

Predicting Successful Performance

**Human characteristics important for superior job performance
may be identified by studying successful agents**

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PERSONNEL, like the members of any organization, form the backbone of the Cooperative Extension Service. Within the confines of the broad scope of service set down by Extension policy, employees endowed with a diversity of skills and abilities strive to achieve the organizational objectives. The degree to which they achieve these objectives depends, in part, upon the extent to which their personal characteristics overlap those essential for doing the job.

If Extension is to prosper, it is critical that employees possess the skills and abilities required to meet its objectives. Hiring unqualified personnel results in organizational failure or excessive training programs. The present paper relates how human characteristics important for superior job performance may be identified by studying successful Extension employees. More important, however, the paper describes exploratory efforts conducted in Indiana toward identifying these characteristics in each job applicant and describes how criteria may be established for accepting or rejecting applicants on the basis of their characteristics. Findings resulting from the development of a selection program over the past five years appear in the paper. There is every possibility that these findings can be successfully applied by agents and others interested in upgrading Extension personnel.

As will be noted, data are being collected from present employees in an attempt to identify methods and means for predicting success for someone applying for employment. However, findings to date also have implications for presently employed staff. For one thing, present employees will be interested, as a matter of personal

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curiosity, in these efforts directed toward identifying possible predictors of success. They also will find areas being explored in these studies useful background for counseling and guiding young people who are interested in Extension as a career or who simply need encouragement. This exploratory work also can serve to identify areas that may be profitably examined when considering an applicant for employment.

Because of the successful utilization of psychological tests in industry and education, it was decided to explore the possibility of using tests in selecting county Extension agents in Indiana.¹ In view of limited previous research dealing specifically with agent selection, there were virtually no guide lines that could be followed in identifying tests to be included in exploratory batteries. Consequently, four broad categories of human characteristics were selected (mental ability, interests, personality, and attitudes) and tests were chosen in each of these areas on the basis of their validity for selection in industrial and educational settings.

MENTAL ABILITY

Mental ability was the basis of the first probe in Indiana (conducted on a very limited scale). A number of tests were tried out prior to 1960, using a volunteer group of 35 county agents and 11 assistant county agents. Two of the tests, the Graduate Record Examination and the Adaptability Test (AT), tended to measure the same mental ability. For example, an agent rating high on one tended to rate high on the other. Since the Graduate Record Examination is widely used for appraising the suitability of students applying for admission to graduate school, and since agents are encouraged to undertake advanced study as part of their professional improvement, scores on the AT are somewhat indicative of a person's suitability for graduate study.

Promising results of the first study led to a more extensive investigation in which more measuring instruments were administered to a large number of employees. The objective of this study, conducted in 1961, was to determine the relationship between test scores and performance ratings of 92 county and 82 assistant county agents. The ratings (used as criterion scores) were obtained by the use of the Personnel Comparison System. When using the Personnel Comparison System, a qualified rater (one who knows the rates

¹ Other efforts are underway concerned with this same problem. For example, see Fred P. Frutchie, *The Development of an Aptitude Test for the Selection of County Agricultural Agents* (Washington: Federal Extension Service, U. S. Department of Agriculture, January, 1965), ER&T-7 (1-65).

well) compares each individual ratee with every other ratee on some attribute such as job proficiency.² The comparisons are converted so that each appears on a common scale of measurement, thus resulting in a numerical index for each individual. The index serves as his criterion score. The criterion score is a measure of how well the employee performs his job and is the thing to be predicted from the test scores.

Of the tests tried in 1961, the Adaptability Test (AT)³ was the only one showing promise. The AT was designed to measure mental adaptability or mental alertness. Other things being equal, persons scoring high on mental alertness are, presumably, more apt to succeed on jobs that involve originality and make greater demands on intelligence, while persons scoring low on tests of this type are more likely to succeed on simple manipulative and routine jobs. The significant, positive relationship found between scores on the AT and job proficiency ratings⁴ indicated that the probability of an applicant becoming a successful county agent could be estimated on the basis of his scores on the AT.

A follow-up study was initiated in an attempt to discover if high achievers in school would be rated as successful agents. Grade point averages were obtained from college transcripts and used as an index of school achievement. To some extent it was felt that grade point average might give an indication of motivation, and that one might cautiously infer that a motivated student would make a motivated agent. A statistically significant, positive correlation was found between grade point averages and the Personnel Comparison System previously mentioned.⁵

Since both the AT and grade point average could be used to indicate the likelihood of an applicant becoming a successful agent, a

²C. H. Lawshe, N. C. Kephart, and E. J. McCormick, "The Paired Comparison Technique for Rating Performance of Industrial Employees," *Journal of Applied Psychology*, XXXIII (1949), 69-77.

³J. Tiffin and C. H. Lawshe, *Examination Manual for the Adaptability Test* (Chicago: Science Research Associates, Inc., 1943). The test comes in two forms, each containing 35 items. The forms are equivalent in difficulty, time of administration, and interpretation. The AT can be administered on an individual basis or in groups. It has a time limit of 15 minutes. A standard scoring key, provided in the examiner's manual, makes scoring simple, requiring only a few minutes of time. A testee's score is the number of items answered correctly. Reliability coefficients range up to .90. Norms for 12 groups are presented in the examiner's manual; however each investigator is encouraged to establish norms for his own use.

⁴A phi correlation coefficient of .23 ($p < .05$) indicated a significant, positive relationship between scores on the AT and supervisors' rating of job performance.

⁵Phi coefficients ranging from .37 to .50 showed a relationship between grade point average and supervisors' ratings of job performance. All correlations were statistically significant beyond the .05 level.

method was devised for combining the two scores in a predictive scheme to take advantage of the information provided by each predictor test. For each measure a score was determined so that the number of persons scoring high on the predictor (AT or grade point average) but low on the criterion (job performance rating) was minimized, whereas the number of those scoring high on the job performance rating but low on the AT or grade point average was maximized. The decision rule is to hire only those applicants who achieve test scores above both "cutting" scores thus developed. Hiring applicants who score below the cutting score on both predictor measures (AT and grade point average) is unwarranted in this framework; however slavish adherence to hiring only those applicants scoring above the cutting points is not generally recommended since there often are a number of other relevant factors such as organizational policy, interests, work history, etc., which warrant consideration.

As a result of these studies we can say that when the Adaptability Test and the college grade point average are used together they have reasonable accuracy in predicting which job applicants will eventually become successful agents. On the basis of these results it was decided that further progress in exploring the personnel selection problem might be made by addressing investigations to the area of interests.

INTEREST PATTERNS

Another factor that prompted the decision to explore the area of individual interest was the turnover problem. Fifty-two per cent of those hired between 1945 and 1961 had terminated employment (a total of 170 people). Since the cost of training agents who terminate shortly after hiring is viewed as loss, and as a continuous flow of new personnel usually has a disruptive effect on county programs, the general consensus was that something should and could be done to alleviate the problem.

Extensive research in many fields has demonstrated that individuals in a specific occupation tend to exhibit an interest pattern similar to other members in that occupation. Moreover, there is little overlapping of patterns between occupational groups. Presumably an employee having interests like those of his co-workers will be more satisfied with his job and more motivated to perform it satisfactorily. It would seem that such a person would also be less likely to terminate employment than would an employee not having the concordant interest pattern.

In line with the above reasoning, a study was initiated in 1962 in which the Strong Vocational Interest Blank (SVIB)⁶ was administered to a volunteer group of 67 county agents and 65 assistant county agents.⁷ When compared with agricultural students and "people in general," the agent group showed a unique interest pattern. In all, 19 scales (falling in the areas of general administration, arts, social service, outdoor activities, science, and interest maturity) discriminated the agent group from agricultural students and "people in general."

A follow-up study was designed to determine if certain of the SVIB scales were related to tenure. Criterion groups were formed of short tenure employees (those who had terminated employment within one year of hiring) and long tenure employees (those who had remained for one year or longer). Six scales which could be used for classifying people in terms of long or short tenure emerged:⁸ (1) farmer; (2) public administrator; (3) Y.M.C.A. secretary; (4) city school superintendent; (5) musician; and (6) life insurance salesman. To utilize this finding, scores on each of these six scales would be combined. A total score would indicate whether or not a prospect is like the long tenure group (whether he could be expected to remain with Extension for a number of years).

PERSONALITY AND ATTITUDES

Eighty agents, classified as administrators, participated in a third series of studies started in 1963. Purposes of these studies were to explore the domains of personality and attitudes and to re-examine the usefulness of the Adaptability Test (AT). Two measures were used to investigate personality factors contributing to job performance—the Survey of Interpersonal Values⁹ and the Gordon Per-

⁶E. K. Strong, Jr., *Strong Vocational Interest Blank Manual* (Palo Alto, California: Consulting Psychologists Press, 1959). The SVIB measures interests interpreted in terms of various occupations. Responses are made to 400 items by expressing like, dislike, or indifference. An individual's responses are compared in the scoring process with known responses of persons in 48 occupations and on several special scales. The instrument, administered without a time limit, may be hand scored or sent to a professional scoring service. The latter is preferred when testing on a large scale.

⁷See Charles Alan Gosney, "Vocational Interest Patterns of Indiana County Agricultural Extension Agents" (unpublished Master's thesis, Purdue University, 1963).

⁸A discriminant function analysis was used. This generates a set of weights (one for each predictor variable) that, when applied to the scale scores and combined linearly, separate people into the appropriate criterion classification with minimal error or overlap between criterion groups.

⁹L. V. Gordon, *Survey of Interpersonal Values* (Chicago: Science Research Associates, Inc., 1960).

sonal Profile.¹⁰ The Job Preference Check List and Factors of Importance in a Job¹¹ were included to measure work attitudes.

Agents in each district were rated by the supervisor for that district on over-all job performance, using the Personnel Comparison System. Job performance indices (scores) were analyzed as to their relationship with the predictor tests (those concerning personality factors, attitudes, and the AT) included in the study. Of all the instruments used, the only one correlating significantly with the job performance criterion was the AT.

With the discouraging results from these attempts to find measures of personality and attitude that would correlate with job performance ratings, a second study was initiated in which Strong Vocational Interest Blank (SVIB) scores and scores on the Thurstone Temperament Schedule¹² were compared with the job performance (criterion) ratings mentioned above.¹³ In this study all sub-scales of the Thurstone Temperament Schedule failed to correlate significantly with the criterion. However, there was some indication that the instrument predicted better for younger than for older agents. Because of this tentative finding and some limitations of the agent sample, the Thurstone Temperament Schedule is being further explored.

With the exception of the Aviator Scale, none of the scales of the SVIB correlated significantly with the job performance criterion. As this was the first attempt to relate scales of the SVIB to job performance (previous studies had dealt with tenure), the significant correlation between scores on the Aviator Scale and job performance suggests that the Aviator Scale is a potential predictor which might be added to those presently in use.

Statistical analyses are presently underway which should produce a more accurate and efficient prediction system than the one presently employed. The AT, grade point average, and Aviator Scale of the SVIB are being combined into a prediction equation. If this attempt is successful, it will be possible to arrive at an estimate of each applicant's future job performance on the basis of the combined information of the three predictors.

¹⁰L. V. Gordon, *Gordon Personal Profile* (New York: Harcourt, Brace & World, Inc., 1963 revision).

¹¹The "Job Preference Check List" and "Factors of Importance in a Job" are exploratory paper and pencil inventories being developed by the Indiana Office of Personnel Training.

¹²L. L. Thurstone, *Thurstone Temperament Schedule* (Chicago: Science Research Associates, Inc., 1953).

¹³See Wilbur LeRoy Bluhm, "An Examination of Three Tests for the Selection of County Extension Personnel" (unpublished Master's thesis, Purdue University, 1964).

A study is underway dealing with life history items that might permit the identification of 4-H leaders. Although the life history approach has been around in one form or another for a number of years, there has recently been a revived interest in its potentiality as a predictor in industrial settings. Those aspects of job performance which can not be accounted for by conventional methods (such as personality and attitude inventories) occasionally have been found to be amenable to life history items. It is hoped that the questionnaire (developed for 4-H leaders) can be modified to contribute to the agent selection program by increasing the accuracy of prediction.

More time is being devoted to devising techniques for the selection of women agents, an area that has been largely neglected in the past. Preparations are being made to relate interest scales of the Strong Vocational Interest Blank (SVIB) to tenure for a sample of female county agents. The procedures being used are in most respects similar to those conducted earlier with male agents.

SUMMARY

Work to date has enabled us to provide officials making hiring decisions with information about applicants of known reliability and validity. The information pertains both to job performance and tenure and is secured from two psychological measuring instruments (Adaptability Test and Strong Vocational Interest Blank) and a record of college achievement (grade point average). The job applicant is being assessed in the areas of mental ability and interest. Although our first venture into personality and attitude assessment for predictive purposes led to failure, a new project focusing upon the life history approach is underway. The objective of another project, just starting, is to determine the relationship between interests and tenure in a sample of female agents. The prediction scheme is being revised to include an interest measure in the battery of performance predictors.

Although some inroads have been made on the problem of personnel selection, much remains to be done. Prediction of job performance is still far from perfect. There is always the necessity of periodically checking the effectiveness of the prediction system when working within a dynamic, ever-changing organization. The failures have been more frequent than the successes. At the present level of theoretical sophistication, however, the only solution seems to be the empirical approach of trial and error.