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Predicting Direct Care Staff Tenure: The Development and Use of a Weighted Application Process

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Abstract

The following study examined the ability of a weighted application process to predict tenure of employees working at a behavioral health center. Because the company considered the application process a three month period, the weighted application instrument included information from the application form and data taken from the first three months of employment (personal history information, training data and performance appraisal data). The job applicants employed with the company less than eight months were considered low tenure employees. The job applicants employed with the company longer than eight months were considered high tenure employees. Application instrument weights were created and applied to the holdout groups for the short-tenure and long-tenure employees. Quadrant analysis was performed on the data and it was found that the weighted application instrument resulted in a 20% increase in differentiating between high-tenure and low-tenure employees.

Predicting Direct Care Staff Tenure: The Development and Use of a Weighted Application Process

Job application forms can provide valuable information about prospective employees. An important issue facing employers is deciding what application data is most useful in selecting successful job applicants. Where clear guidelines are not provided, selection decisions focusing on application information may be based on the personnel biases, prejudices and whims of each application reviewer (Gatewood & Fields, 1990). To enhance their usefulness, systematic scoring and statistical analysis can be performed on application data that isolates those specific factors predictive of job success.

A weighted application blank (WAB) is an instrument for scoring application forms and is designed to determine if individual items on an application form distinguish between successful and unsuccessful employees. Lawrence, Salsburg, Dawson and Fasman (1982) describe WABs as offering a systematic method for determining which personal history factors and other variables of job applicants are important for selection and success in specific occupations. Once identified, application items related to employee success are

then weighted to reflect the degree of importance in differentiating good and poor performers (Gatewood & Fields, 1990). By summing the weights in accordance with the predictive power of each item, a total score for all items can be derived (Cascio, 1991). Cutoff or passing scores can then be set to maximize the number of applicants who are predicted to be successful on the job (Gatewood & Fields, 1990).

The WAB is appropriate in any organization having a relatively large number of employees doing similar work and for whom adequate records are available (Cascio, 1991). It is particularly valuable for use with positions requiring long and costly training, with positions where turnover is abnormally high, or in employment situations where large numbers of applicants are seeking only a few open positions (England, 1971).

The WAB has several advantages over traditional personnel selection instruments. Since most applicants expect to fill out an application form for employment, the WAB is less likely to be threatening to applicants. Since there would appear to be no right or wrong answers, application forms may seem innocuous to an applicant (Gatewood & Fields, 1990). If application information is something that will be collected anyway, WAB information is valuable if for no other reason than it is inexpensive to collect (Bellows, 1961).

Additionally, direct costs associated with a WAB are likely to be considerably lower than tests or interviews which require a one-on-one relationship to administer.

Historical Overview of WABs

The utility of WABs was extensively studied during the period between 1950 and 1970. England (1971) lists over one hundred studies on WABs during this period and many of these studies were found to be appropriate for employee selection. Although WABs have been used to predict such diverse performance measures as absenteeism, training program success, rate of salary increase, supervisory ratings and job performance, most studies employed job tenure as the criterion measured. England (1971) reports that job tenure measures appear particularly amenable to prediction with WABs. Schmidt and Hoffman (1973) found that WABs were extremely effective in predicting tenure among job applicants. Scott and Johnson (1967) found WAB use to be an effective technique in selecting long-term unskilled workers. Cascio (1976) found WABs to successfully predict the tenure of female clerical personnel. Dunnette, Kirchner, Erickson and Banas (1960) developed a WAB which successfully predicted the turnover of female office workers and key-punch operators. Lawrence et al., (1982) reported a reduction in six-month turnover

in one organization, from eighty percent to twenty-six percent due to the use of a WAB.

The ability of the WABs to predict early turnover among job applicants has been demonstrated across a variety of employee populations. Mosel and Wade (1951) used biographical data to reduce turnover among department store clerks. Kriedt and Gadel (1953) used the WABs to predict early turnover among clerical employees. Dunnette and Maitzold (1955) and Kirchner and Dunnette (1957) reported successful prediction of early turnover among seasonal workers in a cannery and with female office employees. Fleishman and Berniger (1961) reported successful identification of early turnover among clerical employees in a university setting. Fleishman and Berniger (1960) also demonstrated that the WAB can be used to successfully predict tenure among nursing aids. WABs have also been utilized successfully in jobs such as telephone operator (Friedman & McCormick, 1952), production supervisor (Lockwood & Parsons, 1960), research scientist (Albright, Smith, Glennon & Owens, 1961), and police officer (Malouff & Schutte, 1986).

Cross Validation

Procedures used to assign weights to items in the WAB are simple and straightforward, but once weights have been developed, it is absolutely essential

that they be cross-validated (Owens, 1976). Cross-validation is important since it helps to ensure the weights were not assigned haphazardly. Roach (1971) reports that WABs are usually cross-validated either by a holdout sample or by selecting another sample of employees hired during a different time period. Unless cross-validation occurs, unreliable results can be obtained when the usefulness of a test is evaluated for the same groups on whom the test was developed (Cureton, 1950). The predictive validity of the WAB may decrease over time due to such factors as changes in the company policies or labor market conditions. Dunnette et al., (1960) and Wernimont (1962) found that the ability of a WAB to predict clerical employees job tenure fell quite drastically over a five-year period. Buel (1964) and Roach (1971) recommended that once the WAB is developed and implemented, its usefulness in prediction should be reevaluated through cross-validation on new employees hired in subsequent years. Gatewood and Fields (1990) recommended reevaluation should occur every two to three years.

Equal Employment and WABs

The use of a WAB reinforces the goals of the equal employment laws and WABs are subject to uniform guidelines. Where a professionally developed objective measure replaces traditional selection devices with possible substantial

subjective interviewer bias, the employer takes a large stride towards eliminating artificial barriers to employment of minorities and females (Lawrence et al., 1982). However, a purely statistical relationship of application blank items with job success may not be a legally satisfactory explanation for using weights of non-job related items in a discriminatory manner (Pace & Schoenfeldt, 1977). Pace and Schoenfeldt (1977) report WAB procedures that weight items concerning sex, race, religion, national origin, or items that correlate with sex, race, religion, or national origin are potentially illegal if a protected group is adversely affected in employment. It is recommended that job analysis be incorporated into the development of the WAB to safeguard against possible illegalities. This step will help ensure all decisions made are job-related, which is what the courts use as a legal standard.

Basic WAB Procedures

Appropriate procedures must be followed in the development and use of WABs. According to the procedures described by England (1971), the steps typically involved in the development and application of WABs are:

1. The first step in the process is choosing a measure (criterion) of employee success. Typical measures include job tenure, absenteeism,

training program success, rate of salary increase, supervisory ratings or job performance.

2. After the criterion has been chosen, two criterion groupings of employees must be formed. A number of employees are assigned to each group, one representing a high criterion group (successful or desirable employees) and one representing a low criterion group (unsuccessful or undesirable employees). The company makes the determination which employees are considered successful or unsuccessful. For example, if tenure was the criterion, the company may determine that an employee would have to stay with the company six months or longer to recoup the training costs of each employee. Therefore, the company may consider employees successful if they stayed with the company six months or longer and unsuccessful if they stayed with the company less than six months.

   Next, the two criterion groups are split into "weighting" and "holdout groups." For example, if the criterion was tenure, there would be a weighted and holdout group for long-tenure and a weighted and holdout group for short-tenure. Weighting groups serve as a basis for developing weights for application form items that differentiate between short and

long-tenure employees. Holdout groups are used to determine if the weights derived will hold up when applied to a sample of employees not included in the original development of weights.

3. The third step is to select the items that will be assessed. The traditional WAB only includes items from the actual application form. This study, however, incorporated items from the application form and data taken from the first three months of employment (personal history information, training data and probationary performance appraisal data). This additional information incorporated in the WAB was relevant to the study because the company considered the application process a three-month period. An employee at this company was not considered a permanent employee until after his/her three month probationary period ended. England (1971) recommends that as many items as possible be used in the initial analysis since many may not differentiate among successful and unsuccessful employee groups.

4. The fourth step is to create item response categories. In order to test for any possible item response-criterion relationship, response categories must be created for each of the WAB items. These categories serve as a method for scoring applicants responses to the application blank items.

5. The fifth step is to determine item weights. The greater the response difference between the successful and unsuccessful groups, the more important an item is in predicting the criterion. The first step in developing weights is to determine separately for each category the percent of each criterion group that falls into each response category. For example, if the predictor was education and the criterion groups were "quits" and "remains on the job," the following results may be obtained:

Predictor 1	Criterion Group			
Education	Quit	Remained	Difference	Weight
High School	40%	10%	30%	30
Associates	30%	50%	-20%	-20
Bachelors	20%	20%	0%	0
Graduate	10%	20%	-10%	-10
	100%	100%		

The percent differences are then calculated for each response category of each predictor. For the above data, percent differences are 40% - 10% or 30% for the "high school" category, -20% for "associates," 0% for "bachelors," and -10% for "graduate." The percent differences are then converted into weights. Thus, the 30% difference would be given a weight of +30 and the -10 difference a weight of -10. By determining

which category the subject fit in (e.g. she is a high school graduate) and assigning the weight determined for that predictor category (e.g. +30 in the previous example) a total score can be obtained for each subject by summing the assigned weights for each predictor. A variety of weighting schemes is possible, but available evidence shows little difference in predictive validity efficiency as the result of different weighting procedures; the weights need only be roughly proportional to the difference in percents (Weiss, 1983).

6. The sixth step is to apply the weights to the holdout group. The holdout groups were held out from the initial development of the WAB scoring weights. The holdout groups serve as a basis for cross-validating the scoring system. Individuals in both holdout groups are scored on the responses to items that were found to discriminate between the criterion. All individuals in the holdout groups receive total WAB scores.

7. The seventh step is to evaluate how well the scoring system distinguishes between the criteria. The total WAB scores and criterion measures are plotted on a graph. For example, if tenure was the criterion, then tenure and employees WAB scores are plotted on a graph. If the WAB was successful, high-tenure employees would have higher WAB scores than

low-tenure employees. Therefore, the high-tenure group scores should be skewed toward high WAB scores and conversely for the low tenure group scores.

8. The last step is to set cutoff scores to be used in selection decisions. The cutoff WAB score represents the point above which an applicant is selected for further evaluation and below which an applicant is not. The cutoff score should optimally classify the holdout group members in the correct (i.e. appropriate hire or appropriate rejection) group. By examining the plot that was completed in step seven, a line can be drawn which sets the ideal cutoff score to reject the maximum number of unsuccessful candidates and accept the maximum number of successful candidates.

It was the purpose of this study to construct a meaningful WAB that would enable prediction of tenure for direct care staff applicants at a small Southeastern behavioral health center. Historically, previous studies on the WAB have incorporated only those items on the application form. This study, however, assessed items from the application form and data taken from the first three months of probationary employment (personal history information, training data and performance appraisal data). This additional information

included in the WAB was relevant to the study because the company considered the application process a three-month period. An employee at this company was not considered a permanent employee until after his/her three-month probationary period. The procedures used in the development and application of the WAB followed the steps outlined by England (1971).

The areas under investigation were:

1. A determination concerning which questions in the company's employee selection instruments were important in predicting tenure.
2. A determination concerning the importance of initial probationary performance ratings scores on tenure.
3. Recommendations concerning how to revise current employee selection instruments that would enable the successful prediction of short and long-term tenure employees.

Method

The company under investigation was a licensed behavioral health center located in the Southeastern part of the United States. The company was responsible for providing services to individuals with disabilities. It served a four county area and had approximately two hundred and fifty employees. The company provided many different services including residential, case

management, day programming, personal care and information hotline services. The company had been in operation for approximately eighteen years.

The type of job being evaluated was that of direct care staff. Those employees worked directly with the individuals with disabilities. The direct care staff worked in the residential program division of the agency, which consisted of seven group homes (providing twenty-four hour care) and approximately fifty-five natural and foster care families living in the community (providing less than twenty-four hour care).

There were approximately one hundred and twenty direct care staff working in the residential program. The direct care staff provided habilitative services to the clients. The direct care staff were responsible for following written educational programs, procedures and schedules which meet each client's identified need of service. The direct care staff provided training to the clients in all areas of independent living which may have included personal hygiene skills, housekeeping skills, social skills development, cognitive training, job skills and behavior management needs.

The company's current preemployment selection instruments consisted of an application, interview and an interview information sheet. The personnel director was responsible for hiring direct care staff on a monthly basis. If the

applicants successfully completed the application and interview, they were then invited to begin training for the position.

The typical direct care staff was found to be approximately twenty years of age, a college student and was often beginning her/his first job. The direct care staff began employment at minimum wage and if after three months of employment received a satisfactory evaluation, she/he received a five percent increase in pay.

The initial training direct care staff received before employment was a required two-week course. The first week of training lasted approximately thirty hours. The curriculum covered areas such as residential specific training, sensitivity training, communication training, habilitative training, OSHA training, behavior support training, medical and first aid/CPR training. The second week consisted of on-the-job training. Work schedules were made out for each direct care staff and their on-the-job training was specific to their assigned schedule.

Procedure

The criterion measured by the WAB was job tenure. The job applicants who stayed with the company for less than eight months were considered short-tenure employees. The job applicants who stayed with the company eight

months or longer were considered long-tenure employees. The employees under study were hired between 1/1/95 and 6/30/96. There were 70 short-tenure and 63 long-tenure employees identified. Weighted and holdout groups were formed for the short-tenure and long-tenure employees. The ratio of employees in each group was two employees in the weighted group for every one employee in the holdout group. The weighted group for long-tenure consisted of 42 employees. The weighted group for short-tenure consisted of 48 employees. The hold-out group for long-tenure consisted of 21 employees. The holdout group for short-tenure consisted of 22 employees.

A large number of questions on the application form were not selected to be included in the WAB. This was because many of those questions were open-ended and item response categories could not be developed. Additional questions that were selected and included in the WAB came from personal history data, training data and probationary performance appraisal data. The final selected items from these areas are presented below:

Application Form

		Circle highest level
Education:	High School	1
	Associate	2
	Bachelors	3
	Graduate	4

Experience:	Number of years of related experience (i.e. health care, child care, etc.)	Experience
		Less than one year _____
		1 - 2 years _____
		2 - 3 years _____
		More than 3 years _____

Employee Face Sheet

Date of Hire: _____

Employee Interview Form	Circle one
Did applicant have a car?	Yes / No
Did applicant have automobile insurance?	Yes / No
Is applicant willing to transport clients?	Yes / No
Is applicant willing to work weekends?	Yes / No
How many hours per week does applicant want to work?	Less than 10 ____ 10 - 20 hrs ____ 20 - 30 hrs ____ 30 - 40 hrs ____
Preference of shifts: (Rank shifts as #1 being first preference and #3 being last preference.)	7 - 3 _____ 3 - 11 _____ 11 - 7 _____
Did applicant have experience working with handicapped individuals?	Yes / No
Is applicant presently attending college?	Yes / No
Did applicant have supervisory experience?	Yes / No

Probationary Performance Evaluation

I)	Work Habits	Avg. Score _____
II)	Program Implementation	Avg. Score _____
III)	Client/Staff Interaction	Avg. Score _____
		Total Score _____

Form I - 9

Gender: _____

Age: _____

Address:

Miles
Less than 5 _____
6 - 10 _____
More than 10 _____

Married: _____

Other

* Date of Leaving _____

Reason for Leaving _____

Results

Quadrant analysis was performed on the data and it was found that the WAB resulted in a 20% increase in successfully differentiating between high-tenure and low-tenure employees. In examination of table two, quadrant two (which represents the region of appropriate hire) and quadrant four (which represents the region of appropriate rejection) contained 29 out of 43 WAB scores or 67% correct decisions. In contrast, quadrant one and quadrant two (which represents the region of appropriate hire without the WAB) contained 20 out of 43 scores or 47% correct decisions. By subtracting the percent of correct decisions obtained without the WAB (47%) from the percent of correct

decisions obtained with the WAB (67%), a 20% increase is obtained with the use of the WAB.

Presented below are three tables representing: Corresponding weights for each predictor, plotted holdout sample WAB scores and derived cutoff scores.

Table one: Corresponding weights for each predictor

Predictor		Criterion Group			
		Successful	Unsuccessful	Difference	Weight
Education	High School	77%	80%	3%	-3
	Associate	8%	4%	4%	+4
	Bachelor's	15%	16%	1%	-1
	Graduate	0	0	0	0
Predictor		Criterion Group			
		Successful	Unsuccessful	Difference	Weight
Experience (related)	Less than 1 year	81%	78%	3	+3
	1 - 2 years	15%	22%	7	-7
	2 - 3 years	4%	0	4	+4
	More than 3 years	0	0	0	0
Predictor		Criterion Group			
Car	Yes	88%	88%	0	0
	No	12%	12%	0	0
Predictor		Criterion Group			
Auto Insurance	Yes	85%	86%	1	-1
	No	15%	14%	1	+1

Predictor		Criterion Group			
Transport Clients	Yes	96%	90%	6	+6
	No	4%	10%	6	-6
Predictor		Criterion Group			
Work Weekends	Yes	98%	94%	4	+4
	No	2%	6%	4	-4
Predictor		Criterion Group			
Hours Per Week	Less than 10	0	0	0	0
	10 - 20	2%	4%	2	-2
	20 - 30	21%	26%	5	-5
	30 - 40	77%	70%	7	+7
Predictor		Criterion Group			
Preference of Shifts		Successful	Unsuccessful	Difference	Weight
	123	31%	44%	13	-13
	132	4%	10%	6	-6
	213	33%	8%	25	+25
	231	10%	14%	4	-4
	312	21%	20%	1	+1
	321	0	4%	4	-4
Predictor		Criterion Group			
Experienced with Handicapped	Yes	67%	40%	27	+27
	No	33%	60%	27	-27
Predictor		Criterion Group			
Attending College	Yes	58%	52%	6	+6
	No	42%	48%	6	-6
Predictor		Criterion Group			
Supervisory Experience	Yes	50%	38%	12	+12
	No	48%	62%	14	-14

Predictor		Criterion Group			
Probationary Performance Evaluation (Work Habits)	Below 3.0	4%	48%	44	-44
	3.0 - 3.3	50%	42%	8	+8
	3.4 - 3.7	29%	9%	20	+20
	3.8 & Above	17%	0%	17	+17
Predictor		Criterion Group			
Probationary Performance Evaluation (Program Implementation)	Below 3.0	8%	24%	16	-16
	3.0 - 3.3	60%	71%	11	-11
	3.4 - 3.7	10%	5%	5	+5
	3.8 & Above	21%	0%	21	+21
Predictor		Criterion Group			
Probationary Performance Evaluation (Client/Staff Interaction)		Successful	Unsuccessful	Difference	Weight
	Below 3.0	2%	19%	17	-17
	3.0 - 3.3	48%	52%	4	-4
	3.4 - 3.7	29%	14%	15	+15
	3.8 & Above	23%	14%	9	+9
Predictor		Criterion Group			
Probationary Performance Evaluation (Total)	Below 3.0	2%	43%	41	-41
	3.0 - 3.3	54%	43%	11	+11
	3.4 - 3.7	25%	14%	11	+11
	3.8 & Above	21%	0%	21	+21
Predictor		Criterion Group			
Gender	Male	52%	38%	14	+14
	Female	48%	62%	14	-14
Predictor		Criterion Group			
Age	18 - 20	17%	16%	1	+1
	21 - 23	50%	42%	8	+8
	24 - 26	19%	26%	7	-7
	27 & Older	14%	16%	2	-2

Predictor		Criterion Group			
Address	Less than 5 miles	73%	40%	33	+33
	6 - 10	19%	26%	7	-7
	More than 10 miles	8%	34%	26	-26
Predictor		Criterion Group			
Married	Yes	17%	8%	9	+9
	No	83%	92%	9	-9

Table two: Plotted holdout group WAB Scores

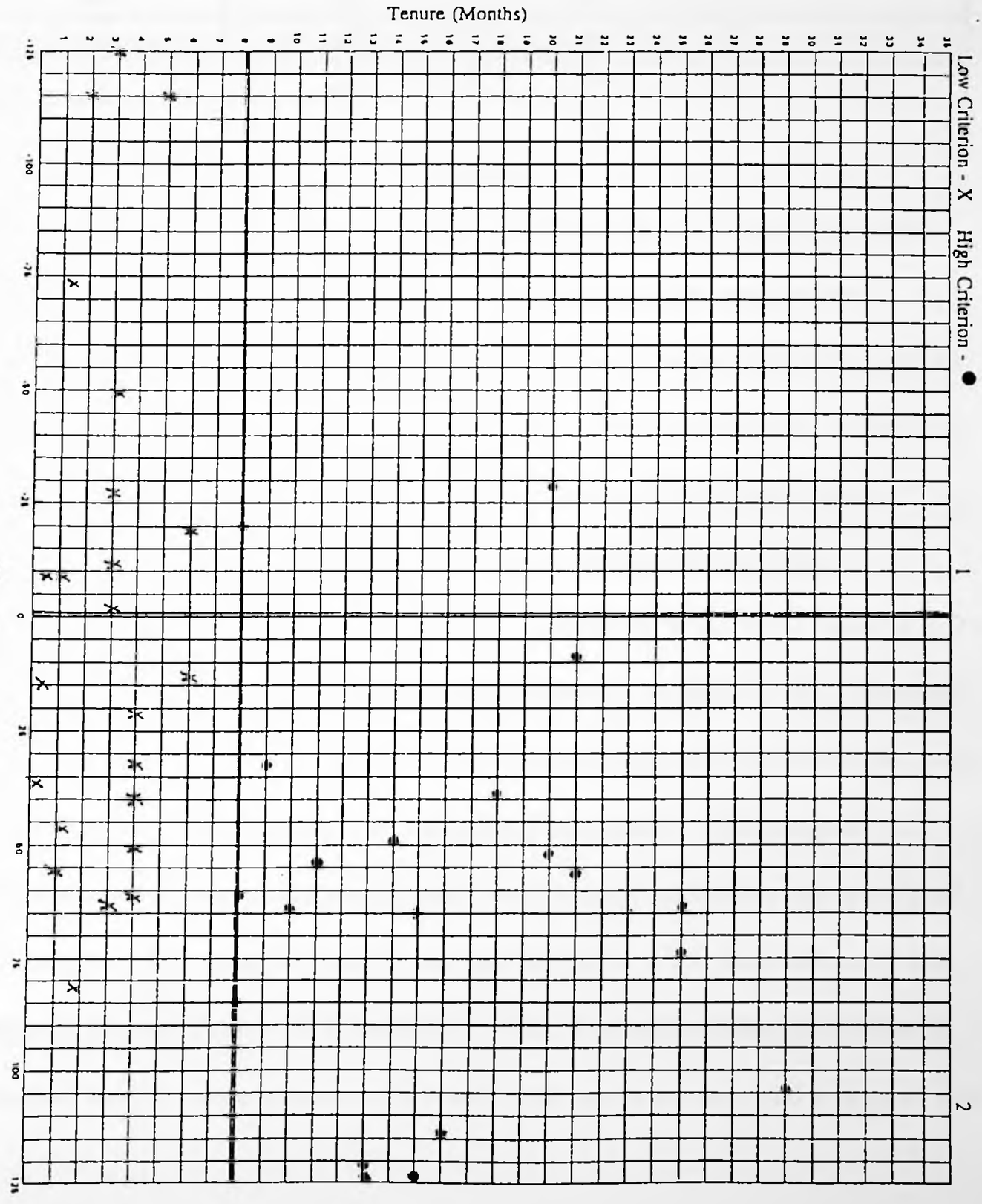

Table three: Cutoff scores

Cutoff Score	Hired	High Tenure	Low Tenure
65	9	8	1
64	12	10	2
52	18	14	4
49	20	15	5

Discussion

As indicated by table one, the single largest predictor of employee tenure was the employee's rating in work habits on the probationary performance evaluation. Employees who scored below a 3.0 in work habits received a weight of -44. Work habits involved the employee's attendance, punctuality, cooperation with others, initiative and ability to follow procedures. The second largest predictor of employee tenure was the employee's rating in his/her total probationary performance evaluation scores. Employees who scored below a 3.0 in total probationary performance rating scores received a weight of -41. The total probationary performance rating scores incorporated the combined scores on work habits, program implementation and client/staff interaction. The program implementation scores on the probationary performance evaluation also produced large weights. For example, employees scoring below a 3.0 received a -16 and employees scoring above a 3.8 received a +21. The probationary performance evaluation weights were indicative of whether an employee received a high or low

total WAB score. Because the probationary performance evaluation scores received the largest weights, they appear to be the most important in comparison to the other items measured and may serve as the best indicator of whether an employee will have high or low tenure.

The predictor regarding address was found to be an important factor in the WAB. Employees living less than five miles from work received a weight of +33 whereas employees living more than 10 miles from work received a weight of -26. This result was surprising since the predictor "Having a car" resulted in no difference between high-tenure and low-tenure employees. However, having a car or not, employees living less than 5 miles were likely to have more transportation options (walking, bike) than an employee living 10 or more miles from work.

Not surprisingly, the predictor "Experience with handicapped individuals" had a large weight. Employees who had some experience with the handicapped population received a weight of +27 as opposed to employees with no experience who received a weight of -27. Because working with handicapped individuals can be extremely demanding and stressful, the employees with some experience had an idea of what they would encounter at work. Thus, tenure was positively affected by this predictor.

Another noteworthy predictor was the employee's preference of shifts. Those employees preferring to work 3:00 p.m. - 11:00 p.m. as their first preference, 7:00 a.m. - 3:00 p.m. as their second preference, and 11:00 p.m. - 7:00 a.m. as their third preference, received a weight of +25. This result was probably due to the fact that entry level employees were usually assigned hours between 3:00 p.m. and 11:00 p.m. Thus, the employee's first preference was fulfilled.

A moderate predictor of job tenure was how many hours the employee requested to work per week. The employee requesting to work full-time (30-40 hours) received a weight of +7. Employees requesting to work less than full-time (10-20 or 20-30) received negative weights. It is possible that those employees needing the pay of a full-time job are more committed to performing at a higher level to keep their job.

Employee attending college was found to be a moderate predictor. Those employees attending college received a weight of +6 and employees not attending college received a -6. There was some indication a large portion of the college students were majoring in a human services field which may have affected their commitment to staying longer with the company in order to gain the human services experience.

Supervisory experience was a moderate predictor that indicated a +12 for having supervisory experience and a -12 for not having supervisory experience. Employees with supervisory experience may have been more disciplined to following policies and procedures more consistently which enabled them to be more successful in the position.

The predictor of gender produced moderate weights. Males received a weight of +14 and females received a weight of -14. This factor was one of the more interesting findings, and also the most difficult from which to infer a reasonable explanation. Some potential conclusions may be derived from the results of this item, however. Among them are: societal views of gender based careers, and young men being seemingly more accepting of the physical demands of working with potentially aggressive clients.

Conclusion

The addition of the WAB into the company's current selection instruments would likely result in the reduction of turnover for direct care staff. Because training costs can be extremely high, it would also be a money saving strategy for the company.

The recommended cutoff score for the WAB depends on the number of employees needed at the time of hire. For example, the company may set a higher

cutoff score if fewer employees are needed. The present study indicated if the cutoff score were 65, 89% of the employees scoring a 65 or above would be successful. In the present study, 9 employees scored a 65 or above. However, if a larger number of employees were needed, a lower cutoff score might be used. For example, if the cutoff score in the present study were 49, 75% of those scoring a 49 or above would be successful. In the present study, 20 employees scored a 49 or above.

It is recommended that the company eliminate the application questions that were not found to differentiate between successful and unsuccessful employees. In review of the company's preemployment application questions, the majority of those questions were not included in the WAB. This was because a large number of those questions were open-ended questions and item-response categories could not be developed. It is unlikely these questions could be systematically evaluated and should be eliminated or revised so that item-response categories could be formed. Additionally, two questions (car, car insurance) on the WAB should be eliminated because these items revealed little or no information. It is recommended that the company continue looking at application information and probationary performance ratings as part of the application process to predict employee tenure.

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