# Article

"Rational/Statistical Method of Test Validation"

Craig C. Pinder

# Rational/Statistical Method of Test Validation

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*This study demonstrates the application of a test validation procedure similar to that described by Mobley and Ramsay (1973) but which avoids the use of factor analysis in isolating dimensions upon which subsequent job subgrouping is based. Instead, a semi-judgmental, semi-statistical method was employed. Actual test validation data are reported which, although missing in Mobley and Ramsay's (1973) article, attest to the utility of a job grouping approach to the validation problem.*

Since the time when industrial and personnel psychologists first came to accept Hull's (1928) gloomy prediction that the classical model of personnel test validation would enjoy limited success, theorists and practitioners have explored alternative and more elaborate approaches in their attempt to make tests more valid and useful to the personnel practitioner. Among the more popular of the "new" approaches is that first popularized by Ghiselli (1956) and later incorporated by Dunnette (1966) in his modified model of personnel selection and placement - the application of "moderator" variables to the problem. A moderator variable can be defined as one which, when introduced to a relationship between a predictor and a criterion, has the effect of altering the overall relationship between the two variates of interest. For example, if an aptitude test was found to be predictive of a performance criterion for men, but not for women, sex would be described as "moderating" the relationship between the test and the criterion.

The rationale for the need for moderated selection strategies has been articulated by Dunnette (1966). It is highly unrealistic to expect a common test (or battery of tests) to be predictive of job success for a heterogeneous population of employees working at a heterogeneous set of jobs in any given organization. Validity is nearly impossible to demonstrate in the midst of such complexity and heterogeneity. The solution offered with the use of moderator variables is to reduce some of this heterogeneity through the

subgrouping of people, jobs, (or both), and the subsequent validation of predictors within each of the relatively more homogeneous subpopulation identified.

In recent years the moderated selection approach has enjoyed a mixed status in the field (Abrahams & Alf, 1972a, 1972b; Dunnette, 1972; Ghiselli, 1972; McNemar, 1969; Pinder, 1973; Zedeck, 1971), but there seems to be enough potential payoff left in this strategy to warrant further investigation.

## THE BASES FOR SUBGROUPING

As described by Dunnette (1966), the subgrouping to reduce heterogeneity can be conducted on predictors, applicants, job behaviors, or situations (p.112). Optimally, we would subgroup a universe of job applicants on the basis of *all* of these variables such that each selection strategy finally developed would be used for a highly specified subpopulation only. In applying this approach however, practical constraints such as finite budgets and small populations have limited the extremity of the subgrouping. In most organizations practitioners have been limited to subgrouping either on the basis of jobs, or types of applicant.

Much of the theoretical and applied research attempting moderated strategies has seen the subgrouping of *applicants* usually on the basis of race, sex, or age. (In light of U.S.government regulations pertaining to the problem of unfair discrimination in employment, the choice of applicants over job types is not unreasonable.) Bartlett and O'Leary (1969) have illustrated the problems which can be overcome through this approach.

Relatively less attention has been paid recently to the alternative of subgrouping *jobs* for the sake of differential prediction, although the idea is neither new or necessarily complex. Years ago, Thomas (1952) demonstrated the application of inverse factor analysis to a population of office jobs for various personnel management operations. More recently, Landy (1972) has reminded us of this possibility.

Job subgrouping need not be a statistically complex problem, although it seems that in order to form subgroups of jobs which are truly internally homogeneous, more than one or two job dimensions must be considered in the sorting process. It would seem that the necessity for a multivariate analysis of jobs for subgrouping has been the major problem with purely rational methods based on the inspection of job descriptions (or simply job titles). Therefore, multivariate statistical procedures become more attrac-

tive as alternatives. However, most small or midsized organizations lack the statistical competence to approach the problem in such a sophisticated fashion. Therefore, they may resort to the hiring of outside consultants or the complete abandonment of the idea altogether. (The first outcome is expensive; the second, both unfortunate and also potentially costly.)

The research reported here illustrates a compromise between the simplistic approaches using purely rational inspection and classification of jobs on the one hand, and certain statistically sophisticated approaches which employ modern multivariate methods. In many ways, our research parallels that reported recently by Mobley and Ramsay (1973).

In two chemical plants, Mobley and Ramsay (1973) gathered job analysis data on a number of a priori dimensions and then factor-analyzed the data to derive four independent factors. Factor scores were then computed for each job, and the profiles thus formed were submitted to an hierarchical subgrouping program developed by Ward and Hook (1963) and reproduced in FORTRAN in Veldman (1967). They demonstrated the validity of their approach by reporting the job titles eventually sorted into each "job cluster". They proceeded to argue that their approach would assist in the validation of tests through the process of validity generalization, although no data were provided to substantiate their claim.

The research described here takes a similar approach in a clerical sample. However, two major differences between our study and that of Mobley and Ramsay (1973) will be of interest to the practitioner. First, we avoided the use of factor analysis and all of the vagaries associated with this technique (Francis, 1972; 1973) and second, we actually gathered and report herein test validation data.

**METHOD**

This research was conducted using the clerical staff of the home office of a large life insurance company situated in the American Midwest. The total sample consisted of 284 employees (mainly female) occupying 227 different jobs. The company's objective was to update their clerical selection program so as to derive the benefits of testing while meeting the requirements of the EEOC.

**Job Subgrouping**

The decision was made to try to reduce heterogeneity through grouping

jobs, rather than employees, in this "concurrent" validation study (Dunnette, 1966, 14-15). Several considerations entered the decision. First, due to the relatively small population size (both in terms of number of jobs and number of employees) the complete subgrouping of both employees and jobs (in which homogenous subgroups of employees would be formed within each of a number of relatively homogeneous job families) was not possible. It was possible to subgroup on the basis of only one variable -employees *or* jobs - not both. Second, a careful subgrouping of applicants based on demographic data (as might be gathered through a weighted application blank) was not possible since many such background items are no longer legally collectable.[1] Further, a reliable subgrouping of personnel based on psychometric measures would require on-going consultation by a clinical psychologist, whereas the grouping of jobs was deemed more within the capabilities of the regular personnel department staff. Finally, research by the present author (Pinder, 1973) has cast some doubt on the merits of one variety of the people-grouping approach, and its alternative still seemed to be worth exploring.

**Job Profiles**

For each clerical job in the Home Office, a "profile" of necessary worker skills was developed. Two members of the Personnel Department who had done considerable job analysis work and who were familiar with most of the clerical jobs provided the profiles for approximately 70% of the 227 jobs. The remainder were gathered through interviews with supervisors and/or job incumbents themselves. Frequent use was made of job descriptions.

The task was to spread 100 points, representing the total skill requirement placed on the worker by the job, across 7 aptitude dimensions for each job.

The 7 factors were identified and defined on the basis of discussion by the author with various department managers and personnel specialists in the company, as well as a careful examination of samples of clerical job

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[1] In Canada, legislation exists that makes discrimination on the basis of various demographic characteristics illegal. As of March 1, 1978, the Canadian Human Rights Act makes discrimination for employment illegal if it can be shown by an individual that considerations of race, national origin, sex, age, colour, religion, marital status, physical handicap or conviction with pardon entered into an employment rejection in his regard. Many provinces also have legal codes against such discrimination.

descriptions. It was felt that the 7 major worker requirement factors, either alone or in combinations, could be used to describe the demands placed upon job incumbents by any of the company's clerical jobs. The factors used are defined in Table 1.

TABLE 1

### Definitions of the Seven Worker Aptitude
### Dimensions Used in Job Profile Formation

1.  *Verbal:* The ability to speak, listen, read and write clearly and effectively. This involves the need for a strong vocabulary and command of English phrases and idioms, as well as business or professional terminology.

2.  *Numerical/Computational:* The ability to make quantitative interpretations and manipulations, using arithmetic, algebra, or more advanced forms of mathematics.

3.  *Clerical:* The ability to check, code, file, sort and arrange materials according to some pre-arranged system.

4.  *Social:* The ability to communicate with people inside and outside of the Company in a personable and business-like manner. This included such things as telephone conversations with customers, agents and the general public, as well as personal meetings with individuals from these sectors.

5.  *Supervisory:* The ability to lead and direct the work of others. This included providing on-the-job training and advice as well as making sure that the daily work load of other employees is successfully completed.

6.  *Machine Skills:* The ability to use office machinery such as calculators, adding machines, switchboards, etc., with speed and accuracy. Does not include typing or keypunch skills.

7.  *Typing/Keypunch:* The skill involved in transcribing activities.

All 100 points and as few as one or as many as all 7 of the factors were used in describing each job. The number of points assigned to a factor in any job reflected the relative importance of that factor to successful job performance as compared to the other 6 factors. Therefore, the job profiles were "ipsative" rather than normative (Guion, 1965). In other words, the correct frame of reference for determining the number of points to be given to a factor was the number of points given to other factors in the same job, *not* the number of points given to the same factor in other jobs where the skill in questions was comparable in degree. This distinction is critical to understanding our approach.[2]

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2   For example, Job A might be characterized by a simple profile with 50 points assigned to the verbal factor, 25 points to supervision, and 25 points assigned to the social dimension. This implies that for this particular job, the verbal factor is seen as twice as important as either of these other two factors. However, one could not conclude that the *absolute level* of importance of the verbal factor in Job A is equal to that for another job where the verbal factor also

After profiles had been thus generated for each job, they were presented to department managers for approval or modification. Where major changes were suggested, the author interviewed the supervisor or job incumbent to be sure that the revised profile was accurate and that the exercise was not being misunderstood. Approximately 20% of the profiles were changed. A common source of difficulty and cause for profile modification was a confusion between the verbal and social factors.

The final profiles were punched onto data for computer subgrouping. It is this next step which to some practitioners may appear prohibitive, but which is in fact not as difficult as first appears.

**Computer Analysis**

A modification of a program entitled "HGROUP", which is presented in Veldman'n book *Fortran Programming for the Behavioral Sciences* (1967) was used to combine the 227 profiles into 5 mutually homogeneous and distinct families. This program, originally described by Ward and Hook (1963) is becoming an increasingly popular subgrouping technique because it is relatively easy to copy and keypunch, because only a few parameters must be staded for each individual problem, and because of the fact that it employs one of the more defensible measures of profile similarity - Cronback and Gleser's (1953) $D^2$ statistic (see Nunnally, 1967).

The technique has been adopted for use by this author for the subgrouping of organizational units (Pinto & Pinder, 1972); and corporate managers (Pinder & Pinto, 1974). It is the same subgrouping technique employed by Mobley and Ramsay (1973) in the validation research cited earlier.

The final step was to sort all test and criterion data into the 5-family system determined by the job clustering procedure, and to seek validity within each family. Both simple Pearsonian correlation and stepwise multiple correlation were employed to predict criterion scores, using the tests alone and in combination.

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received 50 points, since that other job may be more demanding on all three of the dimensions in these two profiles. While this technique is similar to many approaches to job evaluation insofar as a number of "factors" pertaining to job performance are delineated, the difference between this method and most job evaluation strategies lies in our use of ipsative profiles rather than normative job evaluation profiles (in terms of the distinction made above).

**Tests and Criteria Employed**

In accord with the individualized strategy advocated by Dunnette
(1966) and others, different tests and different criteria were employed in the
construction of possible validation models for the different job families.

Data were gathered using 7 different tests (with subtests yielding 9
predictors):

1) Short Employment Tests (Clerical Aptitude)
2) Minnesota Clerical (Two Subtests)
3) Employee Aptitude Survey (EAS):
     Test 1 - Verbal Comprehension
     Test 2 - Numerical Ability (Three Subtests)
     Test 4 - Visual Speed and Accuracy
     Test 6 - Numerical Reasoning
     Test 7 - Verbal Reasoning

These tests were employed because of their respectable reliability figures
and the face validity of their content, given the nature of most of the com-
pany's clerical jobs.

Supervisory ratings of employees based on 4 measures of job proficien-
cy served alone and in linear combinations to yield 10 different criteria. The
four basic measures were: (1) Trainability (quickness to learn new respon-
sibilities and procedures); (2) Quantity of Output; (3) Quality of Work; and
(4) Employee Cooperativeness and Attitude. These were combined with unit
weights to yield the ten criteria shown at the bottom of Table 5.

Supervisory ratings were gathered especially for the study. Supervisors
were assured that employee job status was not related in any way to their
assessments, and that the ratings were for research purposes only - they
would not be asked to defend their ratings in interview with employees.
Meetings were held with supervisors to present the importance of test validi-
ty, the urgent need for the study, and the necessity of their cooperation in
making *valid* ratings of their employees for the sake of the study.

Ratings on each criterion were grouped by department or by rater
(when a given rater performed many appraisals) and transformed to T
scores having a mean of 500 and a standard deviation of 100, in an attempt
to overcome some of the problems caused by the usual individual dif-
ferences among raters in terms of average rating level. Great care must be
taken to foster valid and reliable ratings - for the sake of overcoming the
classic problems of halo, leniency, central tendency and the general range
restriction usually inherent in concurrent validation studies. It must be

realized that this study, like many studies, depended on the validity and accuracy of three components: the tests, the job grouping method, and the criterion measures. Weakness in any one of these three facets would have resulted in the collapse of the study similar to that of the proverbial 3-legged stool.

## RESULTS

### Job Families

The subgrouping program yielded 5 mutually distinct and exhaustive families of jobs which can be represented in terms of their mean profile scores on the seven grouping variables. As in the research conducted by Mobley and Ramsay (1973) a plot was made of the overall within-family variability as an inverse function of the number of families of jobs identified. Table 2 presents the relationship found in this study. It is apparent that forcing the 227 jobs into a 4-family system, although leading to more parsimony, would have resulted in a large increase of total within-group profile dissimilarity over the 5-family solution.

### TABLE 2

**Results of Hierarchical Job Clustering
Procedure-Total Within-Group Variance
At Each Cluster Solution**

| Number of Job Families | Total Within-Group Variability |
|---|---|
| 10 | 4496.84 |
| 9 | 5251.39 |
| 8 | 6794.57 |
| 7 | 7487.88 |
| 6 | 9346.62 |
| 5 | 9388.94 |
| 4 | 21536.52 |
| 3 | 32376.73 |
| 2 | 60129.85 |

Table 3 presents the mean profile scores for the five families, while Table 4 presents the same data in standard score form. As can be seen in Table 4, Family 1 consisted of 65 jobs which seemed to require an emphasis on Numerical skills and Machine skills (such as calculators). There was relatively low demand in terms of the Typing, Social, Clerical, and Verbal

factors. Some typical job titles in this group are: Research Clerk, Operations Clerk, Dividend Clerk, Cash Receipts Clerk, and Rate Calcucation Clerk.

## TABLE 3

### Means and Standard Deviations
### For Worker Requirement Variables in Each
### Job Family (SD in Parentheses).

| Worker Requirement Variable | Job Family | | | | |
|---|---|---|---|---|---|
| | *1* | *2* | *3* | *4* | *5* |
| Verbal | 16.38 | 21.02 | 15.00 | 31.30 | 4.71 |
| | (9.62) | (7.76) | (9.89) | (11.37) | (5.49) |
| Numerical | 36.31 | 2.80 | 6.30 | 11.74 | 2.94 |
| | (9.85) | (4.94) | (6.94) | (9.84) | (5.92) |
| Clerical | 28.46 | 22.88 | 45.87 | 13.91 | 81.32 |
| | (12.75) | (8.87) | (10.83) | (8.62) | (11.17) |
| Social | 5.31 | 15.00 | 6.09 | 24.13 | 1.76 |
| | (5.07) | (8.95) | (7.97) | (10.87) | (4.91) |
| Supervision | 12.31 | .34 | .22 | 7.72 | .15 |
| | (3.07) | (1.83) | (1.04) | (10.73) | (.86) |
| Machine Skills | 9.92 | 4.32 | 16.30 | 5.33 | 4.12 |
| | (3.12) | (4.20) | (19.61) | (4.99) | (4.17) |
| Typing | 2.46 | 33.39 | 11.52 | 5.87 | 4.85 |
| | (4.93) | (9.93) | (11.33) | (7.17) | (6.80) |
| Number of Jobs | 65 | 59 | 23 | 46 | 34 |

## TABLE 4

### Standard Scores Describing the
### Five Clerical Job Families in Terms of Their
### Mean Scores on Seven Subgrouping Variables

| | Job Family | | | | |
|---|---|---|---|---|---|
| *Variable* | *1* | *2* | *3* | *4* | *5* |
| Verbal | -.19 | + .19 | -.31 | + 1.04 | -1.15 |
| Numerical | + 1.34 | -.73 | -.51 | -.17 | -.72 |
| Clerical | -.38 | -.45 | + .50 | -.82 | + 1.97 |
| Social | -.53 | + .34 | -.46 | + 1.16 | -.84 |
| Supervision | -.14 | -.29 | -.31 | + .96 | -.32 |
| Machine Skills | + .32 | -.37 | + 1.10 | -.24 | -.39 |
| Typing | -.67 | + 1.40 | -.06 | -.44 | -.51 |

Job Family 2 inclued 59 primarily-secretarial jobs. They generally required high degrees of Typing skill and an above average demand in terms of Verbal and Social skills. Most of the company's jobs bearing the title "Secretary", as well as many Typist and Clerk Typist jobs appeared in this group.

Only 23 jobs sorted into Family 3. These jobs were primarily clerical and machine-oriented in nature. Typical job titles included Policy Change Clerk, Mail Courrier, Input/Output Clerk and Chief Computer Librarian. The lowest factor scores for this group were on the Numerical and Social dimensions.

Family 4 contained 46 jobs whose most salient demands were in terms of the Verbal, Social, and Supervisory factors. Jobs in this group, like those in Family 2, have relatively low Clerical demands, although they differ from the earlier group insofar as Family 4 jobs require relatively little typing. Some typical job titles include: Centrex Console Operator (Switchboard), Assistant to the Manager, and Senior Correspondent.

Job group 5 included 34 relatively low level clerical jobs whose profiles were primarily 100% Clerical demand. Some typical job titles were the following: Mail Clerk, Supply Clerk, File Clerk, and Kardex Clerk.

It seems therefore that the subgrouping program yielded 5 distinct families of jobs, each based on a common set of worker demands.

**Success of the Job Subgrouping Method**

As was expected, various combinations of the selection tests were found to be predictive of different job criteria within each of these families. The overall validity attained when all jobs were pooled was statistically significant in the case of some criteria, and insignificant in the case of others. However, as has been argued elsewhere (McNemar, 1969; Pinder, 1973; Zedeck, 1971) considerations other than simple statistical significance are important in evaluating the success of selection models. An important index of the utility of the model is the standard error of prediction (in terms of criterion scores) yielded by the model. Another criterion of importance to the practitioner is the number of tests necessary to derive the reported validity statistics. In light of theses considerations, we feel our method was at least moderately successful.

Two tables are presented which help in the appraisal of our approach. Table 5 reports the Multiple R,$R^2$, Standard Error of Prediction, and

significance level of R which resulted when all 9 predictors were employed
with all 274 subjects. This table may serve as a "base" against which to
compare the results obtained when the subgrouping approach was applied.

### TABLE 5

**Pertinent Validation Statistics:**
**Results for Criteria 1-10 Using**
**Nine Tests in Each Model (n = 273)**

*CRITERION\**

|              | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8      | 9      | 10    |
|--------------|-------|-------|-------|-------|-------|-------|-------|--------|--------|-------|
| Multiple R   | .277  | .275  | .288  | .293  | .242  | .228  | .341  | .206   | .232   | .223  |
| $R^2$        | .077  | .076  | .083  | .086  | .059  | .052  | .116  | .043   | .054   | .050  |
| Stan. Error  | 78.87 | 87.00 | 89.39 | 90.95 | 83.62 | 96.87 | 93.29 | 112.03 | 114.44 | 98.56 |
| Significance | <.01  | <.01  | <.01  | <.01  | <.05  | N.S.  | <.01  | N.S.   | N.S.   | N.S.  |

\*    *The Criteria Used Were the Following:*
1.   Trainability + Quantity + Quality + Attitude
2.   Trainability + Quantity + Quality
3.   Trainability + Quantity
4.   Trainability + Quality
5.   Quantity + Quality + Attitude
6.   Quantity + Quality
7.   Trainability
8.   Quantity
9.   Quality
10.  Attitude

Table 6 presents the corresponding statistics which resulted after the
jobs had beed subgrouped and differential strategies had been identified.
Note that the number of tests used ranged from 3 (in the case of Family 2) to
7 (in the case of Family 1).

### TABLE 6

**Pertinent Validity Statistics**
**for the Selection Models Chosen**
**for Five Job Families (N varies by Job Family)**

|                       | Job Family |       |       |        |       |
|-----------------------|-----------|-------|-------|--------|-------|
|                       | 1         | 2     | 3     | 4      | 5     |
| Multiple R            | .488      | .441  | .570  | .373   | .591  |
| $R^2$                 | .238      | .194  | .325  | .139   | .350  |
| Standard Error        | 80.78     | 92.84 | 77.45 | 102.65 | 64.71 |
| Level of Significance | <.01      | <.01  | <.05  | <.05   | <.01  |
| Number of Tests       | 7         | 3     | 4     | 4      | 6     |
| No. of Subjects       | 75        | 71    | 21    | 69     | 36    |
| No. of Jobs           | 65        | 59    | 23    | 46     | 34    |

**DISCUSSION**

The job subgrouping method employed in this study seemed to provide a moderately useful increase in selection validity and utility in the population studied over the alternative non-moderated approach. The decision of whether or not to adopt such a strategy however, must be based on several considerations. The major reasons for *not* employing a strategy such as the one presented here include the additional interviewing and statistical effort required in generating and subgrouping the necessary job profiles; and the additional day-to-day administrative complexity necessary in using the method for selecting among new candidates. That is, the more elaborate approach described here entails the use of 5 separate test batteries, as compared to only one in the case of the more simplistic non-moderated approach. In any organizational setting, the decision must be made as to whether the benefits derived by the more sophisticated approach are worth the additional cost and effort. In the organization in which the present research was conducted, the benefits were seen as outweighing the costs - so the system was adopted.

The moderated approach resulted in multiple correlation coefficients which were significant at the five percent level in two of the five families, and at the one percent level in the other three families, thereby satisfying the requirements of the EEOC. Of more interest to the practitioner, however, is the statistical accuracy provided by our method. The average standard error across the five families at the solution selected in each was 83.69. This figure compares favorably with the average of 94.50 which resulted when the family structure was not used (see Table 5).

Two caveats must be noted. First, cross-validation is advisable when using this method as when using most validation methods. It is important to be assured that the solutions derived are as valid for new recruits as they were for the on-board employees who served to generate the original models.

Secondly, it is essential to maintain a vigilance over the company's jobs. Jobs change, and as they do the appropriate predictors of job performance are also likely to change. Under a job family system, it might be necessary to re-classify jobs from one family to another (and then re-compute the mean profiles of the families involved) or even to create entirely new families for new, unusual jobs. In the case of major organization-wide job redesigns of course, it would be necessary to generate all-new profiles and perform a new subgrouping analysis. These maintenance procedures are necessary to keep the system useful and valid.

## A FINAL NOTE

Critics will argue that many of the new designs for validation involve much folderol and are extremely complex - to a large extent, they are correct. When you ask these critics to report on the statistical accuracy and significance, and the ethical worth of their more simplistic alternative proposals however, their silence serves as a behavioral reminder of the fact that people are complex, jobs are complex, the prediction of human performance in organizations is therefore very complex, and so it is no wonder that the simplistic tools so commonplace before the law required the demonstration of validity are inadequate. As suggested by Weick (1969), complex tools are necessary to register and understand complex phenomena. Recent trends in personnel selection and placement tend to support Weick's hypothesis.

## Méthode statistico-rationnelle de validation des tests

Dans cet article, l'auteur décrit une méthode relativement simple qui a été expérimentée en vue d'établir un système de classement scientifique des emplois.

L'expérience a été faite parmi le personnel de bureau d'une compagnie d'assurances du «midwest» américain qui comptait 284 employés occupant 227 fonctions différentes. L'entreprise désirait remettre à date son programme de sélection du personnel.

On a alors tenté, de façon à éviter la disparité, de grouper les fonctions plutôt que les employés, en scindant celles-ci en sept sous-groupes fondés sur le contenu des fonctions. Comme deux préposés au personnel avaient déjà procédé à l'analyse des tâches, on a utilisé les données qui avaient été ainsi recueillies. Quant au reste, on a procédé par entrevues auprès des cadres ou des titulaires eux-mêmes. La tâche totalisait 100 points, ce qui équivalait à la compétence maximale requise pour la fonction selon les aptitudes requises pour chacune d'entre elles. Avec l'aide des différents chefs de service et des préposés au personnel, on identifia et définit sept types de fonctions après analyse sérieuse des descriptions de tâche selon la nature du travail à accomplir. Les critères retenus selon les fonctions étaient les suivants:

a)   aptitudes verbales, c'est-à-dire l'aptitude à parler, à écouter, à lire et à écrire;
b)   aptitudes au calcul, c'est-à-dire la capacité de procéder à des opérations arithmétiques, algébriques ou opérations mathématiques plus avancées et à en faire l'interprétation;
c)   aptitudes de travail de bureau: vérification, codification et classification selon un système préétabli;
d)   aptitudes sociales, c'est-à-dire la capacité de communiquer avec les gens: clients, agents, public en général;
e)   aptitudes à conduire les autres, soit à les entraîner au travail, à leur donner des conseils et à veiller à ce que le travail soit bien exécuté;

f)     aptitudes mécaniques, c'est-à-dire l'habileté à comprendre le fonctionnement et le maniement de l'équipement de bureau avec célérité et efficacité;

g)     aptitudes à exécuter le travail de copie et de transcription.

Le nombre de points attribués à un facteur dans chaque tâche était mis au point de façon à réfléchir l'importance relative de ce facteur dans l'accomplissement de la tâche comparé aux six autres facteurs. Une fois les profits établis pour chaque fonction, ils furent soumis aux chefs de service pour approbation et modification. Lorsque des changements étaient suggérés, l'auteur procéda à des entrevues auprès des surveillants ou des titulaires pour s'assurer que le profil était bien exact. On en a modifié environ vingt pour cent d'entre eux et, à ce sujet, la principale source de difficulté a résidé dans une confusion entre les aptitudes verbales et les aptitudes sociales.

A partir de ces données de base, on a établi cinq familles d'emplois dans lesquelles on a rangé les 227 fonctions. Dans la première famille, on a inclus les 65 emplois qui paraissaient exiger des connaissances en mathématiques et en utilisation de l'équipement de bureau. La deuxième famille comprenait les catégories de fonctions qui consistait dans du travail de secrétariat au nombre de 59. On ne trouvait que 23 emplois dans la troisième famille qui consistaient également dans du travail de bureau. Quant à la quatrième famille, au nombre de 46 emplois, elle regroupait des fonctions dont les exigences les plus saillantes touchaient les contacts avec les gens et ne demandaient par conséquent que peu de connaissances dans le travail de secrétariat, sauf en ce qui concernait certaines tâches. Le cinquième groupe consistait à des emplois de bureau exclusivement.

Cette méthode de classifier les emplois s'est avérée relativement heureuse, mais pour qu'elle réussisse, il est important de s'assurer qu'elle vaut pour le recrutement des nouveaux employés tout comme elle le valait pour le personnel en poste qui a servi de modèle. De plus, il est important de suivre de près l'évolution des tâches et, en cas de changement, il peut être nécessaire de refaire le reclassement des fonctions à l'intérieur des familles ou même d'établir des familles nouvelles. Certains peuvent trouver que la méthode précédente est inutilement compliquée, mais il n'en reste pas moins que pour comprendre et en quelque sorte photographier un phénomène complexe, il faut aussi des outils complexes. Les tendances récentes dans le domaine de la sélection et du placement du personnel confirment cette hypothèse.

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