolled at Washington and Lee University, where he was awarded the George Mahan award for creative writing. He transferred to the University of Richmond in 1966 and was graduated with a major in psychology in June, 1968.

In September, 1968, he entered the University of Richmond graduate program to obtain his Master's degree in general-experimental psychology.

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