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Attitude data were obtained from 556 employees in a western telephone company. Respondents held one of sixteen "craft" jobs in the department selected for study. Multiple discriminant function analysis was performed using sixteen groups formed on the basis of subjects' job titles. Variables used in this primary analysis included job satisfaction, organizational commitment, motivational force, and sources of organizational attachment. Discriminatory power for the sixteen group solution was 0.65. A secondary analysis was performed in which discriminant function means were related to means of jobs on several job characteristics variables. These two analyses, viewed jointly, suggest that the relatively high discriminatory power achieved in the primary analysis may have been a function of job scope/job attitude relationships demonstrated in the secondary analysis. (Author)

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JOB CHARACTERISTICS AND JOB ATTITUDES: A MULTIVARIATE STUDY

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JOB CHARACTERISTICS AND JOB ATTITUDES: A MULTIVARIATE STUDY

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Relationships among job characteristics and workers' attitudes are a continuing concern of researchers. Numerous studies (Beer, 1968; Bishop & Hill, 1971; Campbell, 1971; Cummings & ElSalmi, 1970; Hackman & Lawler, 1971; Kirsch & Lengermann, 1972; Lawler & Hall, 1970; Maurer, 1972; and Shepard, 1969, 1971) on the subject have been published since Hulin and Blood (1968) reviewed the literature.

To date, most studies of job characteristic-employee attitude relationships have used univariate and bivariate (correlational) techniques in analyzing data. Virtually no studies have focused on job characteristic-employee attitude relationships using multivariate data analysis techniques (e.g., multiple discriminant function analysis, multivariate analysis of variance, canonical correlation, etc.). Multiple discriminant analysis was used in one recent study (Herman & Hulin, 1972) dealing with differences in attitudes among groups formed on the basis of department, function, hierarchical level, tenure, age, and educational level. Data on job characteristics were not, however, reported by the researchers.

In the present study, therefore, the concern was with determining the extent to which groups of workers formed on the basis of their job title differed from one another on a multivariate attitude composite. Multiple discriminant analyses were performed to test the degree to which individuals' attitudes related to their group membership (i.e., their job title). Attitudes measured included organizational commitment, sources of organizational attachment, performance motivation, and satisfaction with work, pay,

co-workers, supervision, and promotion prospects. Questions guiding the analyses were:

(1) Can groups formed on the basis of job title be successfully discriminated from one another on the basis of incumbents' attitudes; that is, are between group differences in attitudes greater than within group differences?

(2) Given that group differences are capable of "explaining," to a large degree, individual differences in attitudes, which variables most account for such between group differences?

(3) To what extent are group means on the discriminant functions related to characteristics of the various jobs represented in the study's sample? More precisely, are the scores of jobs on the "composite" variables resulting from the discriminant analysis related to mean scores of the jobs on such characteristics as autonomy, variety, feedback, etc.?

Method

Data reported here were collected from blue- and white-collar workers in a western telephone company. Individuals supplying data held one of the following jobs? (1) Deskman, (2) PBX Installer, (3) PBX Repairman, (4) Station Installer, (5) Station Repairman, (6) Line Assigner, (7) Supplyman, (8) Messenger, (9) Building Mechanic, (10) Splicer, (11) Lineman, (12) Central Office Equipmentman, (13) Frameman, (14) Plant Service Clerk, (15) Plant Reports Clerk, and (16) Reports Clerk. Of the 1000 individuals asked to participate in the study 605 agreed to do so and were administered a group of questionnaires during the months of June and July of 1971. Two groups of individuals were excluded from the data sample (Analysis Clerks because of the small number, 3, in this group; and 9 other individuals who supplied us attitudinal data but not their job title). The sample was thus

reduced to 593.

Job characteristics data were collected several months after the attitude data had been obtained. An attempt was made in this phase of the investigation to get ratings of the sixteen jobs from at least five incumbents in each job group. A total of 164 ratings of the sixteen jobs were obtained from job incumbents during the month of March 1972.

Attitude Measures

Attitude data were obtained using instruments designed to measure job satisfaction, organizational commitment, performance motivation, and sources of organizational attachment.

Job Satisfaction. The Job Descriptive Index (JDI) developed by Smith, Kendall, and Hulin (1969) was employed to measure several aspects of job satisfaction: (1) satisfaction with the work itself, (2) satisfaction with pay, (3) satisfaction with promotion prospects, (4) satisfaction with supervision, and (5) satisfaction with co-workers.

Organizational Commitment. A fifteen item questionnaire designed to assess the degree to which individuals are committed to their employing organization was used as an index of this construct. (Cronbach's alpha for the fifteen item instrument was .90 for this study.) An individual would be described as highly committed to the extent that: (1) he was willing to exert high levels of effort in the service of organizational goals, (2) he had a strong desire to remain a member of his employing organization, and (3) he had internalized the organization's values and goals. Respondents were asked to indicate their agreement or disagreement with statements such as the following:

> I am willing to put in a great deal of effort beyond that normally expected in order to help this organization be successful.

Strongly Disagree	Moderately Disagree	Slightly Disagree	Neither Agree nor Disagree	Slightly Agree	Moderately Agree	Strongly Agree

Performance Motivation. This construct was measured using a fifty-eight item questionnaire. Half of the items were designed to measure the degree to which various performance related outcomes were either positively or negatively valued by individuals. These are what, in the expectancy theory motivational framework, are commonly referred to as valences (see, for example, Vroom, 1964). The remaining twenty-nine items asked the respondent to indicate his beliefs about the probability of especially high levels of performance leading to these outcomes. These are expectancy items. For each of the expectancy items in the first part of the questionnaire there was an accompanying valence item in the second part. An individual's motivation force was computed by:

$$\text{Motivational Force} = \sum_{i=1}^{29} (\text{expectancy of item } i) \times (\text{valence of item } i)$$

Two questions are presented below from the instrument. The first is an expectancy item, the second a valence item.

If a person performs especially well on your job, he is more likely to feel a sense of accomplishment at the end of the day, then if he does not perform especially well.

Not at all true			Moderately true			Very true
1	2	3	4	5	6	7

Having a feeling of accomplishment.

Dislike very much			Neither dislike nor like			Like very much
-3	-2	-1	0	1	2	3

Sources of Organizational Attachment. This twelve item instrument measured the impact of various factors on an individual's decision to stay with or leave his employing organization. Items included in the questionnaire were concerned with job duties, salary prospects, organization's effectiveness, unit's effectiveness, geographical location of the organization, the way supervision structures the work, promotion prospects, immediate work colleagues, organization's values, supervision's response to employee's feelings, reactions at all levels to performance, and organization's reputation. A typical item from the questionnaire is shown below:

My feelings about the effectiveness of this organization as a whole.

-3	-2	-1	0	+1	+2	+3
Strong influence toward leaving			No influence in either direction			Strong influence toward staying

Job Characteristics Measure

Job characteristics data were obtained from incumbents in the jobs studied using a slightly modified version of an instrument reported in the Hackman and Lawler (1971) study. The instrument was designed to measure eight job characteristics: (1) variety, (2) autonomy, (3) task identity, (4) feedback, (5) friendship opportunities, (6) dealing with others, (7) prestige of the job when compared with other craft jobs in the division, and (8) prestige of the job when compared with all other jobs in the division. A typical item from the instrument is shown below:

How much variety is there in your job?

Very little; I do pretty much the same things over and over and use the same pieces of equipment and procedures almost all of the time. (Scored 1)
Moderate variety. (Scored 4)
Very much; I do many different things and use a variety of equipment and procedures. (Scored 7)

Hackman and Lawler (1971) describe the job characteristics instrument in detail. A parallel description is, therefore, not offered here. Note, however that the two prestige measures did not appear on the instrument described by Hackman and Lawler. These were added to the instrument for the present study.

It should be noted that in addition to having incumbents rate their jobs on the eight characteristics, ratings were also obtained from supervisors and peers. Coefficients of concordance demonstrated that the rankings of jobs by the three "sources" of ratings (incumbents, supervisors, and peers) were very similar. Coefficients of concordance were .87 ($p<.001$) for variety, .76 ($p<.01$) for autonomy, .64 ($p<.02$) for task identity, .58 ($p<.05$) for feedback. .46 ($p<.20$) for friendship opportunities. .75 ($p<.01$) for dealing with others, .82 ($p<.01$) for prestige (craft), and .78 ($p<.01$) for prestige (all jobs). Given this relatively high degree of similarity among among the rankings of jobs by the three rater groups it was decided to use incumbents' ratings of the jobs in all analyses.

Results

The central analytical technique for information sought in the present study was multiple discriminant analysis. A multivariate technique was selected for two reasons. First, one-way analyses of variance showed that the sixteen job groups differed from one another on all of the nineteen

attitudinal indices. Results of the analyses of variance are presented in Table 1. It can be seen that seven of the F values are significant

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Insert Table 1 About Here

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beyond the .001 level, nine are significant beyond the .01 level, and the remaining three are significant at the .05 level. While these F values are of interest in and of themselves, it should be noted that the nineteen variables are not statistically independent of one another. This leads to the second point: A "distorted picture" of between group differences is likely when successive F tests are performed on correlated measures (Tatsuoka, 1970, pp. 2-3).

Having established that the sixteen groups in the present study differed from one another (F values in Table 1) on the nineteen correlated variables the next logical step was to compare them on multivariate composite measures by means of a multiple discriminant function analysis.

Multiple Discriminant Analysis

Multiple discriminant analysis resulted in four statistically significant discriminant functions that accounted for 70.3% of the total discriminable variance. Power of the sixteen group solution was .649 (cf. Tatsuoka, 1970, p. 48); that is, approximately 65% of the variability in individuals' attitudes was "explainable" on the basis of their job group membership. (Note that because of missing data for some subjects the sample size was reduced from 593 to 556.) Discriminant function coefficients for the four significant discriminant functions and the proportions of discriminable variance accounted for by each are presented in Table 2.

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Insert Table 2 About Here

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Function I accounts for 31.7% of the total discriminable variance (X^2 = 635.85, df = 285, p < .01)[3]. Group means on the original nineteen variables were used in conjunction with the coefficients associated with Function I to compute group means for Axis I of the discriminant space[4]. Figure 1 shows the placement of groups with respect to Axis 1.

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Insert Figure 1 About Here

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Separation of groups along Axis I is primarily a function of (in order of decreasing potency in the discriminant function) JDI work itself, JDI pay, JDI promotion prospects, JDI co-workers, and SOA job duties. Jobs to the right on Axis I are filled by individuals who (relative to individuals in other jobs) have low satisfaction with the work itself and co-workers, high satisfaction with pay and promotional opportunities, and feel that their job duties are not a strong influence in binding them to their employing organization. Jobs to the left on Axis I have incumbents with, generally, "opposite" attitudes. Note that jobs to the left on Axis I are skilled craft jobs (e.g., PBX Repairman, Deskman, etc.) while jobs to the right of the space are semi-skilled or unskilled. The separation of groups along Axis I appears to relate, therefore, to skill level differences of the jobs studied. (As will be shown later, the positioning of groups along Axis I was related to the job characteristics indices of variety and autonomy.)

Function II accounts for 18.1% of the total discriminable variance

(X^2 = 434.25, df = 252, p<.01). Inspection of the discriminant function reveals that the variables most accounting for between group differences are (in order of decreasing potency) JDI pay, JDI promotion prospects, SOA supervision's structuring of work, SOA geographical location of the organization, and SOA job duties. Group means on the original nineteen variables were used in conjunction with Function II's coefficients to compute group means for Axis II of the discriminant space. The positioning of jobs along Axis II is shown in Figure 1. Incumbents in jobs near the positive end of Axis II (e.g., Deskman, Plant Reports Clerk, PBX Repairman) when contrasted with individuals in jobs near the negative end of the same axis (e.g., Supplyman, Splicer, Lineman) show higher satisfaction with pay, lower satisfaction with promotional opportunities, and are more attracted to the organization by supervisors' structuring of work, geographical location of the organization, and job duties.

Function III accounts for 11.4% of the total discriminable variance (X^2 = 319.33, df = 221, p<.01). Function III contrasts jobs mainly on the basis of SOA organization's effectiveness, SOA promotion prospects, SOA reactions to performance, motivational force, and SOA organization's reputation. Figure 2 shows the placement of jobs along Axis III of the discri-

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Insert Figure 2 About Here

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minant space. Individuals in jobs to the right on Axis III (e.g., Station Installer) have, relative to other individuals in other jobs (e.g., Building Mechanic), low motivational force and are highly attracted to their employing organization by the organization's effectiveness, promotion prospects,

reactions to performance, and the organization's reputation.

Function IV accounts for 9.1% of the total discriminable variance (X^2 = 246.77, df = 192, $p<.01$). Jobs are contrasted by Function IV mainly on the basis of JDI supervision, SOA unit's effectiveness, motivational force, JDI promotion prospects, and SOA reactions to performance. Figure 3 shows the placement of jobs along Axis IV. Jobs such as Plant Reports Clerk, C. O.

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Insert Figure 3 About Here

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Equipmentman, etc. are filled by individuals with relatively high scores on JDI supervision and JDI promotion prospects. These individuals tend to have relatively low motivational force, feel that reactions to their performance are not a potent source of attraction to the organization, and view their work unit's effectiveness as a force binding them to the organization.

Job Characteristics-Discriminant Function Centroid Relationships

Group means on Axes I-IV of the discriminant space were correlated with mean scores for the sixteen jobs on the eight job characteristics indices. Table 3 shows the results of this analysis. Although the data in Table 3 show that only six of the thirty-two correlations are statistically different from zero (using an α = .10 criterion) there are twelve that are greater than .30. Therefore, despite the small N (= 16), which limits the number of correlations reaching significance, it appears that there is a meaningful pattern of correlations in Table 3.

As can be seen, the positioning of jobs with respect to Axis I is related to variety, autonomy, and friendship opportunities. Placement of jobs with respect to Axis II is related to variety, autonomy, and prestige

(craft jobs as a reference group). These correlations suggest that the attitude contrasts revealed by discriminant functions I and II may be related to "job scope" differences among the sixteen positions studied. (Job scope is inferred here from the variety and autonomy associated with a job.) Jobs in the upper-left quadrant of Figure 1 (e.g., Deskman, PBX Repairman, etc.) are jobs with relatively large scope, while jobs in the lower-right quadrant of the figure (e.g., Supplyman, Frameman, etc.) are jobs with relatively small scope. The fact that variety and autonomy indices for the sixteen jobs are related to group means on both discriminant functions I and II lends strength to the argument that scope differences may have been a factor contributing to the results of the multiple discriminant function analysis. The argument is further strengthened by the fact that the job characteristics data were not employed in the discriminant analysis.

Discussion

Results of this study demonstrated that grouping individuals on the basis of the jobs they held led to a relatively high degree of discriminatory power: Sixty-five percent of the variability in individuals' attitudes was "explainable" on the basis of their group membership. It was also shown that mean job characteristic scores were related to the positioning of jobs in the discriminant space.

Earlier it was mentioned that a recent study by Herman and Hulin (1972) investigated attitudinal differences among groups formed on the basis of several "individual differences" and "organizational" (structure-related) variables. They reported that structure-related variables were able to account for more of the variance in individuals' attitudes than individual-differences variables. The present study's findings suggest that the discrimination achieved by Herman and Hulin may have been more a function of the

jobs held by individuals in their sample than of differences in either "function, hierarchical level, or primary task orientation" (except to the extent that such structural variables relate to differences in individuals' jobs). All jobs in the organization reported here were at the same hierarchical level. The discrimination achieved was not, therefore, a function of differences in level. There is some evidence for a "functional" or "primary task orientation" basis for the discrimination obtained by Herman and Hulin. To the extent that workers in one functional subdivision of an organization have job duties that are more similar to those of others in the same subdivision than to the duties of persons in other subdivisions, we would expect moderate to high discriminatory power. This follows from the multitude of studies in the literature that have shown the existence of relationships among job characteristics and job attitudes. Similarly, one would expect that grouping by primary task orientation (i.e., department) would result in successful discrimination if individuals in a given department had jobs of a similar nature that were at the same time different from those of others in other departments.

The results of this study as well as those of others (e.g., Hackman & Lawler, 1971) are in agreement as to the relationships that exist among job characteristics and workers' attitudes. If, as is suggested in this paper, Herman and Hulin's results were a function of job differences the "organizational frames of reference" explanation of their results might be expanded so as also to include job characteristics among the factors in the organizational environment that impact upon individuals' attitudes. It may be that job duties of organizational members are more influential--or at least as influential--in "shaping" attitudes than hierarchical level, functional area,

or primary task orientation. Studies are obviously need to determine the relative impact of each of these factors.

To test the impact of functional area of an organization on workers' attitudes one could collect data from workers in various functional subdivisions of an organization who all had the same job duties. Given a constant job one could then test (using multiple discriminant analysis) for attitudinal differences among the workers from the various functional subdivisions. If the "organizational frames of reference" theory is correct, differences should be found. A similar study could be conducted using workers with the same job from different departments within an organization. If department (primary task orientation) is, indeed, important in influencing individuals' attitudes then differences among the various departmental groups should be found. A study to examine the effects of job vs. hierarchical level would be difficult to design since as level changes so does the work done by an individual. This may make a "same job, multi-level" study impossible to carry out. The other two studies ("same job, different functional areas" and "same job, different departments") are feasible, however.

In addition to the implications of the present study's findings for the Herman and Hulin "organizational frames of reference" theory presented above, the results also have relevance for two other recently reported studies (Beer, 1968; and Campbell, 1971).

Beer studied the relationship between job complexity and the satisfaction of workers' needs, and reported that there were "no essential differences" in need strength or need satisfaction between workers in routine (low complexity) and complex (high complexity) clerical jobs. As a result, he concluded that "an increase in variety does not necessarily result in increasing higher

order need satisfaction or motivation (p. 221)." Evidence from the present study indicated that motivational force was indeed different for workers in the sixteen jobs studied. In fact, motivational force was one of the most influential variables in both the third and fourth discriminant functions[5]. It would appear, therefore, that job complexity indeed can be related to the motivation of workers. The results reported by Beer may have been a function of little actual difference between what were reported to be "routine" and "complex" clerical positions.

Campbell (1971) studied the relative impact of shared job and shared supervision in determining employees' attitudes. Shared job was used to refer to individuals having the same job title. Shared supervision referred to individuals having the same supervisor. Campbell reported that shared supervision related most to workers' attitudes and that shared job was unrelated to attitudes. According to Campbell ". . .the job itself, if it mainly meets already gratified needs, may show little association with worker [sic] attitudes [p. 525]." Since all individuals with a common job title in the present study shared the same job and this "shared job" led to a high degree of discriminatory power, Campbell's conclusion that shared job is unimportant, in terms of its impact upon workers' attitudes, appears questionable. While the present study did not attempt directly to test the formulations of Campbell, evidence derived from it has clear implications concerning such formulations.

In conclusion, the present study's findings showed that the job an individual holds is associated not only with attitudes about the work itself but also relates to other attitudes as well (e.g., satisfaction with pay, satisfaction with promotion prospects, etc.). The degree to which the job affects

individuals' attitudes was revealed by the high (65%) discriminatory power achieved when individuals' attitudes were viewed in relation to their job group (job title) membership. Given the findings of the present study, the thrust of future research in this area should be to determine the relative power of job characteristics and organizational (structure-related) variables to "explain" individual differences in attitudes.

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[2]Correlations among the nineteen variables ranged from -.54 to .87 with 109 of the possible 171 bivariate correlations having an absolute value of .30 or more.

[3]Significance of the function tested by a technique described in Overall and Klett (1972, pp. 288-289). See their discussion for the rationale underlying the significance tests.

[4]The means of the sixteen jobs on the nineteen variables are not reported here but can upon request be obtained from the senior author.

[5]For the sixteen jobs studied, in fact, motivational force was found to correlate .57 ($p<.05$) with autonomy and .32 (n.s.) with variety.

TABLE 1

One Way Analysis of Variance Results

Variable	df[1]	F
Motivational Force	15, 560	2.10**
Organizational Commitment	15, 572	2.36**
SOA; Job Duties	15, 572	2.46**
SOA; Salary Prospects	15, 572	2.67***
SOA; Organization's Effectiveness	15, 572	3.26***
SOA; Unit's Effectiveness	15, 572	1.73*
SOA; Geographical Location of the Organization	15, 573	3.77***
SOA; Supervision's Structuring of Work	15, 573	1.75*
SOA; Promotion Prospects	15, 573	2.41**
SOA; Immediate Work Coleagues	15, 570	2.25**
SOA; Organization's Values	15, 572	2.39**
SOA; Supervision's Response to Feelings	15, 573	2.64***
SOA; Reactions to my Performance	15, 572	1.98*
SOA; Organization's Reputation	15, 573	2.20**
JDI; Supervision	15, 569	2.44**
JDI; Co-workers	15, 569	2.35**
JDI; Work Itself	15, 569	4.95***
JDI; Pay	15, 570	5.85***
JDI; Promotion Prospects	15, 569	3.98***

*$p < .05$

**$p < .01$

***$p < .001$

[1] Degrees of freedom vary because of missing data for some measures.

TABLE 2

Discriminant Function Coefficients

Variable	Discriminant Function			
	I	II	III	IV
Motivational Force	-.14	.27	-.37	-.35
Organizational Commitment	.03	-.13	.24	-.22
SOA; Job Duties	-.18	.38	-.16	.06
SOA; Salary Prospects	-.12	.02	-.31	.04
SOA; Organization's Effectiveness	.07	.20	.69	-.15
SOA; Unit's Effectiveness	.04	-.26	-.18	.40
SOA; Geographical Location of the Organization	.05	.43	.27	-.27
SOA; Supervision's Structuring of Work	.16	-.44	.03	-.24
SOA; Promotion Prospects	.14	-.11	.56	-.01
SOA; Immediate Work Colleagues	.15	.06	.07	.14
SOA; Organization's Values	.17	.20	-.15	.19
SOA; Supervision's Response to Feelings	.09	.16	-.34	-.27
SOA; Reactions to my Performance	.06	.09	-.52	-.33
SOA; Organization's Reputation	.04	-.08	.36	.16
JDI; Supervision	.10	.24	-.01	.96
JDI; Co-workers	-.26	-.20	.24	.10
JDI; Work Itself	-.84	.07	.14	.03
JDI; Pay	.44	.48	-.04	.28
JDI; Promotion Prospects	.39	-.47	.01	-.34
Proportion of discriminable variance explained by discriminant function	.32	.18	.11	.09

TABLE 3

Zero Order Correlations: Job Characteristics Means and Positioning of Jobs in Discriminant Space

Variable	Discriminant Function Means			
	Axis I	Axis II	Axis III	Axis IV
Variety	-.50*	.43*	-.10	.07
Autonomy	-.48*	.45*	.01	.10
Task Identity	-.01	.18	.10	.06
Feedback	.21	.35	.00	.31
Friendship Opportunities	.60**	-.13	.08	.10
Dealing with Others	-.17	.35	.21	.08
Prestige (Craft jobs reference)	-.32	.50*	.02	.42
Prestige (All jobs reference)	-.25	.31	.18	.14

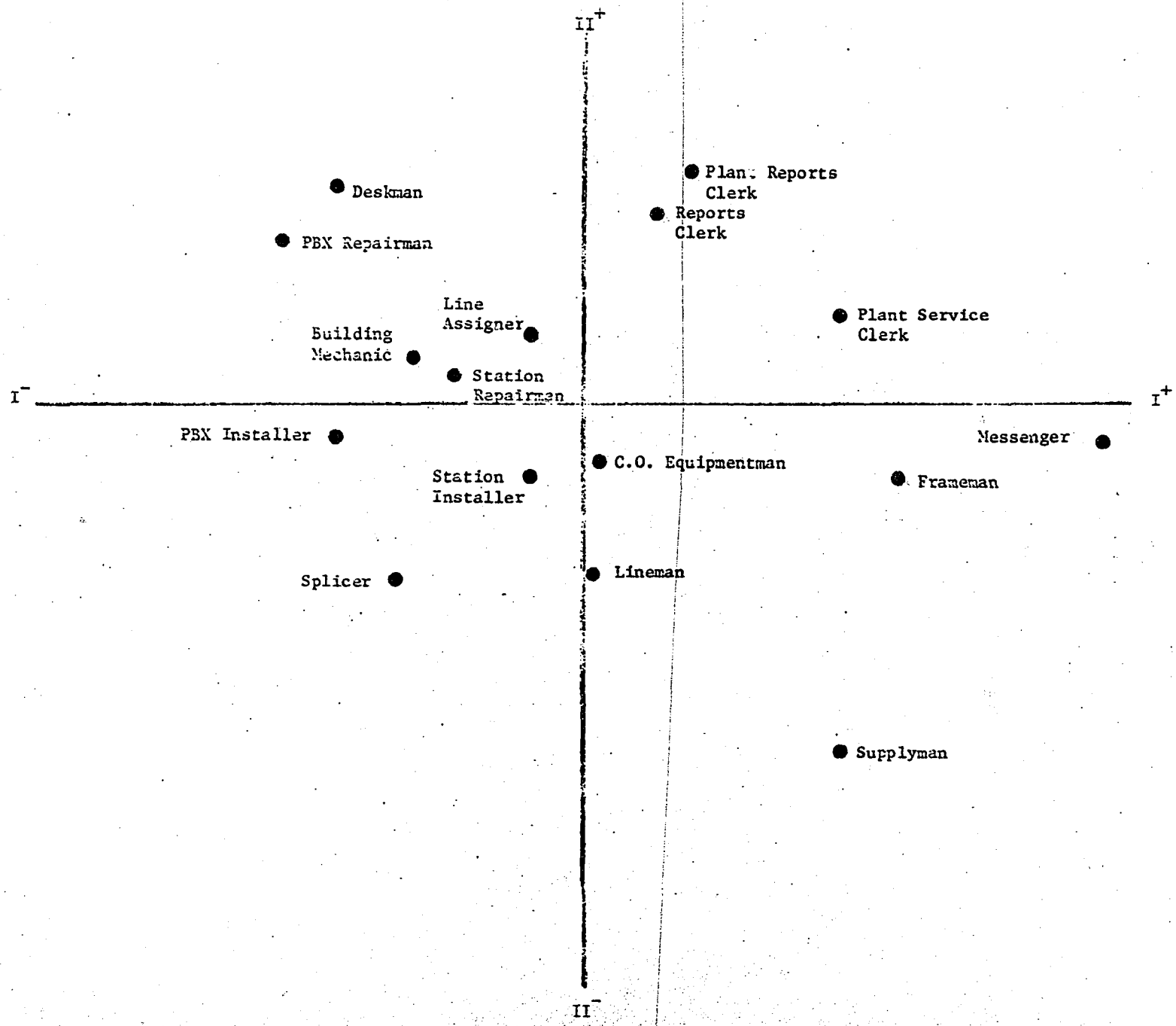
* $p<.10$

** $p<.05$

Note. - N=16 for all correlations shown in the table.

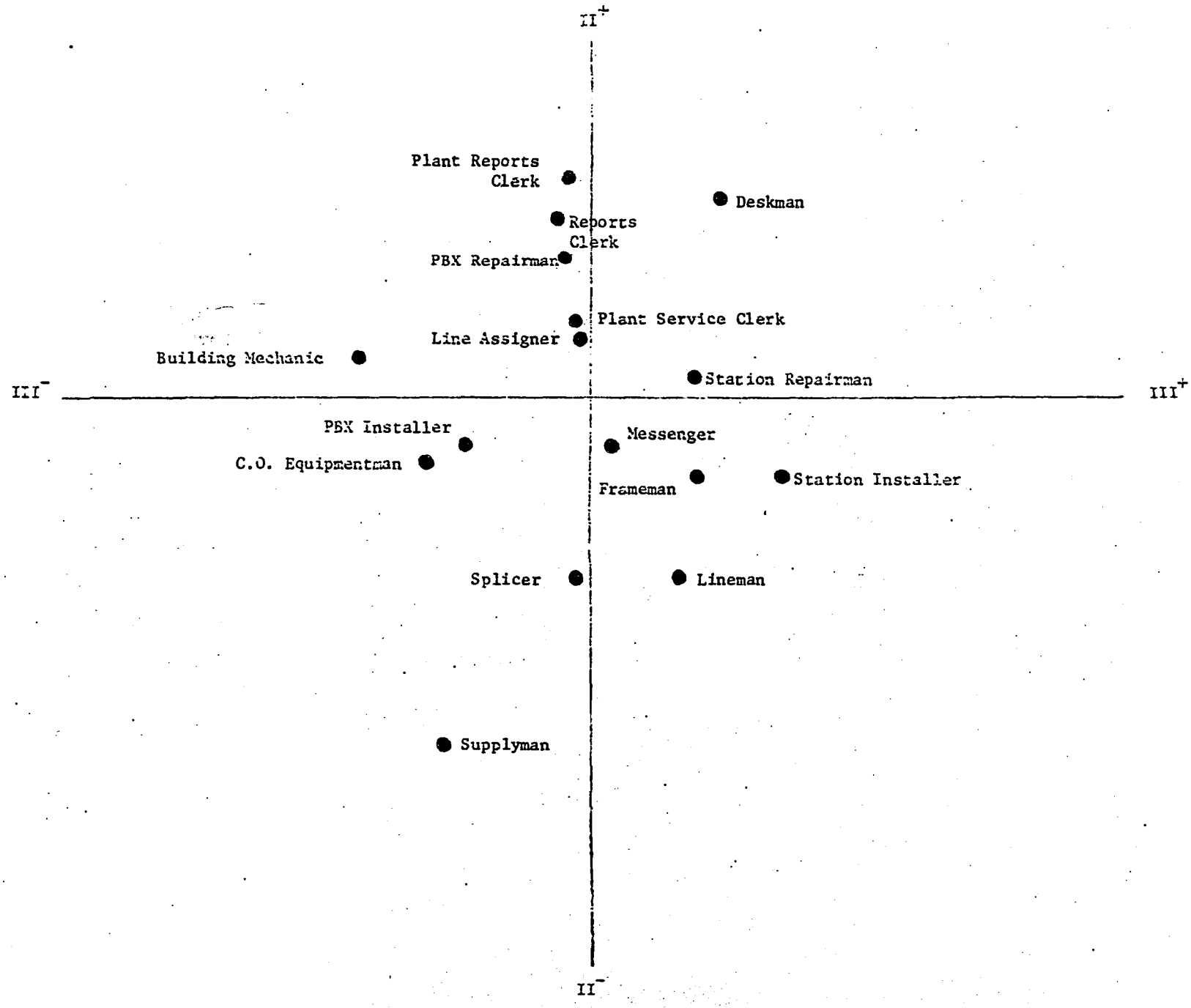
(Figure Caption)

Fig. 1. Group Means on Discriminant Functions I and II.


II+
Deskman
PBX Repairman
Plant Reports Clerk
Reports Clerk
Line Assigner
Building Mechanic
Station Repairman
Plant Service Clerk
I−
I+
PBX Installer
Messenger
C.O. Equipmentman
Station Installer
Frameman
Splicer
Lineman
Supplyman
II−

(Figure Caption)

Fig. 2. Group Means on Discriminant Functions II and III.


II+
Plant Reports Clerk
Deskman
Reports Clerk
PBX Repairman
Plant Service Clerk
Line Assigner
Building Mechanic
Station Repairman
III−
III+
PBX Installer
Messenger
C.O. Equipmentman
Frameman
Station Installer
Splicer
Lineman
Supplyman
II−

(Figure Caption)

Fig. 3. Group Means on Discriminant Functions III and IV.

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