

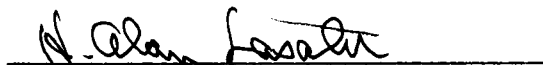
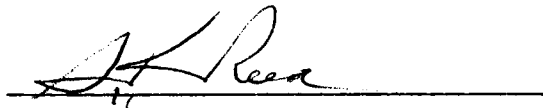
To the Graduate Council:

I am submitting herewith a thesis written by William John Fitzgibbons entitled "The Validity of Seniority as a Predictor of Future Performance." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Industrial and Organizational Psychology.



Michael E. Gordon,
Major Professor

We have read this thesis
and recommend its acceptance:



Accepted for the Council:



Vice Chancellor
Graduate Studies and Research

THE VALIDITY OF SENIORITY AS A PREDICTOR
OF FUTURE PERFORMANCE

A Thesis
Presented for the
Master of Science
Degree
The University of Tennessee, Knoxville

William John Fitzgibbons
March 1981

3049625

DEDICATION

To Mase

Thank you, you make it all worthwhile

ACKNOWLEDGEMENTS

Nothing has enriched my personal or professional growth more than my association with Dr. Michael E. Gordon. For his advice and his friendship, I am deeply grateful.

I would like to express my sincere thanks to Dr. S. Kyle Reed and to Dr. H. Alan Lasater, not only for the valuable assistance which they provided, but for their patience and understanding with regard to time constraints on this project. I am especially appreciative of Dr. John M. Larsen, Jr., who offered steadfast support throughout my graduate studies.

I owe my parents a special debt of gratitude. Their dedication and love has been a constant source of strength in my life. For Jayne, I reserve my deepest thanks and love . . . she chose to go through this with me and her laughter made it easy.

Finally, the author would like to express his sincere appreciation to Ms. Donna Hickok and Ms. Ann Lacava for their invaluable assistance in preparing this manuscript.

ABSTRACT

The intent of this investigation was to provide empirical evidence on a long-standing debate concerning the use of seniority in staffing decisions. Specifically, the purpose of the study was to evaluate the appropriateness of basing promotional decisions, either wholly or in part, on an employee's length of service. "Policy-capturing" regression models were utilized to simulate staffing decisions involving a variety of seniority provisions.

Data were collected on the job changes of 162 female sewing machine operators. Past (i.e., old job) performance, seniority, and interjob similarity were examined for their ability to predict performance in the new job. Performance in the old and new jobs was measured in terms of a quarterly efficiency index. Seniority was operationalized two ways: total time with the company and time in the old job. Lastly, five job evaluation factors used to describe operations in the plant were employed to assess the degree of similarity between the old and new jobs.

The results support existing policies which prescribe promotion on the sole basis of past performance ($p < .0001$) or on the basis of job seniority ($p < .06$), when applicants are equally qualified. Interjob similarity, which was expected to moderate the predictive influence of seniority, was instead found to be a significant predictor of future

performance itself ($p < .02$). This research indicated that the best promotional model, although not a policy discussed in the literature, would be comprised of past performance, interjob similarity, and job seniority. However, additional research is required to test the generality of these findings.

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INTRODUCTION

Recent publications (Brett, 1980; Kochan, 1980) are indicative of the renaissance of interest among behavioral scientists in the study of unions. Even industrial psychologists, whose discipline has long been criticized for being top-heavy with management-oriented research, are beginning to empirically study human resource problems in the realm of organized labor (Gordon and Fitzgibbons, 1979; Gordon, Philpot, Burt, Thompson and Spiller, 1980). Gordon, Cosby and Johnson (1980) note that "the field of industrial relations is being carefully scrutinized for topics amenable to behavioral science research" (p. 1).

One industrial relations topic appropriate for behavioral science investigation is seniority, a venerable contract provision which dates back to the earliest collective bargaining agreements. The concept of seniority may be broadly defined as privileged employee status awarded on the basis of continuous length of service in an organization. More specifically, "Seniority is the application of the criterion of length of service for the calculation of relative equities among employees with respect to their claims to jobs and prerogatives related to employment within the collectively determined scope of application of the criterion" (Meyers, 1965, p. 194).

Due to the negotiating efforts of organized labor, seniority has a pronounced impact on corporate policies

which govern staffing decisions such as retention, recall, promotion and transfer. Further, it is common practice for entitlements to vacation pay, insurance coverage and other organizational rewards to increase with an employee's length of service, irrespective of his/her union status (Gordon, Cosby and Johnson, 1980).

A great deal has been written about the advisability of using seniority as a basis for decisions concerning organizational staffing or the disbursement of employee rewards. Not surprisingly, unionists strongly advocate the concept of seniority as the "only viable and equitable known method for resolving employee competition" (Fischer, 1976, p. 498) and as an asset to management through the promotion of a stable, experienced work force. By contrast, management consultants who preach the advantages of union-free environments often point to seniority as one of the stultifying operating standards imposed upon the organization once a bargaining unit has been certified (Myers, 1976). Finally, there are writers who recommend a more limited role for seniority, viz., employing it as a basis for promotion only in those instances in which the old and new jobs are reasonably similar (Moore, 1951).

The purpose of this investigation is to assess the validity of basing promotional decisions, either wholly or in part, on the criterion of an employee's length of service. To this end, the background of seniority in industrial relations will be examined by reviewing the

existing literature on the subject. Policy-capturing regression models will be proffered as a logical approach to clarifying the relationship between seniority and job performance.

I. LITERATURE REVIEW

Background

Promotional consideration on the basis of length of service is a provision engendered by the job security concerns of early workers. The first contracts which included seniority clauses did so to protect older workers from layoffs provoked by technological developments. According to Meyers (1965), promotions and layoffs have been allocated by seniority in the newspaper industry since 1902. The early part of this century witnessed increasing recognition of the workers' vested interest in their positions which were formerly subject to the whims of supervisors. Thus, the concept of seniority gained popularity as an equitable alternative to the otherwise arbitrary decision-making rules of the day.

Supreme Court endorsement of the National Labor Relations Act in 1939 facilitated the organization and growth of industrial unions. Consequently, seniority provisions became more prevalent in collective bargaining agreements between unions and manufacturers beginning with World War II (Craft, 1975).

According to Cascio (1978), "seniority policies and practices have virtually become institutionalized in the United States with over 90% of all collective bargaining agreements (and 79% of those covering 1,000 or more workers)

containing seniority clauses in one form or another" (p. 28). Reviews by the Bureau of Labor Statistics (Administration of Seniority, 1972) and the Bureau of National Affairs (see Miller, 1980) put the number of contracts having seniority agreements at 76 percent and 85 percent, respectively. Non-union employers utilize the concept of seniority as well. Rees (1962) noted that formalized systems which use tenure to regulate layoffs exist in many union-free environments.

Seniority is not a uniformly administered contract provision. Agreements vary considerably with regard to the size of the seniority unit, the method used to calculate seniority, and the role of seniority in staffing decisions. To begin, the size of the organizational unit upon which accumulated time is based varies from contract to contract. Resultant seniority systems range from the narrowest job-based type to the broadest plantwide variety (Greenlaw & Biggs, 1979). Unions generally favor wider administrative units, although employers resist these arrangements citing the attendant increase in job bumping as the cause of widespread disruption in productivity, rising break-in costs, and additional retraining (Gordon, Cosby and Johnson, 1980).

Methods of calculating an employee's length of service differ with respect to the time at which seniority begins accruing. In some cases, an individual's seniority begins as soon as he/she is assigned to a job; in others,

seniority does not accrue until a probationary period in the new position has elapsed. Programs also differ with respect to the formulae used to determine what constitutes continuous service and the manner in which seniority is adjusted for employment interruptions.

Finally, seniority provisions vary in regard to the staffing decisions which are influenced. In a survey of 400 labor agreements, Miller (1980) found that seniority affected layoff and recall in 85 and 75 percent of the contracts, respectively. In addition, despite traditional employer concern that seniority-determined promotions stifle employee initiative (Healy, 1955), Miller (1980) found seniority clauses influencing promotional decisions to some degree in approximately 65 percent of the contracts reviewed.

In spite of their extensive usage and varied practical application, seniority provisions are not accepted without reservation. In fact, the utility of basing organizational decisions on seniority is subject to continual debate.

Seniority: Pros and Cons

The seniority literature does not want for opinionated treatises on the relative merits of seniority systems. The issue has been heatedly debated from both the managerial and organized labor points of view. Many advantages and disadvantages have been postulated in the

name of seniority. "The matter involves questions of the effect of seniority on efficiency, management rights, employee rights and ethics" (Knowles, 1955, p. 279).

The most widely discussed benefit for unions and their members is that seniority clauses reduce arbitrariness, favoritism, and discrimination in staffing decisions (Cohen, 1979). Additional theorized benefits include individual protection from arbitrary and discriminatory union practices (Rees, 1962), the opportunity for employees to plan their careers (Mills, 1978), protection from the harsh consequences of overly strict application of efficiency criteria to older workers (Cohen, 1979), and assurance of continued employment for those workers whose jobs have become obsolete (Mills, 1978). "The union further argues that the great majority of jobs in modern industry are so simple that variations in skill and ability are secondary" (Knowles, 1955, p. 280). The union holds that as long as an employee meets the established performance standards, he/she is doing a satisfactory job; meeting these standards should be rewarded by the security of seniority.

Mills (1978) noted that the postulated advantage of seniority to employers is based on the assumptions that experienced workers are desirable and that rewarding length of service will promote a more stable work force. Disadvantages include bias against the more able worker due to interference with the employer's right to promote and retain workers on the basis of merit (Cohen, 1979; Knowles,

1955). Healy (1955) observed that while formal promotion arrangements typically constrain management's freedom to assign workers solely on the basis of ability or convenience, they have usually been designed so that efficiency has not been significantly impeded. Conversely, Doeringer (1966) noted that "when ability standards are relaxed . . . the employer shares some of the remedy costs by providing additional training with each promotion" (p. 285).

Finally, anti-unionists often point out the long-term threat to both union and employer from promotions based on length of service. "Few union leaders are willing to admit that the nurturing of low achievers fosters the mediocrity which undermines the competitive competence of the organization and, hence, ultimately decimates its own membership" (Myers, 1976, p. 26).

Although little empirical research has been conducted to test the validity of these claimed advantages and disadvantages, it is generally recognized that the issue of seniority is a major source of grievances. Typical disagreements involve the proper assessment of ability when it is used in conjunction with seniority as a basis for staffing decisions (Cohen, 1979; Healy, 1955). Seniority-based grievances are also common in declining industries as workers attempt to protect their rights to remaining positions (Miernyk, 1980).

Problems associated with seniority systems have not been limited to their role in the grievance procedure,

however. Both union and management have encountered legal difficulties stemming from the impact of seniority on programs designed to insure equal employment opportunity.

Legal Issues

The courts have ruled on a large volume of cases involving the conflict between equal employment opportunity objectives (i.e., affirmative action) and existing seniority systems. Three major issues have been identified by legal scholars who have reviewed and analyzed these cases (Cebulski, 1977; Craft, 1975; Ziskind, 1976). First, the courts had to decide on suitable reparation for minority workers who had been discriminatorily denied employment opportunities after the passage of the Equal Employment Opportunity Act of 1972. In Franks v. Bowman Transportation, the Supreme Court utilized the "rightful place" approach in dealing with a make-whole remedy for compensating the victims of unlawful employment discrimination. Retroactive seniority was ordered from the date that opportunity was wrongfully denied (Ziskind, 1976). This "rightful place" approach has been adopted by the majority of courts evaluating seniority systems in Title VII cases (Taylor and Witney, 1979).

The second issue on which the courts have ruled involves apparently neutral seniority systems. While Title VII "explicitly permits 'bona fide' seniority systems as long as they were not devised with the intent to

discriminate, such . . . practices do produce adverse impact to the extent that past discriminatory practices are perpetuated" (Cascio, 1978, p. 28). The Teamsters v. U.S. (T.I.M.E.-D.C.) case addressed itself to discrimination in seniority systems which occurred prior to the effective date of Title VII. The Supreme Court held that workers who suffered from pre-Act discrimination were not entitled to relief and retroactive seniority was not to be awarded to a time earlier than the effective date of Title VII (Behman, 1976). However, seniority systems enacted after the effective date of Title VII which result in discriminatory treatment are illegal.

Finally, Craft (1975) noted that the use of the last-hired-first-fired approach to layoffs has been challenged in the courts for its negative effect on minority gains realized through affirmative action. Cebulski (1977) evaluated a number of solutions to the conflict between seniority and affirmative action and concluded that "many of these alternatives meet with criticism based on resistance of management, unions and employees to erosion of vested interests in establishing methods of assigning work and reducing the work force" (p. 8). Many court rulings have required a change in the size of the organizational units upon which seniority is based. Generally, the courts have favored the broader plantwide seniority systems over their narrow job-based or departmental counterparts.

Short of court-imposed modifications, remedial changes in seniority provisions have been devised through collective bargaining. For example, some unions and employers have voluntarily negotiated agreements wherein layoffs are based on inverse seniority. These plans permit senior workers to opt for temporary layoff, thus enabling minority employees with less company service to retain their jobs (Friedman, Bumstead and Lund, 1976).

Psychological Research on Seniority

The psychological literature has been characterized by a dearth of research in union organizations (Gordon and Burt, 1979). Consequently, seniority remains a neglected topic in applied psychological research, overlooked by the classic works on the psychology of union-management relations (Gordon, et al., 1980). For example, Kornhauser, Dubin and Ross (1954) provide little more than a summary of the applications of seniority, while Stagner and Rosen (1965) fail to mention the topic. Recent reviews of industrial relations research (Brett, 1980; Kochan, 1980) disregard seniority entirely.

Possible explanations for this widespread neglect include a lack of interested sponsors in such research and the historic mistrust with which unions view psychologists. Also, Gordon, Cosby and Johnson (1980) point out that "organized labor is proud of the acceptance seniority has achieved throughout industry and, therefore, would not be

expected to encourage or cooperate in a study which might produce evidence of the non-utility of this centerpiece of union benefits" (p. 8).

To date, behavioral scientists have conducted very little empirical research to determine the impact, if any, which seniority may have on organizational effectiveness. This situation of apparent disinterest is surprising because "seniority, which is directly related to job security and promotional opportunity, has been cited as an important factor in the development and maintenance of satisfactory employee morale" (Craft, 1975, p. 754). As such, seniority conceivably affects the morale-related manpower problems of turnover, recruitment and absenteeism--traditional areas of interest for behavioral scientists, particularly industrial psychologists.

This lack of empirical study of seniority is also surprising in view of the increasing popularity of policy-capturing research, an application of regression analysis useful in identifying and validating the factors on which decisions are based in the field of human resources management. For example, Robinson, Wahlstrom and Mecham (1974) utilized a multiple regression weighting of numerical job analysis data from the Position Analysis Questionnaire (PAQ) to predict equitable compensation rates. Gordon, Mossholder, Nurick and Pryor (1979) proposed a policy-capturing model which permits organizations to examine the degree of their compliance with the Equal Pay Act of 1963.

In this case, regression techniques were employed to statistically control all legitimate exemptions to equal pay (e.g., job requirements, merit and seniority) prior to inspecting sex-based differentials.

Regression models are ideally suited for simulating staffing decisions involving a variety of seniority provisions. In addition, these models provide the means to evaluate the appropriateness of utilizing a particular variable to select individuals for promotion. Four such promotional policies and their statistical formulations are described below.

Promotional Policies

Policy I

Promote on the basis of worker ability

$$Y = b_{pp}X_{pp} + C,$$

where

Y = performance in the new job,

X_{pp} = performance in the old job (i.e., ability).

If b_{pp} , the regression coefficient for past performance, is found to be statistically significant, evidence favoring promotion on the sole basis of ability will have been obtained. Promotional policies which consider only the worker's merit (record of previous achievement), although attractive from a managerial perspective (Healy, 1955), are

relatively rare today (Seniority in Promotion and Transfer Provisions, 1970).

Policy II

Promote on the basis of worker seniority

$$Y = b_{sen} X_{sen} + C,$$

where

X_{sen} = seniority associated with the old job.

If b_{sen} , the regression coefficient for seniority, is found to be significant, evidence favoring promotion on the sole basis of accrued seniority will have been obtained. This policy, while seemingly equitable and practicable, was observed in only 3 percent of the promotional agreements reviewed by Miller (1980).

Policy III

Promote the most senior worker of equally qualified applicants

$$Y = b_{pp} X_{pp} + b_{sen} X_{sen} + C$$

Significance of b_{sen} in this model would indicate that consideration of seniority after statistically equating for worker's ability improves promotional policy. Such a finding would lend considerable support to existing policies. According to two publications (Miller, 1980; Seniority in Promotion and Transfer Provisions, 1970), 75 percent of

the agreements reviewed included consideration of non-seniority variables such as skill and ability.

Policy IV-A

Promote on the basis of seniority when the old and new jobs are similar

$$Y = b_{sen}X_{sen} + b_{sim}X_{sim} + b_{ss}X_{sen}X_{sim} + C,$$

where

X_{sim} = measure of interjob similarity

b_{ss} = moderator variable between seniority and interjob similarity.

This model is an application of moderated regression (Saunders, 1956). Such a model provides a test of the validity of Moore's (1951) contention that only in instances of high interjob similarity can seniority be considered a sound basis for promotion. A significant value for b_{ss} would indicate that the effectiveness of a seniority-based promotional policy is a function of the degree of similarity between the old and new jobs.

Policy IV-B

Promote the most senior worker of equally qualified applicants when the old and new jobs are similar

$$Y = b_{pp}X_{pp} + b_{sen}X_{sen} + b_{sim}X_{sim} + b_{ss}X_{sen}X_{sim} + C$$

If b_{ss} is significant, the effectiveness of a promotional

policy based upon seniority and ability qualifications is revealed to be a function of the degree of interjob similarity.

II. METHOD

This study examined job changes in an apparel manufacturing plant located in a medium-sized southern city. The job changes under investigation encompassed 36 different job operations. The company assigned these operations to one of six job classes, depending on the complexity of the tasks involved. The six job classes, along with their respective operations, appear in Table 1 in order of increasing complexity.

Data were gathered on 162 female sewing machine operators who had changed jobs between December 1977 and October 1979. Some of these job changes could be described as promotions, i.e., moves which involved an upgrade in job class. Other job changes could best be described as transfers, i.e., lateral moves which were made within a particular job class.

The operators belonged to a national union. Promotions were allocated on the basis of seniority, as prescribed by union contract. Management was required to post notices of all job vacancies; then, members of the collective bargaining unit were permitted to "bid" for these openings. The most senior worker who had bid for a particular position, received the promotion (Greenlaw and Biggs, 1979).

Finally, it should be mentioned that the operators were covered by a piecework incentive plan. Under such a

TABLE 1
THE SIX JOB CLASSES AND THEIR
RESPECTIVE JOB OPERATIONS

Job Class	Operations
One	Clip watch pockets Turn and stack Clip hip pockets Measure waist bands
Two	Overedge left fly Sew on zipper Cut zippers Staple zippers Hem watch pockets Scallop hip pockets Hem hip pockets Sew on hip pockets Close pockets Tack leather label Finish band ends Button/buttonhole Staple tickets Attach rivets Serge front pocket facing Finish facings Make belt loops
Three	Sew on left fly Attach facings Tack fly and crotch Bartack belt loops Sew on watch pockets Trim, inspect and fold
Four	Overedge right fly Stay notch Join crotch Safety stitch Sew on risers
Five	Set front pockets Seat seam Hem legs
Six	Fell inseam Band waist

system, piece rates are established for specific operations. A time standard is calculated, usually through time study. "By applying the time standard against the base rate, a rate per piece is determined" (Belcher, 1974, p. 315).

To be included in the sample, operators had to meet the following requirements: First, retrainees had to meet the company's 100 percent performance standard on their new job at the end of a reasonable on-the-job training period. "This was essentially a self-paced [training] program, generally 10 weeks depending on the job class" (Meriwether, 1975, p. 8). Second, it was required that operators remain in their new positions for at least nine months so that stable measures of new job performance could be recorded. It was assumed that performance continued to improve, at a rate subject to both individual ability and new job complexity, for some time after the training period. In order to ensure that the criterion measure did not reflect individual differences in learning ability, performance in the new job was recorded 9-12 months after the job change.

Variables

Criterion

A criterion is a standard by which individual success or failure may be evaluated (Bass and Barrett, 1972). The criterion for this investigation consisted of quarterly efficiency averages which were based on individual production output.

Whenever a criterion is used as an index of the performance of individuals, it is a fundamental consideration that it be a stable index. That is, "it should reflect the relatively permanent, or continuing, level of performance of the individuals on the job[s] in question" (Tiffin and McCormick, 1958, p. 37). The reliability of the criterion provides a measure of this stability or consistency of performance.

It is customary to express criterion reliability by means of a coefficient of correlation between two consecutive measures of individual performance. According to Tiffin and McCormick (1958), "reliability coefficients in the .90's would be considered to be exceptionally good, and those in the .80's would normally be acceptable" (p. 38). To determine criterion reliability, two post-promotion quarterly averages were compared. However, this was possible in only 120 of the 162 cases. Calculation of a second quarterly average was precluded for the more recent job changes because the operators had not been in their new positions for a sufficient length of time.

Predictors

In order to examine the predictive ability of the independent variables included in the regression models, the following information was recorded.

Ability. The quarterly efficiency average prior to an individual's promotion/transfer served to operationalize the predictor variable for ability.

Seniority. Seniority was operationalized in terms of two periods of employment with the company.

A. Total seniority. This variable was measured by the amount of time an employee had accrued with the company.

B. Job seniority. The length of time an operator had spent in the pre-promotion position served to index this variable. For those individuals who had not changed jobs prior to this investigation, total seniority and job seniority were identical ($N = 86$).

Interjob similarity. Through the combined effort of the researcher, the plant manager, and an experienced industrial engineer, a common set of five job evaluation factors were identified which permitted description of each of the 36 job operations. These factors, and the classifications by which operations were described, are presented below in order of decreasing importance for establishing similarity between jobs.

A. Folder. A folder is a device which doubles fabric as it is fed through a sewing machine. Operations were classified according to whether or not the use of a folder was required. Since this task affected the amount of manual dexterity required in an operation, it was

considered to be the most important or crucial source of interjob similarity.

B. Length of sew. Operations were assigned to one of three categories depending on the requisite length of sew (short, medium or long). This factor, reflecting both effort and concentration, was considered to be second in importance.

C. Machine type. On this third factor, operations were classified according to the type of machine on which they were performed (i.e., single needle, double needle, serging or tacking machine). Since operators were responsible for routine maintenance (e.g., needle replacement, lubrication), machine familiarity was considered to be moderately important.

D. Precision. This factor reflects the amount of error which could be tolerated on a particular job. Operations were classified as either high or low, based on the degree of precision required.

E. Amount of garment handled. Depending on the size of the piece(s) of fabric manipulated by an operator, operations were assigned to one of three categories (small, medium or large).

Factors were assigned the following point values on the basis of their judged importance:

Folder	5	similarity	points
Length of sew.	4	"	"
Machine type	3	"	"

Precision.	2	"	"
Amount of garment handled. . .	1	"	"

Similarity points were awarded on the basis of factor equivalence. That is, new and old jobs which had been assigned to identical factor classifications, received the corresponding number of points. Total scores ranged from zero to 15 points, depending on the type and number of factors which a pair of jobs had in common. For example, a transfer between jobs having no common factors received a score of zero, while a transfer between jobs equivalent on machine type only received a three point similarity score. Jobs which were congruent on all five factors received the maximum similarity score of 15 points.

Age of the operator. It is commonly assumed that an age-related performance decrement exists in high production manufacturing situations (Knowles, 1955). Martin (1978) provided evidence of the magnitude of the natural dependency between age and seniority ($r = .50$, $p = .001$). Operator age was recorded so that this confound could be removed to get a better look at the seniority-performance relationship independent of age.

Procedure

To assess the strength of the linear relationship between pairs of variables, Pearson product-moment

correlations were calculated. These were zero-order correlations because no controls for the influence of other variables were made.

The regression models outlined in promotional policies I through IV-B were constructed and analyzed. Forward, backward and stepwise regression techniques were utilized to fully examine the relative contribution of the independent variables to their respective models. Also, residual plots were examined to determine the appropriateness of using first-order linear models. Operator age was entered as an independent variable in these policy-capturing equations to control for the possible reflection of an age-related performance decrement in the seniority measures.

Operators were assigned to one of two groups on the basis of job change frequency because the actual number of job changes was not available. One group was comprised of operators who were changing jobs for the first time. The other group contained operators who had changed jobs more than once. This dummy variable was used to examine the influence of job change frequency on the prediction of new job performance.

In order to test the proposition that experience, as indexed by seniority, facilitates performance of complex tasks, a dummy variable for new job complexity was created. Depending on the complexity of their new positions, operators were assigned to dummy groups. Individuals who had been promoted/transferred into high complexity jobs (i.e.,

grades 5 and 6), comprised one group. The other group contained operators who had entered jobs of lesser complexity (i.e., grades 1-4).

III. RESULTS

Table 2 is a correlation matrix containing Pearson product-moment correlations among the variables. Several findings presented are worthy of special comment. First, the reliability of the criterion, i.e., the correlation between the two post-transfer quarterly efficiency averages, was .95 ($p < .0001$). Such a correlation is indicative of a highly reliable criterion (Tiffin and McCormick, 1958). When used to compare criterion values for two periods of time, the correlation value is commonly referred to as a coefficient of stability. According to Rothe and Nye (1959), a stability coefficient of .95 is not unusual when an incentive plan is in use.

Further examination of Table 2 reveals that operator ability, as indexed by old job performance, significantly correlated ($p \leq .001$) with each of the new job performance measures. Hotelling's t-test for the difference between nonindependent r's revealed that these correlations were statistically equivalent ($t = .3543$, d.f. = 117, $p < .35$).

The relationships between interjob similarity and each of the new job performance measures were significant ($p \leq .04$). This finding suggests that what was to be used as a moderator variable is itself a valid predictor.

Total seniority, job seniority and operator age were all significantly related ($p \leq .05$) to performance on the

TABLE 2
PEARSON PRODUCT-MOMENT CORRELATION MATRIX

Variable	New Job Performance (2nd Quarter)	Old Job Performance	Total Seniority	Job Seniority	Interjob Similarity	Age
New Job Performance (1st Quarter)	.95 p<.0001 N=120	.34 p<.0001 N=162	.07 N.S. N=162	-.09 N.S. N=162	.20 p<.01 N=162	.04 N.S. N=162
New Job Performance (2nd Quarter)		.29 p<.001 N=120	.08 N.S. N=120	-.13 N.S. N=120	.19 p<.04 N=120	.07 N.S. N=120
Old Job Performance (Ability)			.23 p<.004 N=162	.15 p<.05 N=162	.03 N.S. N=162	.17 p<.03 N=162
Total Seniority				.54 p<.0001 N=162	.06 N.S. N=162	.56 p<.0001 N=162
Job Seniority					.04 N.S. N=162	.34 p<.0001 N=162
Interjob Similarity						-.02 N.S. N=162

old job, i.e., older, more experienced workers tended to perform better. This finding offers evidence against the existence of an age-related performance decrement. However, none of these variables was related to either of the measures of performance in the new position. That is, after transfer, no relationship between performance and seniority or age was observed.

Operator age is significantly correlated ($p < .0001$) with both of the seniority measures. These findings are consistent with those of Martin (1978) in that they offer similar evidence of the statistical size of the natural dependency of age and seniority.

Promotional Policies

The first quarterly efficiency average ($N = 162$) was used as Y , the criterion measure of new job performance in the policy-capturing models. This section contains the results of these regression analyses.

Policy I

This policy recommends promotion on the basis of worker ability. Again, the appropriate model to test this proposition was:

$$Y = b_{pp} X_{pp} + C$$

Table 3 contains the results of this regression analysis. The positive regression coefficient for ability was highly

significant [$F(1,160) = 20.83, p < .0001$]. This finding supports the traditional contention that past performance is a valid predictor of future performance. However, the R^2 value of 0.1152 indicates that ability does not account for a substantial portion of variance in the performance criterion for the new job.

TABLE 3
REGRESSION ANALYSIS OF POLICY I--PROMOTE
ON THE BASIS OF ABILITY

Source	DF	SS	MS	F	Prob>F
Ability	1	9074.6374	9074.6374	20.83	.0001
Error	160	69719.5204	435.7470		
Total	161	78794.1578			

Note: $R^2 = 0.1152$

Policy II

This policy recommends promotion on the basis of worker seniority. The model employed to test this proposition was:

$$Y = b_{\text{sen}} X_{\text{sen}} + C$$

Non-significant results were obtained for both total seniority [$F(1,160) = 0.74, p < .391$] and job seniority [$F(1,160) = 1.20, p < .275$]. These findings suggest that

neither seniority measure is a valid predictor of future performance when used alone. These results are consistent with the non-significant correlations between seniority and new job performance (see Table 2).

Policy III

For equally qualified applicants, this policy recommends promotion on the basis of seniority. The appropriate model to test this proposition was:

$$Y = b_{pp}X_{pp} + b_{sen}X_{sen} + C$$

Table 4 contains the results of this regression analysis for job seniority. The partial F results for b_{sen} support the use of Policy III when seniority is operationalized in terms of time in the old job ($p < .06$). This result indicates that even after controlling for the influence of ability, consideration of job seniority slightly improves the prediction of future performance. This was not the case for total seniority, however. The partial F statistic associated with the total seniority regression coefficient was not significant [$F(1,159) = 0.01, p < 0.9051$].

Policy IV-A

This policy recommends promotion on the basis of seniority when the new and old jobs are similar. The model employed to test this proposition was:

$$Y = b_{sen}X_{sen} + b_{sim}X_{sim} + b_{ss}X_{sen}X_{sim} + C$$

TABLE 4
REGRESSION ANALYSIS OF POLICY III--PROMOTE ON
THE BASIS OF JOB SENIORITY WHEN APPLICANTS
ARE EQUALLY QUALIFIED

Source	DF	SS	MS	F	Prob>F
Model ^a	2	10652.1472	5326.0736	12.43	.0001
Error	159	68142.0106	428.5661		
Total	161	78794.1578			

Note: $R^2 = .1352$

^a Source	DF	SS	F	Prob>F
Ability	1	9074.6374	21.17	.0001
Job Seniority	1	1577.5098	3.68	.0568

Tables 5 and 6 contain the results of this moderated regression analysis for total seniority and job seniority, respectively. The significance of b_{sen} was a function of the operational definition of the term. However, neither analysis supported the theory that the effectiveness of a seniority-based promotional policy was a function of the degree of similarity between the old and new jobs, as b_{ss} was not significant in either case. Examination of the b for interjob similarity, which was significant ($p < .02$) in both cases, suggests that the slight predictive ability observed in these models may be attributed to this variable.

Policy IV-B

For equally qualified applicants, this policy recommends promotion on the basis of seniority when the new and old jobs are similar. The appropriate model to test this proposition was:

$$Y = b_{pp}X_{pp} + b_{sen}X_{sen} + b_{sim}X_{sim} + b_{ss}X_{sen}X_{sim} + C$$

The results of these moderated regression analyses are presented in Tables 7 and 8. Again, the results do not support the theory that interjob similarity moderates the predictive validity of seniority. However, due to the significance of b_{sim} ($p < .02$), additional evidence was obtained which suggests that interjob similarity is a valid predictor variable. Consideration of the positive b_{sen}

TABLE 5

MODERATED REGRESSION ANALYSIS OF POLICY IV-A--
 PROMOTE ON THE BASIS OF TOTAL SENIORITY
 WHEN NEW AND OLD JOBS ARE SIMILAR

Source	DF	SS	MS	F	Prob>F
Model ^a	3	3390.4344	1130.1448	2.37	.0716
Error	158	75403.7234	477.2388		
Total	161	78794.1578			

Note: $R^2 = .0430$

^a Source	<u>DF</u>	<u>SS</u>	<u>F</u>	<u>Prob>F</u>
Interjob				
Similarity	1	3117.6867	6.53	.0115
Total				
Seniority	1	248.9187	0.52	.4712
Similarity x				
Total Seniority	1	23.8290	0.05	.8235

TABLE 6

MODERATED REGRESSION ANALYSIS OF POLICY IV-A--
 PROMOTE ON THE BASIS OF JOB SENIORITY WHEN
 NEW AND OLD JOBS ARE SIMILAR

Source	DF	SS	MS	F	Prob>F
Model ^a	3	3822.2646	1274.0882	2.69	.0477
Error	152	74971.8932	474.5057		
Total	161	78794.1578			

Note: $R^2 = .0485$

^a Source	<u>DF</u>	<u>SS</u>	<u>F</u>	<u>Prob>F</u>
Interjob				
Similarity	1	3117.6867	6.57	.0113
Job Seniority	1	684.0460	1.44	.2317
Similarity x				
Job Seniority	1	20.5319	0.04	.8355

TABLE 7
MODERATED REGRESSION ANALYSIS OF POLICY IV-B
USING TOTAL SENIORITY

Source	DF	SS	MS	F	Prob>F
Model ^a	4	12185.4336	3046.3584	7.18	.0001
Error	157	66608.7242	424.2594		
Total	161	78794.1578			

Note: $R^2 = .1546$

^a Source	DF	SS	F	Prob>F
Ability	1	9074.6374	21.39	.0001
Interjob				
Similarity	1	2829.6514	6.67	.0107
Total				
Seniority	1	29.0402	0.07	.7940
Similarity x				
Total Seniority	1	252.1046	0.59	.4419

TABLE 8
MODERATED REGRESSION ANALYSIS OF POLICY IV-B
USING JOB SENIORITY

Source	DF	SS	MS	F	Prob>F
Model ^a	4	13632.3547	3408.0887	8.21	.0001
Error	157	65161.8031	415.0433		
Total	161	78794.1578			

Note: $R^2 = .1730$

^a <u>Source</u>	<u>DF</u>	<u>SS</u>	<u>F</u>	<u>Prob>F</u>
Ability	1	9074.6374	21.86	.0001
Interjob				
Similarity	1	2829.6514	6.82	.0099
Job Seniority	1	1711.9832	4.12	.0439
Similarity x				
Job Seniority	1	16.0827	0.04	.8447

value improves the prediction of future performance, even after controlling for ability and seniority.

Regression models may also be used to examine the impact, if any, which additional variables have on the prediction of future performance. For example, two variables which may influence the seniority-performance relationship are suggested by observation of an existing seniority system, although there is no relevant literature. These variables are job change frequency and new job complexity.

Job Change Frequency

Given that individuals gain experience with each promotion/transfer, operators who have changed jobs frequently may possess a broader base of experience (including actual exposure to their "new" job) than those who have not. As such, it is conceivable that consideration of job change frequency could affect the prediction of future performance.

Results of t-tests indicated that individuals who had transferred more frequently were significantly better pre-transfer performers ($t = -2.76$, d.f. = 160, $p < .007$). However, no intergroup difference was observed with respect to new job performance. In addition, it was revealed that the group of operators who had changed jobs more than once was significantly older ($t = -3.24$, d.f. = 160, $p < .002$).

To test the proposition that job change frequency influences the prediction of future performance, the

following moderated regression equation was constructed and analyzed:

$$Y = b_{pp}X_{pp} + b_{sim}X_{sim} + b_{sen}X_{sen} + b_{chg}X_{chg} + b_{sc}X_{sen}X_{chg} + C$$

where

b_{chg} = dummy variable for job change frequency

b_{sc} = moderator variable for job change frequency and seniority.

Irrespective of the type of seniority measure involved, neither b_{chg} or b_{sc} was found to be statistically significant. As such, no evidence to support the inclusion of job change frequency in promotional policy was obtained.

New Job Complexity

According to seniority advocates, length of service is a reasonable index of experience, (Ghiselli and Brown, 1955; Knowles, 1955). Assuming that experience facilitates performance of complex tasks, new job complexity may function as a moderator of the predictive ability of seniority.

Results of t-tests revealed that the group of individuals who had transferred into low complexity jobs achieved a significantly higher level of new job performance than the operators who had entered high complexity positions ($t = -3.8154$, d.f. = 160, $p < .0002$). However, with respect to past (i.e., old job) performance, the groups were not statistically different ($t = 1.4070$, d.f. = 160, $p < .1614$).

These findings support the contention that future performance level is influenced by the complexity of the new job. Finally, it was determined that the two groups did not differ in regard to operator age ($t = -1.464$, d.f. = 160, $p < .2533$).

This final analysis was performed to examine the theorized affect of new job complexity on the prediction of future performance. The model employed to test this hypothesis was:

$$Y = b_{pp}X_{pp} + b_{sim}X_{sim} + b_{sen}X_{sen} + b_{plx}X_{plx} + b_{sp}X_{sen}X_{plx} + C$$

where

b_{plx} = dummy variable for new job complexity

b_{sp} = moderator variable for new job complexity and seniority.

The results of the moderated regression analyses for total seniority and job seniority appear in Tables 9 and 10, respectively. Inclusion of the job complexity dummy variable in the regression model significantly increases the R^2 value. As such, job complexity accounts for a portion of the previously unexplained variance and improves the predictive ability of the model. The non-significance of b_{sp} in both cases indicates that complexity does not function as a moderator of either seniority measure.

TABLE 9
MODERATED REGRESSION ANALYSIS FOR NEW-JOB
COMPLEXITY INVOLVING TOTAL SENIORITY

Source	DF	SS	MS	F	Prob>F
Model ^a	5	19025.5661	3805.1132	9.93	.0001
Error	156	59768.5916	383.1320		
Total	161	78794.1578			

Note: $R^2 = .2415$

^a Source	DF	SS	F	Prob>F
Ability	1	9074.6474	23.69	.0001
Interjob				
Similarity	1	2829.6514	7.39	.0073
New-Job				
Complexity	1	6576.2853	17.16	.0001
Total Seniority	1	213.2503	0.56	.4568
Complexity x				
Total Seniority	1	331.7418	0.87	.3535

TABLE 10
MODERATED REGRESSION ANALYSIS FOR NEW-JOB
COMPLEXITY INVOLVING JOB SENIORITY

Source	DF	SS	MS	F	Prob>F
Model ^a	5	21136.2936	4227.2587	11.44	.0001
Error	156	57657.8642	369.6017		
Total	161	78794.1578			

Note: $R^2 = .2682$

^a Source	DF	SS	F	Prob>F
Ability	1	9074.6374	24.55	.0001
Interjob				
Similarity	1	2829.6514	7.66	.0063
New-Job Complexity	1	6576.2853	17.79	.0001
Job Seniority	1	1860.5000	5.03	.0263
Complexity x				
Job Seniority	1	795.2195	2.15	.1444

IV. DISCUSSION AND CONCLUSIONS

This study served as a first step toward clarifying the controversy which surrounds the use of seniority as a basis for promotional decisions. The most important finding of this investigation is that total seniority, as measured by an employee's length of company service, does not correlate with or enhance the prediction of future performance. As such, "the seniority principle has no more logical claim to consideration than promotion on the basis of any other arbitrarily selected differentiating factor" (Moore, 1951, p. 144). This finding suggests that seniority may be a dysfunctional basis for making promotional decisions. Additional research, supporting such a finding, would serve to strengthen the argument in favor of promoting on the basis of ability.

Although seniority does not validly predict future performance, it may be useful in predicting other criteria (e.g., job satisfaction, turnover). As such, it is recognized that union arguments which cite seniority's positive role in maintaining stable work forces and boosting employee morale may be valid. However, it is concluded that promotion on the basis of total seniority offers little advantage to the employer interested in staffing higher level jobs with superior performers.

Failure of either seniority measure to meet accepted significance criteria in Policy II--promote on the basis

of seniority--suggests that length of service is not a valid promotional standard. The results support the use of Policy I--promote on the basis of ability--and the use of Policy III--promote the more senior of two equally qualified applicants--when seniority is measured in terms of time spent in the old job.

This study reconfirmed that age is a covariate of seniority and, as such, may serve to confound investigation of the seniority-performance relationship. Therefore, the policy-capturing regression analyses were checked to determine if statistically controlling operator age would alter the results. These findings were no different than those presented in Chapter III.

The results of Policy IV-A indicate that interjob similarity does not moderate the ability of seniority to predict future performance. However, in the Policy IV-B results the sign of the regression coefficient for similarity was positive which suggests that interjob similarity improves promotional policy when worker ability has been statistically controlled. The results involving interjob similarity should be interpreted in view of limitations on the accuracy of the similarity index. The company utilized a total of nine compensable factors to describe job operations for evaluation purposes. Competitive concerns prevented full disclosure of this data and, as a result, interjob similarity was based on only five of these factors. It is conceivable that with more accurate

representation of interjob similarity, this variable holds even greater potential to improve promotional decisions. In addition, this variable could be used to identify career paths involving highly similar operations. Such a program would enable employers to attract and/or prepare individuals for high complexity operations which can be difficult to staff.

Inclusion of new job complexity in the models improves the prediction of future performance. Because new job complexity is position specific rather than operator specific, consideration of this variable has little relevance to promotional selection.

The low values of R^2 in this investigation may be due to restriction of criterion range. The operators involved in the study do not include promotional failures, i.e., individuals who could not meet the company standard by the end of the retraining period. Restriction of range imposes an artificially low ceiling on the R^2 values which can be obtained in an investigation. Additional research, accounting for promotional failures, could be cost-effective. For example, each promotion considered in the investigation involved some degree of retraining. Every instance of inappropriate promotion is costly in terms of training time, rework and related administrative costs (Adie, 1969). Theoretically, improvements in promotional decisions would offer considerable cost savings by reducing the number of promotional failures.

The practical implication of this study is that employers would do well to promote on the objective basis of past performance alone. Such an approach is consistent with the model of behavioral consistency proposed by Wernimont and Campbell (1968). However, better promotional decisions may be obtained by using a combination of ability, interjob similarity and job seniority.

Finally, additional research is necessary in order to test the generality of these findings in other industrial situations. Also, dependent variables that reflect other claimed benefits of seniority (e.g., job satisfaction, organizational commitment) should be tested in appropriate regression models.

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