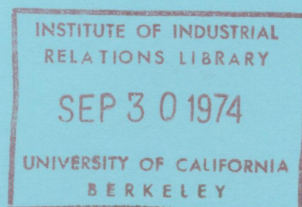[California. University.
    Institute of Industrial Relations (Berkeley)

//Individual differences in an organizational
setting: interrelationships and influences,
by Milton R. Blood with Skip Lima
and John R. Kestell.//

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A series of investigations are reported which examine the interrelationships of individual-difference variables in an organizational setting. Work-reward preferences are treated as the focal variables for the studies. A discussion is presented which examines the appropriateness of within-person and between-person prediction models in the motivation domain.

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Technical Report #7

INDIVIDUAL DIFFERENCES IN AN ORGANIZATIONAL SETTING:

INTERRELATIONSHIPS AND INFLUENCES

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August, 1974

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Table of Contents

Foreword

Whenever a set of several studies is carried out in an organization some decision must be made about how to report the results. Should each study be presented separately or should all of them be integrated into a single presentation? Should the data be reported as a single package or as specific pieces of information? In some ways this technical report provides a compromise decision to that question. Several separate studies are presented in the same report, and an attempt is made in an introductory section and in a concluding section to provide some integration of the studies and their import. The studies sometimes share subject populations and sometimes variables . They are a part of a larger project which is investigating individual and structural variables in a military aviation organization.

The persons responsible for authoring various portions of this report are listed in the headings of the individual sections. Overall responsibility for the report belongs to the senior author. Primarily, this report includes studies from an individual difference perspective in the larger research project. Additional reports from this perspective will be forthcoming.

INDIVIDUAL DIFFERENCES IN AN ORGANIZATIONAL SETTING:

INTERRELATIONS AND INFLUENCES

Individual differences have been of major importance in the field of psychology in general, and they have an even greater role proportionally in the subfields of applied psychology and organizational psychology. An individual-differences approach to psychological measurement is defined by assessing characteristics of individuals and then making comparisons across individuals. In organizational psychology the main characteristics of interest have been those variables which are related to either the organization or the performance of tasks in the organization.

There are two main tasks that individual-difference variables have been called upon to perform in organization psychology. The first of these is to describe. Individual-difference variables are used as descriptors for individuals, groups, and for organizations. Usually the measurements are made on individuals. For descriptors of groups or organizations the data are aggregated over the appropriate set of individuals.

Though it may seem contradictory to claim that variables used as descriptors are individual-difference variables, it is not a perversion of the term "individual difference" in its fullest sense. The term implies comparisons among individuals. The term "descriptor," on the other hand, implies simply the statement of the measurement values or degrees of a characteristic for a single individual. However, when we examine the variables which psychologists use as descriptors we find that in the great majority of cases they are variables that gain meaning only through comparison. To say that someone has an achievement motivation of 63 or

that the average morale in the group is 74.2 only takes on meaning if those scores are put into a context with other scores. The score has meaning as a descriptor because it describes the difference between the focal individual and other individuals or norms based on others.

Individual-difference variables used as descriptors present a summary of the focal individual, group, or organization. They give a profile of the individual along the measured dimensions. Descriptors help us to know the characteristics of the focal individual. Our understanding is increased by the increase in information which is provided about the individual.

The second task which individual-difference variables perform in organizational psychology is to predict. Most often one set of individual-difference variables is used as predictors for another individual-difference variable. Traditionally, these predictions are based on relationships between variables which have been established empirically. The relationship is most often established by demonstrating a correlation between variables over a sample of persons. (One of the sections of this report argues for the use of a model different from this traditional approach.)

Even though not every study which demonstrates relationships between individual-difference variables is done for the purpose of predicting, we can say that the individual-difference variables in such studies are used as predictors. For, where our goal is not prediction, we use the identified relationships to increase our understanding of one variable from information which we have about another variable. Several of the sections of this report are in the form of such predictive studies where the ultimate aim is not to use the variables as predictors, but to increase our understanding through knowledge of the interrelationships among the variables.

Reward preferences as focal variables

For several of the studies presented in the individual sections of this report the measure of preferences among work rewards is used as a variable of primary interest. The importance of reward preferences derives from their strategic theoretical position in the examination of an individual's interaction with a work organization. This theoretical position can be diagrammed as in Figure 1.

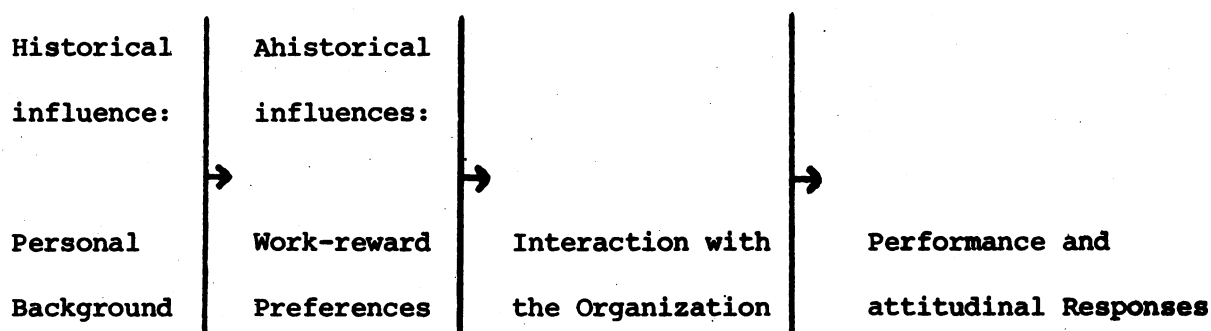| Historical influence:	Ahistorical influences:		
→	→	→	
Personal Background	Work-reward Preferences	Interaction with the Organization	Performance and attitudinal Responses

Figure 1. Components of individual/organizational interaction.

The immediate influence of the process of interacting with the organization is that set of expectations which the individual has at the time of inter-action. This frame of reference derives from all of the historical events and personal attributes which have gone into determining the individual's present state. It is the ahistoric, present state of the individual which interacts with the organizational situation to produce the responses to the situation. The responses include both performance and attitudinal responses. For the present set of studies relationships are investigated which correspond to looking both directions from the preferences position in Figure 1.

Subsections of this report

The first of the more-or-less independent sections of this report is a theoretical discussion of the appropriateness of using within-person,

rather than between-person, information when dealing with the motivation domain. This statement of a theoretical position is included because the focal measure in the following three empirical studies is one which provides within-person information. Such a justificatory section is relevant because (1) within-person information has rarely been used in individual-difference studies, and (2) additional data analysis problems are incurred by the use of within-person information.

The second section is an empirical investigation of relationships between work-reward preferences and some personal background variables. Data are presented from three separate samples. The first sample is composed of engineers. The other two samples are from Naval air fighter squadrons.

The third section of the report presents data demonstrating the relationships between work-reward preferences and attitudinal job responses. These data are from Naval air fighter squadrons. The attitudinal variables for this study are job satisfaction and organizational commitment.

In the fourth section of the report there is both a methodological and a substantive concern. Methodologically, two distinct clustering techniques are compared on the results they provide from the same set of data. Substantively, the work-reward preference variables are used to cluster Naval personnel. Descriptions are provided of the clusters which issue from each clustering technique.

The fifth section of the report is an empirical investigation of relationships between personal background and personality characteristics on the one hand and job satisfaction on the other. These data, also, are from the study of Naval personnel.

Following the separate subsections a set of concluding remarks closes

this report. These final remarks will suggest the research and applied
implications of the data presented.

PREDICTING BEHAVIORS FROM MOTIVATION DIMENSIONS: AN ARGUMENT

FOR WITHIN-PERSON RATHER THAN BETWEEN-PERSON STRATEGIES
Milton R. Blood
Georgia Institute of Technology

Prediction of behaviors from measurements of motivation dimensions is an established part of the repertoire of (at least research) psychologists. Often this prediction is made from a model of straight linear relationship as is usual when making predictions in the ability domain (behavior = (f)motivation), and sometimes motivation dimensions are combined with ability measures in a multiplicative fashion (behavior = (f)(ability x motivation)) in what is essentially the same prediction strategy. In this article the author will propose that another prediction strategy is appropriate for motivation dimensions rather than the traditional linear prediction model or some variant of it.

A motivation dimension is defined here as a measurement of a person which indicates a predisposition of that person toward a behavior. Motivation dimensions have been conceptualized as both voluntary (desires, goals, intentions) and involuntary (needs, drives, reinforcements). Both kinds of conceptual dimensions are included in this discussion. Measurements of motivation dimensions have sometimes been developed specifically as prediction instruments, e.g., the measure of force to work hard which was used by Hackman and Porter (1968). In other instances, motivation measurements have come from the development of personality inventories which have included dimensions descriptive of behavioral propensities, e.g., the dominance scale of the California Psychological Inventory (Gough, 1957) and the need affiliation scale of the Edwards Personal Preference Schedule (Edwards, 1959).

Predictions of behavior from motivation dimensions has nearly always been carried out from the psychometric prediction model which was developed in the abilities domain. In that model behavioral predictions are made between-persons. The person who is highest on the measured characteristic (ability) or motivation dimension is predicted to exhibit the most of the corresponding behavioral performance. This report will argue that there is another prediction model which is more appropriate for use with motivation dimensions. In this model the predictions are made within-persons (but between-dimensions). In this within-person model the strengths of several dimensions are measured for an individual, and the prediction is made that his behavioral performance will correspond to the dimension which is highest.

Description of the Two Models

Between-person model

The between-person model for prediction, sometimes called a normative model, beginning with the choosing of an individual characteristic which is to be predicted--in the present discussion this is a behavior. Then another characteristic is chosen which will be used as a predictor of the behavioral criterion--the present discussion concerns only the use of motivation dimensions as predictors. A relationship (usually linear) is established empirically between the predictor and the criterion, and this relationship is used to predict criterion behavior for persons for whom only predictor information is known. Measurements on the predictor dimension are used in a relative, between-person fashion. Persons are either compared directly and the criterion behavior is predicted to be relative among persons in the same fashion as the relative predictor scores, or an individual's criterion behavior is predicted from comparison to the scores of some norm group.

The predictor can be measured directly as a behavioral intention as Ryan (1970) suggests or as a behavioral propensity toward certain patterns of behavior as in the work of McClelland (1961). Alternatively, the motivational predictor may be a derived score as in instrumentality theory (Vroom, 1964; Mitchell & Biglan, 1971), or as a behavioral intention which is derived from other measures (Dulaney, 1968; Fishbein, 1967). The important characteristic which qualifies the prediction strategy as the between-person model is how the predictor score is used rather than the nature of the measurement of the motivation dimension.

Within-person model

The within-person model for prediction also begins with the selection of the behavior to be predicted. Then, those other behaviors which might be alternative behaviors for the person are determined. Measurements are made for an individual of his/her propensity toward each of the behaviors, and the behavior which is predicted is that alternative for which the propensity is greatest within that person. Thus, the comparisons are made among behaviors but within the person. Again, the scores which are used to make the predictions could be either direct measures or derived scores.

Some within-person techniques have been developed and provide the basis for further methodological development. Within-person strategies have been used in the field of decision-making where they involve comparisons of subjective expected utilities (Edwards, 1954), and they are implied in ipsative measures such as paired-comparison preference scores or normative scores which have been ipsatized by double centering. It should be noted that, though ipsative measures necessarily give within-person information, within-person comparisons do not require formally ipsative measures. Again, it is the use of the measures rather than their psychometric nature which characterizes

the model.

Assumptions of the Two Models

Between-person model

For the between-person model, the basic assumption which is necessary
is that the predictor scores are comparable from one person to another.
This requires that the meaning of the score be the same from one person to
another, i.e., two persons getting the same score should be equally "motivated,"
and a person who receives a higher score should be "more motivated." This
question of the validity of the measurements is absolutely essential to
the between-person model as the comparisons are made from one person to
another. Whatever the motivation dimension under investigation, its meaning
must be the same across all of the individuals involved in the prediction
comparison. In this model scores on the measurements indicate an absolute
amount of motivation.

Further, there is an assumption in the between-person model that the
between-person comparison (relative position on the predictor) is an impor-
tant cue to or influence on the target behavior. That is, it is assumed that
the position relative to other persons on the predictor is related to criterion
behavior. Any person with a particular predictor score will behave in the
same corresponding fashion on the criterion. The important information in
the determination of the criterion performance is assumed to be how the pre-
dictor score compares with the predictor scores of others. This assumption
seems legitimate in the abilities domain (a person with greater ability will
perform better on a test of that ability), but it is not proper in the moti-
vation domain. When a person chooses a behavior, it is not because s/he

prefers that behavior more than other people do, it is because s/he prefers that behavior to the available alternative behaviors. To argue that between-person motivation scores can be compared as predictors for a particular behavior requires that the individuals being compared hold equal positions regarding motivation toward the total complement of alternative behaviors. Only to the extent that this is true, can we predict successfully from the between-person model. Conversely, to the extent that it is not true, the between-person model will be unsuccessful as a prediction strategy.

Within-person model

The necessary assumption concerning comparability of scores in the within-person model is that scores for the same person on different scales be comparable. That is, if a person gets a higher score on one dimension than s/he receives on another, s/he will be expected to exhibit behavior corresponding to the motivation dimension with the higher score. The scores earned on different motivation scales must have meaning relative to each other within the set of scores for a single subject. This is a techno-logical constraint which is not necessary in the more traditional, normative model. Much less effort has been spent developing scales which allow this within-person comparison across scales.

The further assumption is made in the within-person model that the within-person (but between-scale) comparison is the important cue or influence determining the target behavior. In the case of choice behavior, this would seem to be a legitimate assumption. The choice derives from a comparison of the alternatives available. The appropriateness of the within-person model would hold whether the choice is being made between qualitatively- or quanti-tatively-different behaviors. A person may choose between different activities or between different levels of a single activity. In each case the within-

person model would predict the occurence of the activity (or activity level)
which receives the maximum score on the measurement device used.

Empirical tests which have occurred for this strategy in field settings
include both qualitative and quantitative comparisons. Vroom (1966) studied
the organizational choices of M. S. graduates with a within-person comparison
strategy. Each subject listed the three organizations in which he was most
interested as a potential source of employment. For each of the three organi-
zations an instrumentality-goal index was computed which indicated the sub-
jective probability of attaining personal goals in the organization. Using
within-person comparisons, 28 of the 37 subjects (76%) chose, from among
organizations extending offers of employment, the organizations with the
highest (within-person) instrumentality-goal score. An additional subject
chose an organization tied for first place in score.

Ajzen and Fishbein (1969) studied the behavioral intentions of college
students during a non-class time period (Friday night). Data were gathered
which allowed predictions of behavioral intentions from information about a
subject's attitudes about a single behavior, a subject's within-person com-
parison between two alternative behaviors, and a subject's within-person com-
parisons among eight alternative behaviors. Both of the strategies involving
within-person comparisons made more accurate predictions of behavioral
intentions than did the information about a single behavioral alternative.
Data indicating actual behavioral choices were not available in the study.
It is possible that actual choices might not have matched behavioral inten-
tions in this case because there were, in reality, many more behavioral alter-
natives available than the eight which were studied.[2] In effect, Ajzen and
Fishbein studied prediction of behavioral preferences rather than prediction
of behaviors. However, it can be reasonably presumed that the relative

accuracy of the between- and within-person strategies would have been the same for the prediction of behaviors as it was for the prediction of behavioral intentions.

Dachler and Mobley (1973) made within-person comparisons of quantitative choices. They studied differences in level of work activity. Performance levels were designated by five different levels in comparison to a defined standard of performance. Both task goals (behavioral intentions) and actual performance levels were predicted better from within-person information than from information in the form of absolute utility values.

In the latter two studies cited above (Ajzen & Fishbein, 1969; Dachler & Mobley, 1973) the accuracy of predictions from the within-person information was tested with a between-person comparison method (correlations). A more directly within-person prediction strategy such as that employed by Vroom (1966) may have produced even greater prediction accuracy than that which they reported. In a study of the behavior of "bidding" for higher level jobs, Hill, Bass, and Rosen (1970) also used a correlational between-person model to predict whether a person would "bid" or "not bid." Though they made measurements of each individual's motivation to bid and to not bid, they did not make individual predictions from a within-person comparison of the two.

Relative Merits of the Two Models

In a rational analysis the within-person model is the more appropriate strategy for prediction in the motivation realm whenever one considers motivation as a matter of choice. Whenever an attempt is made to predict voluntary action, one should consider and compare the behavioral alternatives available to the person taking the action (Zedeck, 1973). If a teacher is trying to

decide whether s/he will dismiss a class early, s/he will compare that alternative to the other available alternatives (hold the class until the end of the lecture hour, hold the class beyond the lecture hour, call off the class altogether, etc.). The teacher will not compare his/her desire to dismiss the class early to the desire of other professors for early dismissal. S/he will dismiss the class early if that behavior is the most desired of his/her alternatives, not on the basis that s/he wants to dismiss a class early more than others do.

If motivation is construed as a matter of force such that the person has little voluntary control but is simply responding to the motivational forces which impinge on him/her, the within-person model is still rationally correct. For here again it is a comparison within the person which allows logical prediction with the least constraining ceterus paribus. If we wish to predict whether a worker will complete a task we will need to compare the force to complete the task with the forces toward behaviors alternative to task completion. It will do us little good to know whether a worker's "completion force" is greater than his/her coworkers' "completion forces." We must know if his/her "completion force" exceeds his/her "go-for-a-beer force." In order to make the between-person comparison, it is rationally necessary to invoke a ceterus paribus which demands equality between-persons of the forces toward alternative behaviors.

It is clear that in the development of psychometric techniques the between-person model is more advanced. Techniques for the estimation of reliability, validity, and prediction accuracy have been thoroughly developed for this strategy, and in fact, most textbooks in measurement and measurement theory deal primarily with the methodology of between-person measurement. The psychometric development of within-person measurements and predictions is,

on the other hand, less advanced. Some attention has been given to the
production of scores which can be compared across scale dimensions (e.g.,
paired-comparison methods, ipsative scores, ratings of separate behaviors
on the same scales, etc.), but little has been done toward the production
of a full psychometric method for use with the within-person model. What is
required is a set of psychometric procedures for the estimation of reliability
and validity of measurements and indices of the accuracy of prediction.
Perhaps because these procedures are missing, or even more because the usual
introduction to psychometric procedures is via the techniques of between-
person comparisons and the ability domain, methods for within-person measure-
ment and prediction have been relatively neglected. It is to be hoped that
within-person technical procedures will become more familiar and will be
further developed and that persons working in the motivation domain will not
choose the between-person model simply because of the greater technical
sophistication available.

If we are to progress in prediction accuracy we must utilize models
which match our phenomena as closely as possible, and we must develop the
measurement procedures necessary to the execution of those models. We must
not choose on the basis of the strategies for which the technology is most
developed or with which we are most familiar. The within-person model deserves
much greater attention in the motivation domain.

Footnotes

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2. Even in Champaign-Urbana!

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WORK REWARD PREFERENCES AND DEMOGRAPHIC DIFFERENCES[1]

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Past researchers have assessed specific work-reward preferences and
have shown that they were related to demographic differences among workers
(Nealey, 1963; Nealey & Goodale, 1967). Workers indicated their preferences
among specific rewards of equal cost to the organizations in which the
workers were employed. The patterns of preferences for specific rewards
were different among groups of workers divided on demographic variables
such as age, number of dependents, etc.

In a research aimed at developing a measure of preferences among more
general work rewards, Blood (1973) presented data demonstrating different
patterns of work-related preferences among workers in different job situa-
tions. Samples were chosen to maximize between-group differences in job
situation. Having demonstrated this minimal construct validity infor-
mation for the measure of general work-reward preferences, (the Job Orien-
tation Inventory), it is reasonable to ask if these general preferences
differ for demographically subgrouped workers who are in the same job
situation. That is, the differences in specific reward preferences presented
by Nealey (1963) and Nealey and Goodale (1967) may be a manifestation of
a preference ordering for more general categories of potential returns from
the job. This study is an empirical investigation of that research

Blood

question in three separate work samples.

Method

Subjects

The first sample consists of 113 engineers from four separate organi-
zations.[2] As a part of a larger study, these engineers all completed the
Job Orientation Inventory (JOI) and provided personal data. The second
sample consists of 95 Naval personnel in an operational squadron of fighter
aircraft. The third sample consists of 579 Naval personnel in recently-
formed training squadrons with a new, high-technology fighter aircraft.
In the Navy samples also, the JOI and demographic data were collected as
part of larger questionnaire packages. Some of the analyses to be reported
do not have exactly the numbers of subjects announced here because of incom-
plete data.

Measures

The JOI (Blood, 1973) assesses preferences among ten work-reward cate-
gories: Achievement or sense of accomplishment; Responsibility; Opportunity
for growth; Recognition from the community; Status in the organization; Inter-
personal relationships; Pay; Job security; Provision for family; Support for
hobbies or avocational activities. The ten categories are represented by
statements in 45 paired-comparison items. The JOI is designed to reveal
an individual's hierarchy of preferences for certain work outcomes relative
to other outcomes, rather than a person's preferences for work outcomes
relative to other individuals. Scores on the ten categories are ipsative
in nature, that is, a fixed number of scale points are available for allotment
to the ten categories. Comparisons between persons require a recognition
that it is the intrapersonal hierarchy, and not an absolute level, which is

Blood

being compared. Demographic questions were included in all samples as

a part of the larger questionnaire.

Analysis

The strategy employed in the data analyses was essentially the same as

that used by Nealey (1963). Subjects were grouped on the basis of the

demographic variables, and then patterns of work-reward preferences were

examined for between-group differences.

Multivariate differences between groups on the JOI categories were

tested for significance with the Hotelling T^2 statistic. Because of their

ipsative nature, only nine of the JOI categories were included in this part

of the analysis (the exclusion of one category allows the necessary inversion

of the covariance matrix on the computation of T^2). Individual t-tests were

then computed for each of the ten JOI categoreis including the one which

was excluded in the multivariate test. The significance levels of the

individual t-tests should only be attended to if the T^2 reached significance.

Even then, the significance levels of the multiple t-tests are not to be

interpreted as independent statistics with their stated alpha levels.

Nonetheless, Hummel & Sligo (1971) have demonstrated that the T^2 followed

by individual t-tests is a useful and reasonable method for comparing group

centroids. The T^2 examines the data for the significance of the difference

between the n-dimensional centroids, and the t-tests reveal the individual

dimensions which are contributing to the difference.

Results

Sample 1

The first demographic variable to be used as a grouping variable in

Sample 1 was age. In order to split the sample as evenly as possible, they

were divided into those below 40 years of age (N = 61) and those of 40

or more years of age (N = 52). In order to compute the multivariate

analysis, the first JOI dimension (Achievement or sense of accomplishment)

was dropped from the Hotelling T^2 analysis. The results of the analysis

with groups divided on the basis of age is shown in Table 1.

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Insert Table 1 About Here

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The multivariate analysis reached the .01 level of significance. The

individual t-tests which reached at least the .05 level of significance

were for the dimensions of Opportunity for growth and Interpersonal rela-

tions which were higher for the younger group and Recognition from the

community which was higher for the older group.

A second variable which was used to subgroup the sample of engineers

was the educational level attained. There was little difference in the

sample on this variable. Thirty-nine had earned a master's degree and

all of the others had earned a bachelor's degree. As shown in Table 1,

the multivariate test did not reach significance for this division. Thus,

attention to the individual t-tests is inappropriate.

The final variable used to subgroup the engineers was meant to act

as an index of how actively they attempt to remain current in their pro-

fession. This variable is a self-report of the number of professional

journals each engineer reads regularly. The subgrouping division was made

between those who report reading two or fewer journals regularly and those

who report reading three or more journals regularly. As shown in Table 1

the multivariate tests reached the .05 level of significance. Only one

of the JOI dimensions reached significance on the individual t-tests. The group which reported reading fewer journals had a higher preference for Pay.

Sample 2

With the second sample the division into groups on the basis of age was made with one group of less than 26 years of age (N = 48) and the other group composed of subjects with 26 or more years of age (n = 46). The results for this grouping are shown in Table 2. On the second and third samples the final category, Provision for hobbies or avocational activities, was dropped from the multivariate analysis. The multivariate analysis for the age subgroups was not significant in Sample 2, so attention to the

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Insert Table 2 About Here

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univariate t-tests is unwarranted.

In both Sample 2 and Sample 3 analyses were done with subgrouping on each of the variables education (high school or less vs. more than high school) and rank (enlisted vs. officers). There was a strong relationship between these two variables, and there was a nearly identical pattern of results from the analyses in both samples. The between-group differences as indexed by the value of the Hotelling T^2 were greater in the case of rank. Therefore, only the results for the grouping on rank are presented in this paper.

Differences between enlisted men (N = 71) and officers (N = 24) on the JOI categories are shown in Table 2. The value of the Hotelling T^2 reaches the .01 level of significance. Considering the univariate t-tests the officers showed a higher preference for the work-reward categories of achievement

or sense of accomplishment, Responsibility, and Interpersonal relationships.

The enlisted men showed a higher relative preference for the categories of

Pay, Job security, and Provision for family.

Sample 3

Using the same age division as in the second sample, subgrouping for

the third sample was done with one group of subjects with less than 26 years

of age (N = 280) and another group with 26 or more years of age (N = 295).

The results of the Hotelling T^2 analysis which are shown in Table 3 demon-

strate a difference significant at the .01 level. Younger subjects showed

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Insert Table 3 About Here

---

a higher preference for the interpersonal relationship category and older

subjects showed a higher preference for the Achievement or sense of accom-

plishment category.

When divided according to rank the third sample also demonstrated a

significant difference in work-reward preferences. Table 3 shows that the

Hotelling T^2 value was significant at the .01 level. The officers held

significantly higher preferences for the categories of Responsibility,

Opportunity for Growth, and Status in the organization. The preferences

of enlisted men were higher for the categories of Pay, Job security, and

Provision for family.

Discussion

Clearly demographic variables do have a relationship to general work-

reward preferences hierarchy of workers. Not only do workers from different

Blood

work situations express different hierarchies as shown in earlier research (Blood, 1973), but also differentiations can be made within work situations as in the present study.

It will be helpful to examine those results which occurred in more than one sample. Age, which was found by Nealey (1963) to be an influence on preferences among specific reward choices, was found in this study to be a useful index of general work-reward preferences. Two of the three samples demonstrated a difference between groups divided by the age variable. Though the age division was made at different points (40 years in Sample 1; 26 years in Sample 3), in both instances interpersonal relstionships as a return from the job was of higher relative value to the younger group.

In both of the Navy samples the difference between enlisted men and officers corresponded to a difference in the pattern of work-reward preferences. In both cases the officers had a higher preference for responsibility, and in both cases the enlisted men showed a higher preference for the set of extrinsic returns from the job which included pay, job security, and support for the worker's family. It is worth noting that the pattern of differences in preferences differentiating enlisted men from officers is very similar to the differences between engineers who read few and more journals.

In summary, the general conclusion which is possible from these data is that preferences for categories of general work-rewards are under the influence of demographic differences. The more specific conclusions allowed by the present data are that younger workers show a higher relative preference for interpersonal relationship from the job, and in military samples, preferences among enlisted men are higher for extrinsic rewards than for rewards in the form of characteristics of the job itself.

Footnotes

2. The author would like to express his appreciation to John Sims for making this sample available.

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Table 1

Hotelling T^2 and t-tests on JOI Categories in Sample One

JOI Category	Group Means		t-tests	Group Means		t-tests	Group Means		t-tests
	Lo-Age (N = 61)	Hi-Age (N = 52)		Lo-Educ (N = 73)	Hi-Educ (N = 39)		Lo-Jour (N = 44)	Hi-Jour (N = 69)	
Achievement	5.51	6.27	N. S.	6.18	5.87	N. S.	5.70	6.33	N. S.
Responsibility	5.85	5.38	N. S.	5.48	5.95	N. S.	5.27	5.87	N. S.
Opportunity for Growth	7.66	6.69	3.2**	7.01	7.54	N. S.	6.84	7.45	N. S.
Recognition	1.79	2.58	-2.5*	2.12	2.26	N. S.	2.23	2.10	N. S.
Status	3.41	3.71	N. S.	3.73	3.23	N. S.	3.30	3.71	N. S.
Interpersonal Relations	4.38	3.52	2.3*	3.95	4.05	N. S.	4.23	3.83	N. S.
Pay	3.39	3.79	N. S.	3.53	3.62	N. S.	4.02	3.29	2.2*
Security	3.48	3.69	N. S.	3.85	3.05	N. S.	3.75	3.46	N. S.
Family	3.87	4.54	N. S.	4.34	3.95	N. S.	4.61	3.90	N. S.
Hobbies	5.23	4.83	N. S.	4.78	5.49	N. S.	5.05	5.04	N. S.
Hotelling T^2	26.48**			14.09 N. S.			22.41*		

* p $<$ .05

** p $<$ .01

Blood

Table 2

Hotelling T^2 and t-tests on JOI Categories in Sample Two

JOI Category	Group Means		t-tests	Group Means		t-tests
	Lo-Age (N = 48)	Hi-Age (N = 46)		Enlisted (N = 71)	Officers (N = 24)	
Achievement	5.29	6.20	-2.5*	5.38	6.75	-3.4**
Responsibility	4.38	4.20	N. S.	3.93	5.29	-3.4**
Opportunity for Growth	6.67	7.09	N. S.	6.72	7.38	N. S.
Recognition	3.15	2.91	N. S.	3.28	2.42	N. S.
Status	3.40	3.65	N. S.	3.39	3.92	N. S.
Interpersonal Relations	3.92	4.15	N. S.	3.65	5.12	-3.4**
Pay	2.96	4.04	N. S.	4.23	3.33	2.2*
Security	4.25	3.74	N. S.	4.37	2.96	3.1**
Family	5.40	4.57	N. S.	5.54	3.33	4.7**
Hobbies	4.04	4.37	N. S.	4.06	4.42	N. S.
Hotelling T^2	12.13 N. S.			55.44**		

* $p < .05$

** $p < .01$

Blood

Table 3

Hotelling T^2 and t-tests on JOI Categories in Sample Three

JOI Category	Group Means		t-tests	Group Means		t-tests
	Lo-Age (N = 280)	Hi-Age (N = 295)		Enlisted (N = 530)	Officers (N = 43)	
Achievement	5.70	6.17	-3.0**	5.90	6.44	N. S.
Responsibility	4.16	4.35	N. S.	4.14	5.74	-5.6**
Opportunity for Growth	6.80	6.93	N. S.	6.83	7.42	-2.2*
Recognition	2.88	2.80	N. S.	2.82	2.79	N. S.
Status	3.14	3.31	N. S.	3.16	3.98	-3.1**
Interpersonal Relations	4.40	3.63	4.8**	4.01	4.02	N. S.
Pay	4.04	3.78	N. S.	3.94	3.28	2.1*
Security	3.59	3.59	N. S.	3.67	2.60	3.3**
Family	5.18	5.17	N. S.	5.27	3.81	4.3**
Hobbies	4.93	4.70	N. S.	4.82	4.84	N. S.
Hotelling T^2	37.60**			53.23**		

* $p < .05$

** $p < .01$

WORK REWARD PREFERENCES, JOB COMMITMENT AND JOB SATISFACTION

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Past research has consistently demonstrated that reward prefer-
ences can be meaningfully measured and their determinants identified
(Lawler, 1971; Mahoney, 1964; Nealey, 1963; Schuster, 1969; Taylor,
1968; Wernimont & Fitzgerald, 1972). The usual procedure has been to
assess the job reward preferences of a group or groups, and then to
relate these preferences to characteristic differences within or
between groups. The characteristics chosen for study have typically
been demographic in nature, for example, age, sex, number of children,
type of job, etc.

A second class of preference determinants has been suggested by
Nealey (1963), and that is job attitudes. While receiving somewhat
less attention in this context, job attitudes have been found to be
influential factors in a number of work areas (Vroom, 1964). Two job
attitudes were selected for study in this investigation: commitment
to the organization, and satisfaction with the job in general. Commit-
ment was represented by worker responses pertaining to evaluation of
organizational choice, desire to remain with the organization, per-
ceived similarity of personal and organizational goals, intention to
make an effort to further the goals of the organization, and the like.
Job satisfaction, on the other hand, is a general statement of the
worker's affective disposition toward his actual job.

Method

Subjects

Subjects were 579 Navy personnel assigned to recently formed F-14 squadrons. Five hundred thirty-three were enlisted men, and 45 were officers. Their median age was 25 years. Of those for whom education data were available, 91 had less than a high-school education, 317 had completed high-school, and 153 had at least one year of college. Due to incomplete or missing data, not all of the 579 subjects could be included in the study. Five hundred seventy subjects were used in the analysis of commitment, and 535 in the analysis of job satisfaction.

Measures

The Navy was the focal organization for the organizational commitment questionnaire. This instrument, developed by Porter and his associates (Porter & Smith, 1970), asks for the amount of agreement with each of fifteen statements about the organization.

Satisfaction with the job in general was measured by the seven-point GM Faces rating scale (Kunin, 1955). This is a projective attitude scale designed to avoid the potential semantic distortion involved in verbal instruments. The respondent chooses one of seven faces which most represents his feelings. The scale has been employed extensively for both applied and research purposes. It yields a single rating of the worker's overall satisfaction with his job. In this study the respondents were requested to "Circle the face that indicates the way you feel about your job in general." The correlation between commitment to the job and job satisfaction in this sample was .52.

Reward preferences were assessed by the Job Orientation Inventory (JOI) developed by Blood (1973). Forty-five paired-comparison items are presented to the respondent to determine his preferences for ten kinds of rewards: Achievement; Responsibility; Opportunity for Growth; Recognition from Community; Job Status; Interpersonal Relationships; Pay; Job Security; Provision for Family; Support for Hobbies. The JOI is ipsative in nature, that is, only a limited number of scale points are available for assignment to the ten scales. Points assigned to one scale can no longer be assigned to any other. Thus it would be impossible to achieve high (or low) scores on all ten scales. The JOI is designed to reveal an individual's preference for certain work outcomes relative to other outcomes, rather than a person's preference for work outcomes relative to other individuals.

Design and Procedure

The data used in this study were gathered as part of a larger study of the organizational characteristics of the F-14 squadrons in the Navy. These particular data were compiled after the squadrons had been together for three months. Subjects were asked to complete a questionnaire package containing the information used here as well as other kinds of attitudinal and organizational information.

The strategy employed in this investigation was essentially the same as that used by Nealey (1963): respondents were classified into groups according to the variable of interest (in this case commitment and satisfaction); then reward preference patterns were examined for resulting differences. Hence, subjects were classified into high-

(scores of 70 and above) and low- (below 70) commitment to the Navy, after which the respective multivariate JOI centroids of the two groups were compared. Likewise for groups who had high- (scores of 5, 6, 7) and low- (1, 2, 3, 4) satisfaction with the job in general.

Data Analysis

For both variables, overall differences between the two groups on the JOI scales were assessed using Hotelling's T^2 statistic (1931). Because of its ipsative nature, only the first nine of the JOI scales were included in this part of the analysis (the exclusion of the last scale allows the necessary inversion of the covariance matrix in the computation of T^2). Individual t-tests were then computed for each of the ten JOI scales to reveal which of the scales were contributing to the multivariate group differences (if any). Although the significance levels of these individual t-tests cannot be interpreted in the usual manner, the T^2-test followed by individual t-tests is a useful and reasonable method for comparing group centroids (Hummel & Sligo, 1971).

Results

It must be remembered that due to the correlation between them, commitment and job satisfaction are not mutually independent, but hold roughly 25% of their variance in common. In spite of this, both measures are considered to be providing useful, if somewhat overlapping, job attitude information.

The results of the analyses for commitment to the Navy are presented in Table 1.

Table 1 about here

The F-approximation for Hotelling's T^2 shows that high- and low-commit-

ment groups do differ significantly on some weighted combination of the

first nine JOI scales. An examination of the individual t-tests shows

which of the 10 reward preferences are contributing most to group differ-

ences. The high-commitment group is seen to be higher on Achievement,

Responsibility, and Opportunity for Growth, while the low-commitment

group is higher on Interpersonal Relations, Pay, and Support for

Hobbies. The mean-preferences profiles are plotted in Figure 1.

Figure 1 about here

Table 2 presents the results for general job satisfaction.

Table 2 about here

Again, the F-approximation reveals a significant overall difference

between high- and low-satisfaction groups on reward preferences. Those

scales exhibiting the largest differences are Achievement, Opportunity

for Growth, Pay, and Provision for Family. Figure 2 shows the satisfied

group to have higher mean-preference for Achievement and Opportunity

for Growth, while the dissatisfied group preferred Pay and Family.

Figure 2 about here

Discussion

The findings of this study are in substantial agreement with those of previous investigators (Nealey, 1963; Mahoney, 1964). Work-reward preferences can be reliably measured, and their "determinants" identified, in both civilian and military organizations. The term "determinants", however, must be used with caution. The nature of the inquiry of both this and previous studies has been correlational in essence. It would be more accurate to describe the relationship by saying that groups which are characterized by differences on some demographic or attitudinal variables may also be characterized by differences in reward preferences. In other words, differences in age, for example, are related to differences in the preference for pay, security, status, etc. Of course causal statements regarding "determinants" in such instances are, strictly speaking, inappropriate. Nonetheless, such relationships can be useful.

One interesting implication of the current findings involves work design. It was seen that persons who were highly committed to the Navy tended to want achievement, responsibility, and opportunity for growth from their work. Those who were generally satisfied with their job wanted achievement and opportunity for growth. Both commitment and job satisfaction would seem to be attitudes desirable to the Navy. And both these attitudes are most strongly related to job rewards which are intrinsic to the job itself, a function of the work done. Thus, if the Navy would like to engender, attract, or develop (whichever the case may be) personnel with high commitment to the Navy and satisfaction with the job in general, then its efforts would be best spent on

designing the work so as to provide achievement, responsibility, and opportunity for growth. On the other hand, persons characterized by low commitment and low job satisfaction were most desirous of interpersonal relations, pay, family, and hobbies. These factors are extrinsic to the job; they are not related to the work itself but rather are outside-the-job kinds of rewards. Hence, if the Navy works to develop an attractive fringe-benefit package, it may also be developing, attracting, etc., personnel characterized by low commitment and low job satisfaction. It may be simply that a person how is most interested in his work tends to be less concerned with the incumbent fringe benefits, and vice-versa. In that case, it is up to the organization to identify and utilize such persons accordingly.

Footnotes

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TABLE 1

Hotelling's T^2 and t-tests on JOI for High and Low Commitment to Navy

JOI Scale	Group Means		T-Test	
	Hi-Cmt	Lo-Cmt		
Achievement	6.30	5.39	5.79*	
Responsibility	4.45	3.95	3.14*	Hotelling's T^2=63.16
Opportunity for Growth	7.04	6.60	2.99*	F-approximation=6.92
Recognition	2.81	2.86	-0.29	$p < .01$ w/df=9 and 560
Status	3.29	3.15	0.94	
Interpresonal Relations	3.85	4.27	-2.48*	
Pay	3.59	4.39	-4.69*	
Security	3.53	3.69	-0.88	
Family	5.04	5.34	-1.62	
Hobbies	4.65	5.05	-2.34	

N=345   N=225

*$p < .01$

TABLE 2

Hotelling's T^2 and t-tests on JOI for High and Low Job Satisfaction

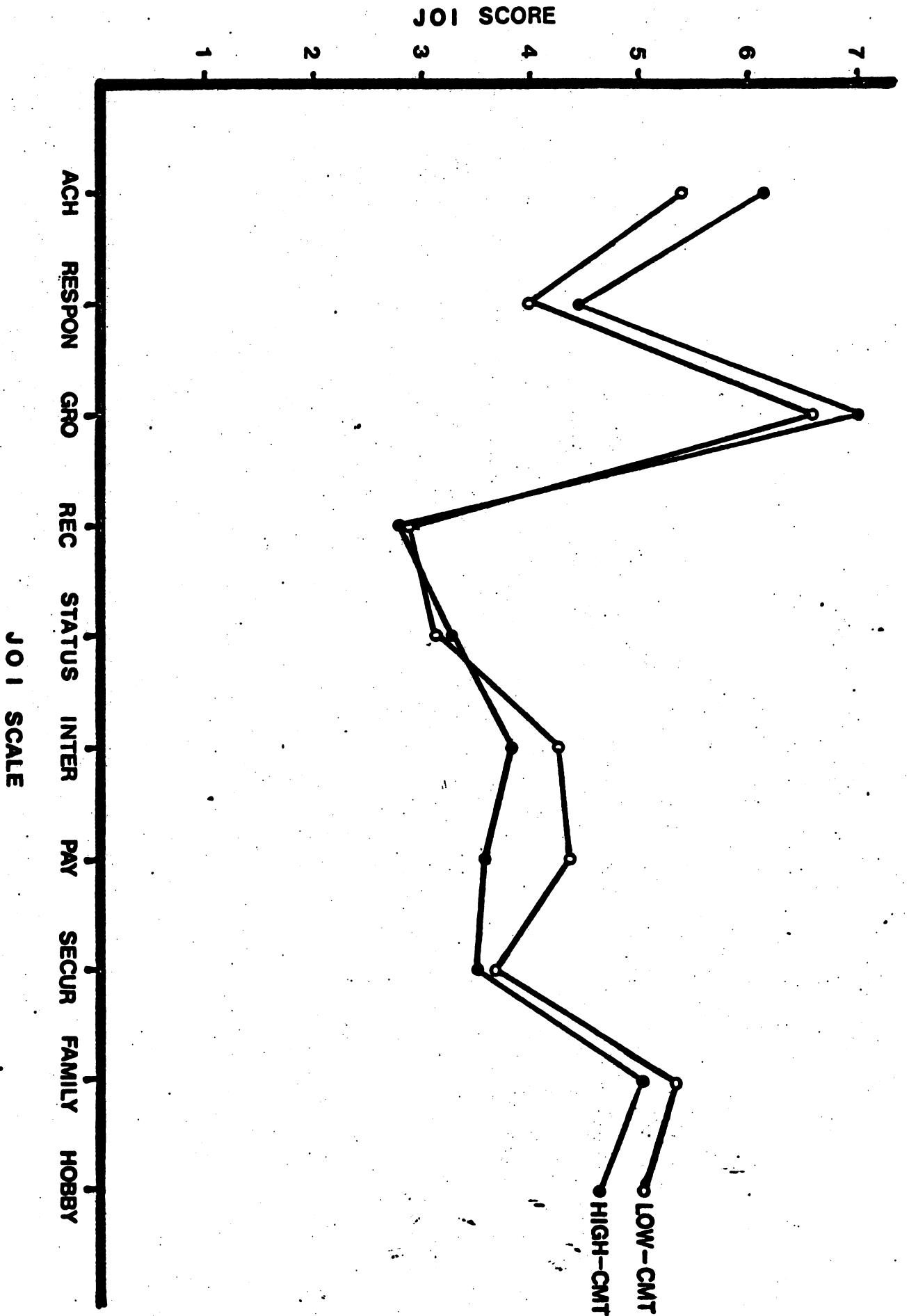| JOI Scale	Group Means		T-Test	
	Hi-Sat	Lo-Sat		
Achievement	6.20	5.35	4.83*	
Responsibility	4.34	4.06	1.63	Hotelling's T^2=41.76
Opportunity for Growth	6.99	6.58	2.53*	F-approximation=4.57
Recognition	2.74	3.04	-1.64	$p < .01$ w/df=9 and 525
Status	3.27	3.09	1.09	
Interpersonal Relations	3.99	4.13	-0.86	
Pay	3.70	4.32	-3.27*	
Security	3.51	3.80	-1.50	
Family	5.03	5.59	-2.74*	
Hobbies	4.67	5.07	-2.14	
	N=377	N=158		

*$p < .01$

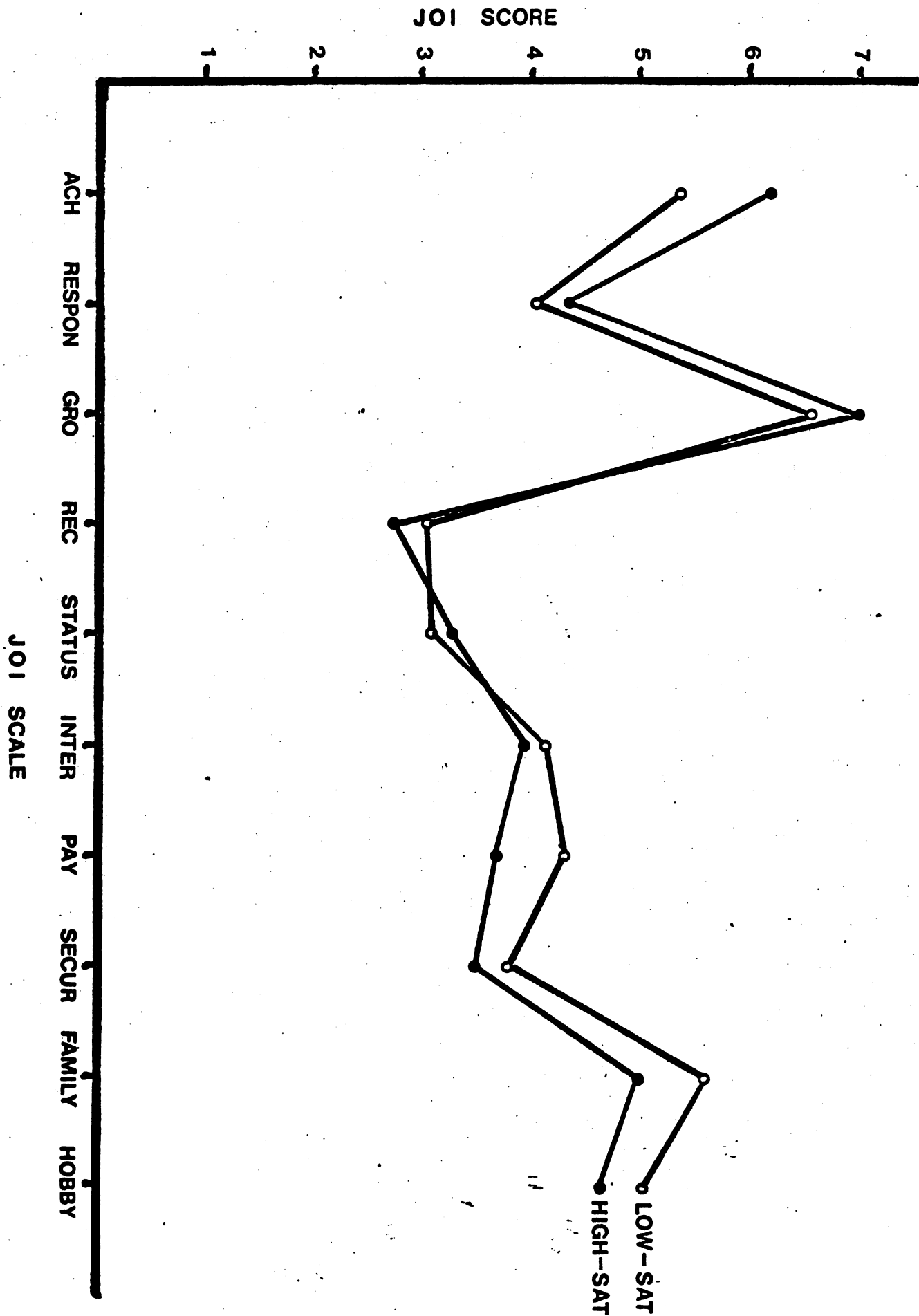Figure 1. Mean Prefenence Scores of High and Low Commitment Groups.

Figure 2. The Preference Scores of High and Low Job Satisfaction Groups.

AN EMPIRICAL COMPARISON OF TWO CLUSTERING TECHNIQUES

WITH MEASUREMENTS OF WORK-REWARD PREFERENCES [1]

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Cluster analysis is a general logic, formulated as procedures by
which entities are grouped together based on similarities and differ-
ences. Grouping together objects that have similar patterns of charac-
teristics is called the cluster analysis of objects, or simply O-analysis.
O-type cluster analysis techniques currently available are the Tryon
method of cluster analysis and the Overall and Klett linear typal
analysis. O-type cluster analysis can be performed using either of
these techniques. Each O-type clustering method serves a similar
purpose in that it attempts to discover the general properties of
objects with respect to particular variables and the general types
into which the objects can be categorized. The clustering techniques
differ, however, with respect to the specific procedures they employ to
arrive at the final cluster solution.

Tryon Method

The Tryon method of O-type cluster analysis begins by correlating
individuals with respect to some set of variables. From this correla-
tion matrix one pivot subject is selected which has the largest variance
across subjects of the intersubject correlation matrix. Thus, subjects
who have mainly high and low correlations, with relatively few inter-
mediate correlations, are most likely to be pivot subjects because of

the large variance as computed from the intersubject correlation matrix. After the pivot subject is defined the subjects who correlate highest with the pivot subject are selected as key subjects. Usually 3 to 7 subjects will be selected. Next, the second pivot subject is selected and the key subjects are defined for cluster 2. This procedure is replicated until the proportion of the initial communality of the raw correlation matrix is exhausted. The number of times that the procedure of selecting pivot and key subjects is replicated dictates the number of clusters that define the sample.

Overall and Klett Method

A recently developed clustering technique is that presented by Overall and Klett (1972). Intersubject correlation coefficients are computed from the score subjects receive on the dependent variables to provide similarity measures among individuals. Next, direct cluster-rotation analysis is performed on the correlation matrix. In direct cluster-rotation analysis, each original profile vector is rotated toward the vectors with which it has the greatest relationship and away from vectors with which its relationship is relatively weaker. A second correlation matrix is formed from the rotated positions. Subjects who have a high correlation in this transformed matrix had related patterns of similarity indices with other subjects in the original correlation matrix. Further similarity matrices are computed based on the interrelationships in the previous similarity matrix. This iterative procedure terminates when the reiterated similarity matrix (the correlation of the correlations raised to the Nth iteration)

contains only values greater than or equal to .95 or less than or equal to .05. Subjects are clustered through the use of a final matrix which contains only 1's ($r \geq .95$) and 0's ($r \leq .05$). A 1 indicates that the 2 subjects are in the same cluster while a 0 indicates the 2 subjects are in different clusters.

The most fundamental difference between these two procedures is that the Tryon clustering method selects pivot and key subjects to define clusters from the original inter-correlation matrix, while the Overall and Klett linear typal analysis transforms the original correlation matrix and forms clusters on the new position of the vectors.

The purpose of the present paper is to compare these two clustering techniques empirically on the same set of data. First, data output will be examined in terms of computer processing time. Next, number of clusters derived using each method will be studied. Third, between-group variability will be calculated separately for each clustering technique. Finally, a clustering by each will be performed on the cluster means and new clusters will be named and examined in terms of group size. A suggestion will be made as to which of these two clustering methods will be most useful to social scientists.

Method

Subjects were 360 enlisted Naval airmen. They were participants in a training program for maintenance and support of F-14 aircraft. Personnel ranged in age from 19 to 45 years, with a mean of 26.8. These airmen were randomly selected from a larger sample.

As part of a larger study, each subject was administered the Job
Orientation Inventory (JOI) developed by Blood (1973). The JOI purports
to measure reward preference with respect to (1) achievement or sense
of accomplishment, (2) responsibility, (3) opportunity for growth,
(4) recognition from the company or from friends, (5) job or company
status, (6) interpersonal relationships or friendships, (7) pay or
monetary reward, (8) job security, (9) provision for family, and
(10) support for hobbies or avocational activities. Scores for these
work values are derived from the paired-comparison of each with the
other 9 rewards. Thus, an ipsative score of 0 to 9 is possible for
each of the 10 rewards with a sum of 45 for each individual profile.

The 360 Ss were randomly grouped into four groups of 90 Ss each.
Each group was subjected to the same set of analyses. The JOI profiles
for each S were computed and correlated with every other subject in the
analysis to give an index of between-subject similarity. From this
original 90x90 correlation matrix in each group, a cluster analysis was
performed using the Tryon method. From the same correlation matrices
cluster analyses were performed using the Overall and Klett technique.
Thus, 4 first-order cluster analyses were performed using each method.
When this clustering was completed, the mean vector was computed for
each cluster in every analysis. These centroids were then used as the
input for a second-order clustering with each method. Correlations
were computed among the centroids from each method. Then the Tryon
technique was used to cluster centroids derived from Tryon clusters
and the Overall and Klett method was used to cluster centroids derived
from the Overall and Klett clusters.

Factor coefficients are used to derive the cluster membership in the Tryon method. Subjects who had the highest factor coefficient with respect to a particular (or cluster) were placed in the cluster along with the pivot subject and key subjects. A $\underline{S}$ could be a key $\underline{S}$ in one cluster, and yet have his highest factor coefficient on a different cluster. Thus, he could be a representative of two clusters. Subjects were placed in a specific cluster by the Overall and Klett procedure, and no $\underline{S}$ was a member of two different clusters. However, since the Overall and Klett procedure tended to result in more clusters with smaller numbers of subjects, only the larger clusters (n≥4) were used in the second-order clustering.

Results

Each of the four first-order analyses performed using the Tryon method resulted in 7 clusters. Table 1 presents the cluster means along with the cluster size for each of the analyses.

Table 1 about here

The Overall and Klett procedure resulted in 6 to 9 clusters for the four first-order analyses. Table 2 presents the cluster means along with the cluster sizes.

Table 2 about here

In each of the four original Tryon cluster analyses 7 clusters were found. The largest cluster size ranged from 32-39 with a mean

of 37 Ss. The second largest cluster size ranged from 20-23 with a
mean of 22 Ss. The smallest cluster ranged from 4-6 with a mean of 5 Ss.

The original Overall and Klett cluster analyses resulted in 6-9
clusters. The largest clusters in each analysis had 21-30 Ss with a
mean of 26 Ss. The second largest cluster size ranged from 11-19 Ss
with a mean of 15 Ss.

From the means in Tables 1 and 2, cluster analyses of the cluster
centroids were performed. The final clusters derived from Table 1
means using the Tryon method are presented in Table 3. Table 4 presents
the clustering of the means of Table 2 using the Overall and Klett
analysis.

Table 3 about here

Table 4 about here

Between-group variability was computed for the 10 analyses on
the 10 JOI variables to get an index of the spread of the cluster means
for each method. The standard deviations on the JOI variables in each
analysis are presented in Table 5.

Table 5 about here

Clustering from a 90x90 correlation matrix, computer processing
time of the Tryon clustering was 90.5 seconds. The Overall and Klett
clustering method, working from the same initial correlation matrix,

used 247.4 seconds of processing time. The large difference is mainly

a result of the iteration procedure. An average of 14 iterations was

necessary. This is a greater number of iterations than were required

by Overall and Klett (1972) on some example data.

Discussion

The two methods of clustering were empirically compared according

to the four characteristics presented in the introduction. First,

there is a greater cost in computer-use time with the Overall and Klett

linear typal analysis. The processing time for that analysis was

nearly three times that of the Tryon cluster analysis with the present

sample size. Since the Overall and Klett procedure is based on an

iteration. of the original intersubject correlations, the required time

is influenced by the number of iterations which are necessary. With

little intersubject similarity, the process may take a great deal of

computer processing time. Where computer time is an important consid-

eration, therefore, the Tryon analysis has some advantage.

Second, the Tryon method generally resulted in fewer clusters with

larger numbers of subjects, and the Overall and Klett procedure resulted

in a larger number of clusters with each cluster having a smaller

number of subjects. This suggests that the Overall and Klett method

is more sensitive to between-subject differences.

Third, examining the between-group variability for the 10 analyses

(5 Tryon, 5 Overall and Klett) on the 10 JOI variables in Table 5, it

is evident that the Overall and Klett clusters have a much larger index

of spread. Forty-five of the 50 comparisons between methods using the same variable resulted in a larger standard deviation for the Overall and Klett method. This finding was true in the 8 original analyses and in the comparison of the two final clusters of the clusters. It appears that the Tryon method does not accentuate between-group differences to the degree that the Overall and Klett method does.

For the Tryon clustering method the clustering of the 28 cluster centroids resulted in 5 final clusters. The largest cluster was subjects whose reward preferences were high on interpersonal relations and hobbies. This cluster was called the good-time guys, with a total group size of 211; 33% of the clustered subjects were placed in this group. The second largest cluster was subjects whose reward preferences were high on achievement and opportunity for growth. This cluster was called the motivated worker, with a total group size of 163; 26% of the subjects were clustered in this group. The third largest cluster contained subjects whose reward preferences were high on pay, security, and family. This cluster was called family men and had a total group size of 156; 25% of the subjects were clustered into this group. The fourth largest cluster was unique in that the Tryon method was the only technique to detect this cluster. The subjects in this cluster were higher on recognition and responsibility. This cluster was called the responsible work crew member. Sixty-two subjects were clustered into this group, or 10% of the total sample. The smallest cluster had high reward preferences of status, interpersonal relations, and

security. This cluster was called the Protestant Ethic work group. The group sample size was 37, with 6% of the subjects being clustered into this group.

The Overall and Klett clustering of the 31 original cluster means resulted in four final clusters. The largest cluster was subjects whose reward preferences were high on achievement, opportunity for growth, recognition, and interpersonal relations. This cluster was similar to a combination of cluster 2 and cluster 4 of the Tryon method. One hundred ninety-two subjects were clustered into this group, 53% of the original sample of 360 subjects. The second largest cluster derived from the Overall and Klett procedure was subjects highest on hobbies. This cluster profile is quite similar to the good-time guys cluster of the Tryon method. This cluster had a total group size of 50; 14% of the subjects were clustered into this group. The third largest cluster contained subjects who were high on responsibility, opportunity for growth, and status. This cluster profile resembled the Protestant Ethic work group cluster and contained 21 subjects; 6% of the subject were clustered into this group. The smallest cluster was high on the job rewards of pay, security, and family and was called family men like the Tryon cluster it resembled. Fifteen subjects representing 4% of the sample were clustered into this group.

Results from both clustering methods agree that the most common profiles of the Naval personnel were the motivated workers and the good time guys. The Tryon technique, however, clustered more subjects into the good time guys group, while the Overall and Klett method clustered more subjects into the motivated worker cluster. The Tryon method detected a fairly large group size for the family men cluster; the

Overall and Klett procedure clustered relatively few subjects into this group. With respect to the Protestant Ethic work group, both methods clustered the same relative number of subjects into this group.

In conclusion, there are clear differences between the two cluster-ing techniques on the four characteristics investigated. The Tryon method may require less computer processing time which would be an advantage where cost is a critical factor. Second, the Overall and Klett technique provided more clusters from each sample, thus indicating a greater sensitivity to individual differences. Though the Tryon method indicates a group membership for every S, the Overall and Klett method allows a single S to define a cluster. The authors prefer the Overall and Klett technique because each S is classified into one and only one cluster. Third, the Overall and Klett method provides the user with more highly differentiated groups. Fourth, although there were differences, both techniques provided interpretable results in the second-order analysis. Given the greater sensitivity of the Overall and Klett technique in the first-order analysis, the authors suggest that it would be the more appropriate method in social science research.

Footnotes

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TABLE 1

Tryon Clustering

Cluster	JOI Scale Means									
	1	2	3	4	5	6	7	8	9	10
Analysis 1 (N=90)										
1 N=37	6.5	4.8	7.4	2.6	3.8	4.5	3.2	3.1	4.7	4.3
2 N=21	6.1	3.8	6.4	1.7	2.8	3.3	4.9	4.4	6.8	4.8
3 N=13	5.0	4.0	7.0	2.9	2.8	4.5	3.5	4.0	5.3	5.8
4 N=10	5.3	4.6	5.7	3.7	3.8	3.9	4.2	4.3	5.3	5.1
5 N= 9	5.6	4.4	5.7	4.3	3.0	4.5	3.2	3.7	4.7	4.4
6 N= 6	7.7	3.5	6.5	4.3	1.7	3.7	4.2	3.7	3.3	6.5
7 N= 4	4.3	5.5	6.3	4.0	4.3	5.3	2.5	5.7	4.8	4.0
Analysis 2 (N=90)										
1 N=39	6.0	5.1	7.1	4.1	3.4	4.5	2.9	3.5	4.3	4.3
2 N=20	5.4	3.3	6.5	2.7	2.2	4.7	4.1	4.3	5.5	6.4
3 N=20	5.6	4.2	6.5	3.9	3.0	2.7	5.4	4.0	6.6	3.9
4 N= 8	5.5	3.6	6.0	3.3	3.3	4.4	3.3	4.3	5.8	4.8
5 N= 4	3.3	5.0	6.0	6.7	1.7	3.3	4.7	3.0	6.3	4.3
6 N= 5	4.8	4.8	6.0	3.0	2.2	2.8	4.0	6.2	6.2	4.8
7 N= 5	4.4	2.6	5.2	4.0	3.2	3.6	5.2	6.6	5.3	4.2

TABLE 1, cont.

Cluster	JOI Scale Means									
	1	2	3	4	5	6	7	8	9	10
Analysis 3 (N=90)										
1 N=32	6.6	4.5	7.3	2.8	3.5	3.6	3.9	2.9	5.4	4.2
2 N=21	5.6	4.1	6.4	2.8	3.0	4.9	4.1	4.4	3.8	5.8
3 N=16	5.2	3.5	6.5	2.6	2.2	3.2	3.5	5.7	7.3	5.8
4 N= 7	4.7	4.1	7.1	3.1	3.5	5.5	3.0	4.3	4.9	5.5
5 N=11	5.2	2.8	6.9	3.0	3.3	3.6	5.1	5.2	5.2	5.6
6 N= 8	7.1	4.1	5.9	2.0	3.1	4.6	5.3	4.5	5.5	3.8
7 N= 5	5.2	2.4	5.6	4.2	4.6	3.2	5.4	4.6	5.8	4.2
Analysis 4 (N=90)										
1 N=38	6.6	4.8	7.6	2.7	3.6	4.4	3.4	2.8	4.6	5.1
2 N=23	6.0	3.9	6.6	3.0	3.1	3.4	3.2	4.6	6.9	3.9
3 N=11	5.3	2.9	6.9	2.8	3.4	4.3	4.0	4.6	5.3	5.6
4 N=13	6.4	3.5	6.8	1.1	3.6	4.2	6.5	4.5	6.1	3.0
5 N= 8	6.0	6.3	7.4	1.8	3.3	2.8	4.5	5.0	2.0	6.1
6 N= 8	5.6	3.5	7.0	4.9	3.0	4.6	3.7	3.1	3.4	5.0
7 N= 6	5.8	4.5	6.5	2.3	3.8	6.0	4.8	3.5	4.0	4.5

TABLE 2

Overall & Klett

Cluster	JOI Scale Means									
	1	2	3	4	5	6	7	8	9	10
Analysis 1 (N=90) 12 iterations 71 of 90 clustered										
1 N= 5	6.6	2.8	5.8	2.6	2.4	2.4	3.2	5.0	6.0	7.4
2 N=30	7.0	5.2	7.6	1.4	3.3	3.6	3.5	3.7	5.4	4.1
3 N= 4	3.8	6.3	7.3	4.5	3.3	4.0	3.0	3.5	6.0	6.2
4 N= 4	6.5	3.8	5.2	2.0	1.3	3.0	7.3	5.8	7.3	3.0
5 N= 5	7.6	4.6	7.4	5.4	4.2	4.0	2.8	3.6	4.0	1.4
6 N= 4	3.8	3.0	5.3	1.0	2.5	4.0	5.8	4.0	8.0	5.8
7 N=11	6.1	3.4	7.7	2.8	3.7	5.9	2.9	1.8	5.6	6.0
8 N= 4	3.3	4.8	7.8	2.5	3.5	3.8	3.3	6.8	4.0	5.5
9 N= 4	3.3	4.8	7.8	2.5	3.5	3.8	3.3	6.8	4.0	5.5
Analysis 2 (N=90) 17 iterations 66 of 90 clustered										
1 N=23	6.6	5.9	7.6	2.5	3.6	4.3	2.4	2.6	4.3	4.4
2 N=14	5.5	3.9	6.8	2.6	1.4	3.5	4.1	5.3	6.2	6.8
3 N= 6	4.2	6.8	7.2	3.7	3.8	4.3	3.7	4.0	2.3	5.2
4 N= 5	6.5	3.6	7.4	2.4	2.8	4.8	4.0	4.0	6.5	3.0
5 N= 4	8.0	3.3	4.5	3.3	1.8	4.5	2.8	5.5	6.0	5.3
6 N= 5	7.8	4.0	6.2	5.8	2.4	6.0	1.8	3.8	3.4	4.0
7 N= 5	3.8	3.6	5.4	2.0	3.2	5.2	4.2	2.8	6.6	8.0
8 N= 4	4.0	4.0	6.5	4.8	3.5	2.3	5.8	4.3	7.3	3.5

TABLE 2, cont.

Cluster	JOI Scale Means									
	1	2	3	4	5	6	7	8	9	10
Analysis 3 (N=90) 15 iterations 65 of 90 clustered										
1 N=21	6.3	5.4	7.6	2.6	4.0	3.0	4.2	2.5	5.7	4.3
2 N= 5	7.8	4.2	6.8	3.0	2.0	3.0	2.8	6.5	5.4	3.2
3 N= 7	6.5	3.7	7.4	1.5	3.1	5.1	1.9	3.7	5.3	6.3
4 N=14	5.6	3.1	6.3	2.6	2.1	3.4	3.4	5.3	7.9	5.6
5 N= 4	2.8	1.3	5.8	5.5	3.3	5.3	5.0	4.3	5.5	6.5
6 N= 6	8.0	4.5	7.5	2.8	3.2	5.5	3.3	3.7	3.7	3.0
7 N= 4	7.8	3.0	6.5	2.0	2.0	6.0	6.0	5.8	3.5	2.3
8 N= 5	4.4	4.4	7.2	2.0	3.4	6.4	4.8	4.6	1.4	6.4
Analysis 4 (N=90) 14 iterations 75 of 90 clustered										
1 N= 7	5.3	3.0	5.9	1.1	3.7	4.2	6.1	6.9	7.4	2.5
2 N= 9	6.1	4.9	8.1	1.2	3.1	3.7	4.8	3.3	3.0	6.7
3 N=30	7.2	5.0	7.6	2.2	3.8	4.7	3.2	2.4	5.1	4.1
4 N=19	6.3	3.8	6.9	3.2	2.8	3.0	3.0	4.2	7.3	3.9
5 N= 6	5.8	6.7	6.8	1.8	3.3	2.7	5.0	5.3	1.7	5.8
6 N= 4	7.8	3.0	7.0	5.0	2.8	5.5	2.5	1.0	3.8	7.0

TABLE 3

Cluster of Clusters - Tryon

Cluster	N Centroids	N Subjects	JOI Scale Means									
			1	2	3	4	5	6	7	8	9	10
1	13	211	5.8	4.2	6.7	3.3	3.2	4.4	3.9	3.9	4.4	5.2
2	13	156	5.5	3.6	6.2	2.9	3.2	3.6	4.6	4.9	6.0	4.6
3	4	37	5.1	4.0	6.4	3.3	3.8	4.3	4.0	4.8	5.6	4.6
4	4	62	5.1	4.8	6.1	4.7	3.0	4.1	3.8	3.6	5.2	4.5
5	7	163	6.4	4.1	6.9	2.7	3.1	4.1	4.1	3.9	5.0	5.0

TABLE 4

Cluster of Clusters - Overall & Klett

Cluster	N Centroids	N Subjects	JOI Scale Means									
			1	2	3	4	5	6	7	8	9	10
1	7	50	5.2	3.0	5.7	2.8	2.4	4.0	4.1	4.6	6.6	6.5
2	17	192	6.9	4.3	7.3	3.1	3.1	4.5	3.4	3.6	4.9	4.5
3	3	15	5.3	3.6	5.9	2.6	2.8	3.2	6.4	5.7	7.3	3.0
4	4	21	4.4	5.8	7.3	2.5	3.5	4.3	4.2	5.2	2.7	5.7

Note.-- 8 iterations, 31 of 31 clustered

TABLE 5

Standard Deviations

Cluster	JOI Scale Means									
	1	2	3	4	5	6	7	8	9	10
Tryon 1	1.02	.62	.58	.92	.84	.57	.74	.75	.96	.83
Overall 1	1.64	1.27	1.00	1.16	.89	.94	1.52	1.37	1.62	1.76
Tryon 2	.85	.88	.55	1.22	.62	.75	.87	1.24	.71	.77
Overall 2	1.57	1.17	.94	1.24	.82	1.04	1.17	.96	1.57	1.58
Tryon 3	.81	.72	.66	.62	.77	.84	.84	1.28	.97	.81
Overall 3	1.73	1.17	.61	1.14	.71	1.28	1.24	1.21	1.80	1.52
Tryon 4	.41	1.04	.37	1.13	.26	.93	1.04	.80	1.17	.97
Overall 4	.84	1.32	.69	1.27	.40	.96	1.28	1.90	2.12	1.62
Tryon C-C	.49	.39	.30	.70	.28	.27	.28	.53	.55	.26
Overall C-C	.74	.65	.81	.53	.55	.63	.67	.69	.73	.70

JOI SCORE

REWARDS

I   GOOD TIME GUYS
II   MOTIVATED WORKERS
III FAMILY MEN
IV   RESPONSIBLE WORK CREW
V   PROTESTANT ETHIC WORK GROUP
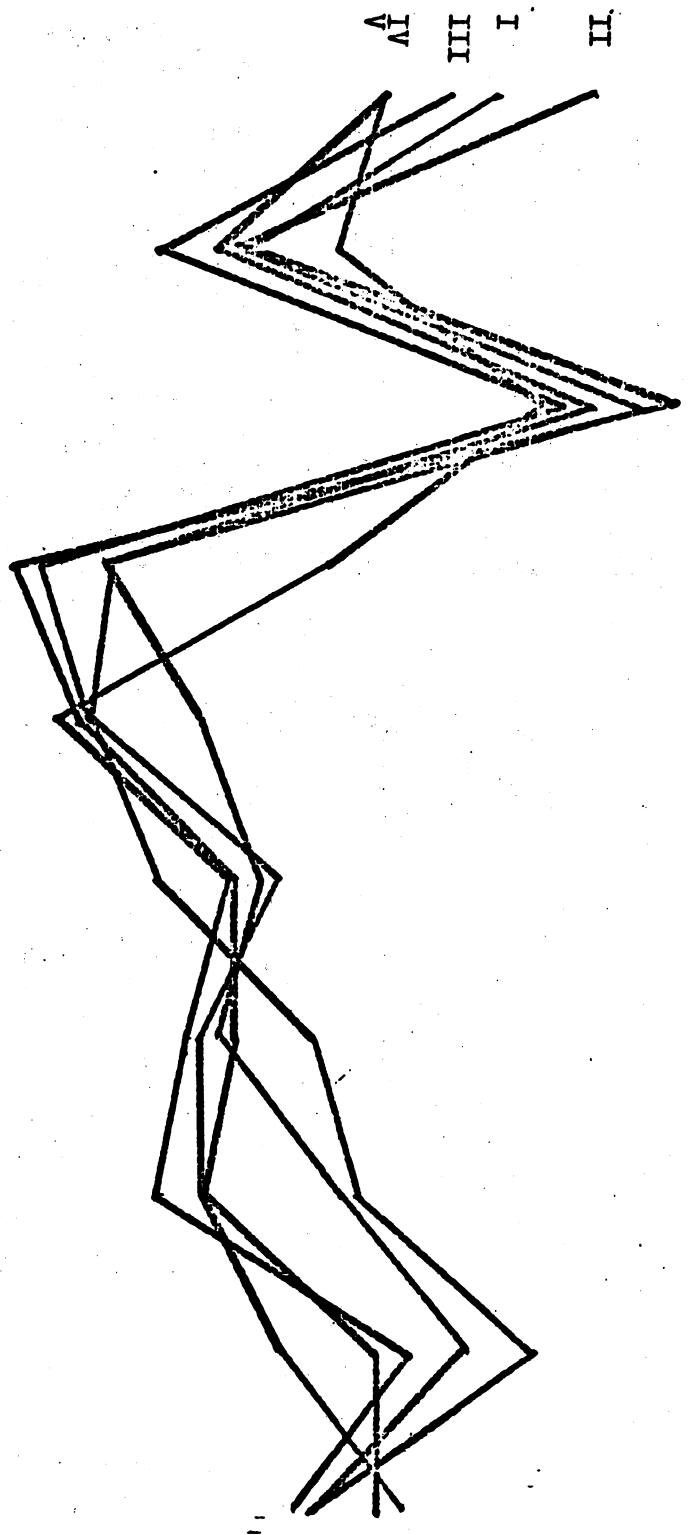
FIGURE 1. Second-order cluster means for the 10 job rewards on the 28 Tryon clusters. (Abbreviations: ACH=achievement, RESP= responsibility, GROW=opportunity for growth, REC=recognition, STAT= status, IR=interpersonal relations, PAY=pay, SEC=security, FAM= family, HOB=hobbies).
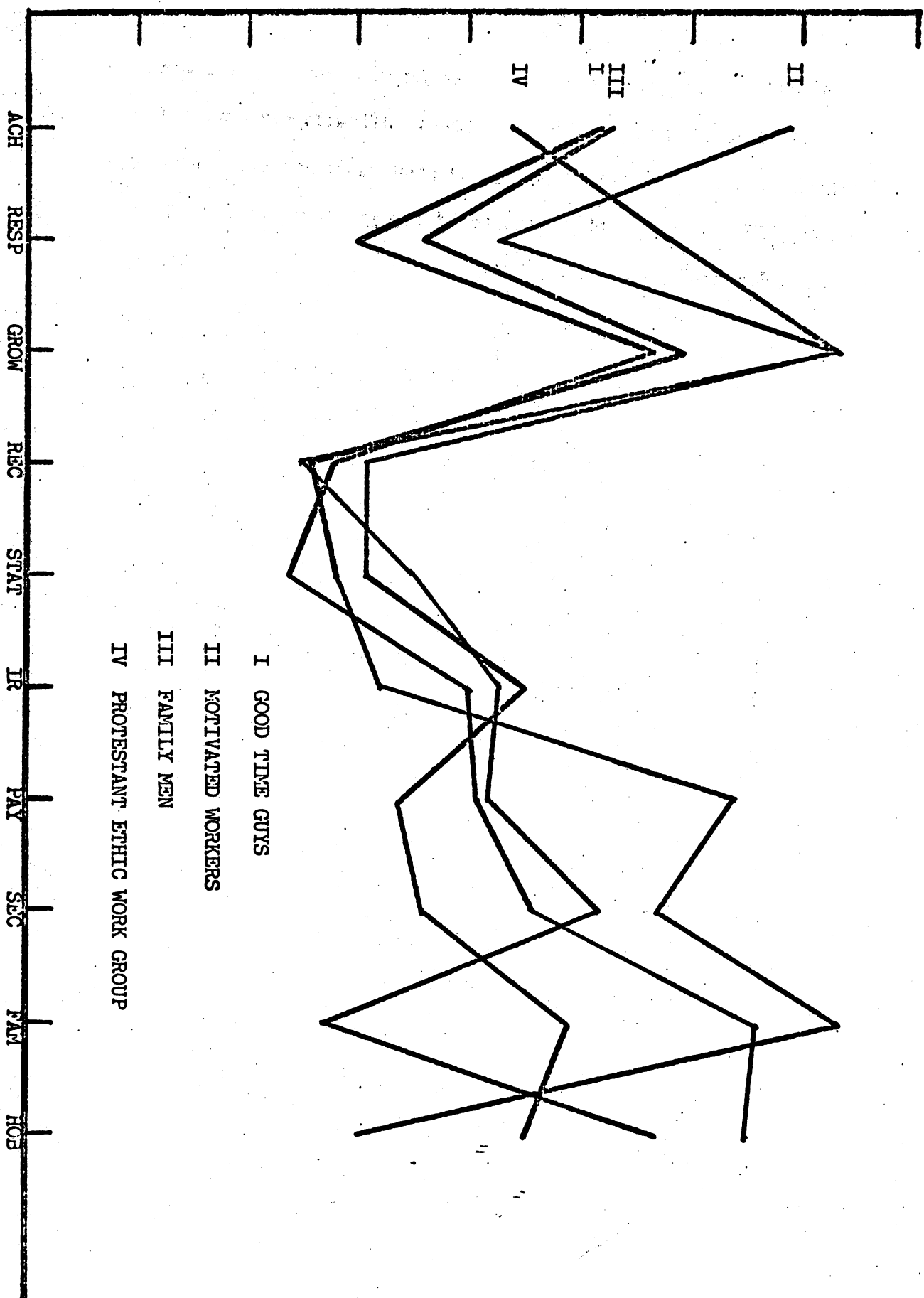
Figure 2. Second-order cluster means for the 10 job rewards on the 31
Overall and Klett clusters.

PERSONALITY, EDUCATION, AND JOB SATISFACTION[1]

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The personal characteristics of a work force or those
characteristics which workers bring to a particular work situa-
tion may influence how they react to their work situation. For
example, Hackman and Lawler (1971) found that a worker's desire
for "higher order need" gratification influenced job response
on satisfaction measures.

In a theoretical framework such as equity theory (Adams, 1963)
the personal characteristics can be thought of as some of the
inputs of the worker to the job situation. Such individual
worker inputs may take many forms including such variables as
education and personality measures. Education is an index of
the skills and knowledge that the worker brings into the situa-
tion. Personality measures indicate the personal characteristics
or psychological manner which the worker inputs.

When a worker participates in a work organization, s/he
contributes not only whatever is the physical product of his
work activity, but the total constellation of his traits, mannerisms,
abilities and knowledge. All of these personal characteristics
may influence his/her attitudinal responses to the work situation.
Many of the personal inputs to an organization are very difficult
to assess or even to conceptualize in a way which would allow

operational comparisons across workers. For instance, the
contribution a worker makes by raising (or lowering) the morale
among coworkers, the input of being a catalyst for communi-
cation among coworkers, or the input of goodwill created for
the organization among persons the worker contacts outside of
the organization. Other inputs can be measured with techniques
established in traditional physchological research. The purpose
of this research project was to make an empirical test of this
influence in a work sample. Education and personality character-
istics were chosen as the input variables of interest because
of the ease of assessing them for workers or work applicants.
In fact, the particular personality measure chosen for this
study was chosen in part for its convenience in administration.

Method

Subjects

The subjects for this investigation were 563 male officers
and enlisted men in the Naval Air Force. At the time of the study
the subjects were involved in a training program for operations
with the F-14, the most recent naval fighter aircraft. The
subjects had been in the Navy for varying lengths of time, but
the bulk of them had been assigned to the F-14 program within
four months preceding the study. Assignment to the F-14 pro-
gram was voluntary and required a commitment of 2 years.

Measures

Education was measured in this study by a self report item.
Subjects were asked to report the number of years of formal,

non-Navy education they had completed. For analysis purposes
the education variable was divided into three levels: completed
less than high school, completed high school, and completed
more than high school.

The measure of satisfaction used in this study was a
seven-point version of the General Motors Faces Scale (Kunin,
1955). Scores on the scale were generated in response to the
statement, "Circle the face that indicates the way you feel
about your job in general." This general measure of satis-
faction was positively correlated with all five scales of the
Job Description Index (Smith, Kendall, & Hulin, 1969). The
correlations with those scales were: Work itself, .70; Pay,
.28; Promotion opportunity, .33; Supervision, .40; and Co-
workers, .39. All of those correlations are significant beyond
the .01 level. Subjects were divided into two groups on the
basis of the satisfaction scale. Those who had selected one
of the positive faces (faces 5, 6, or 7) were one group, and
those who had selected a negative (faces 1, 2, or 3) or neutral
(face 4) face were the second group.

Personality variables were measured by the Self-Description
inventory (SDI) developed by Ghiselli (1954). The SDI employs
a forced-choice technique to measure thirteen personality char-
acteristics: supervisory ability, intelligence, initiative,
self-assurance, decisiveness, masculinity-femininity, maturity,
working class affinity, need achievement, need self-actualization,
need power, need reward, and need security. Respondants to the

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SDI are asked to choose between paired adjectives those which
are most descriptive of them (32 pairs) and those which are
least descriptive of them (32 pairs). The 13 scales were
developed by empirically keying item responses.

Analysis

In order to understand the relationships among these
variables in an efficient multivariate analysis, a 3 x 2 multi-
variate analysis of variance was done. Education (3 levels)
and satisfaction (2 levels) were used as the factors of the
analysis with the 13 SDI scales as the variables of analysis.
The correlation between education (in years) and satisfaction
(in raw scores) was .06 in this sample, thus allowing the factors
to be relatively independent. The multivariate analysis of
variance was chosen as it enables the simultaneous investigation
of the relationships and interactions among the three kinds of
variables--education, personality, and satisfaction.

Results

A 3 x 2 multivariate analysis of variance was done with
education and satisfaction as the two factors of the analysis
and the 13 personality dimensions of the SDI as the analyzed
variables. The relationships between the three education levels
and the SDI measures are shown in Table 1. The Bartlett's Chi

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Insert Table 1 About Here

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Square estimation of the significance of the multivariate
relationship is not significant. Therefore it is not advisable
to attempt to interpret the univariate F test results for the
individual SDI dimensions. There was no reason to believe
that a significant relationship would be found in this analysis.
It simply indicates a lack of a significant relationship between
variables which are hypothesized to be influential on the job
response variable, satisfaction.

The results of the second test for main effects in the
multivariate analysis are shown in Table 2. The relationships

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Insert Table 2 About Here

_____

between satisfaction and the SDI variables were significant
beyond the .05 level of probability in the multivariate test.
Here it is appropriate to consider the univariate F-test results
to discern which of the individual SDI variables are most in-
fluential in the multivariate relationship (Hummel & Sligo, 1971).
The subjects who responded with higher satisfaction (circled the
positive faces) were significantly higher on the dimensions of
Supervisory Ability, Initiative, Decisiveness, Masculinity-
Femininity, and Achievement Motivation. The persons who res-
ponded neutrally or negatively on the satisfaction measure were
not significantly higher on any SDI dimension. The characteri-
zation of satisfied subjects which is portrayed by the SDI
dimensions with significant univariate F's is of able and moti-

vated workers.   One is tempted to use the word dynamic to

summarize the qualities suggested by those dimensions.

The relationships represented in the interaction of the

multivariate analysis are shown in Table 3.   The multivariate

interaction effect was significant beyond the .01 level of

probability.   As shown in the table, the individual SDI dimen-

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Insert Table 3 About Here

_____

sions which were significantly related to the interaction were

Supervisory Ability, Intelligence, Self-Assurance, Achievement

Motivation, and Self-Actualization.

The significant interaction for the SDI variables Super-

visory Ability is shown in Figure 1.   As can be seen in the

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Insert Figure 1 About Here

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figure, the one cell which is most distinguished is the cell

which is defined by high satisfaction and medium education.   That

cell is very high on supervisory ability.   Put another way, among

those persons in this work group who have a medium level of

education those who are high on the Supervisory Ability dimension

are high on satisfaction.

The significant interaction for the SDI variable Intelligence

is shown in Figure 2.   Again a pattern occurs which is similar to

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Insert Figure 2 About Here

Figure 1. For persons at the medium education level satisfaction
is high for those who have the higher intelligence scores. Low
satisfaction occurs for the cells which are low-low, medium-
medium, and high-high on the variables of education and intelli-
gence. High satisfaction is evidenced by those who are either
low education or high education with a medium level of intelli-
gence and by the group that is medium in education and high on
intelligence.

A similar, but less pronounced pattern is shown in Figure 3
for the SDI variable of Self-Assurance. The outstanding cell
is the high satisfaction group with medium education and high

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Insert Figure 3 About Here

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self-assurance.

The interaction with the SDI variable of Achievement Moti-
vation is shown in Figure 4. Low satisfaction is seen among groups

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Insert Figure 4 About Here

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with low education--low achievement motivation, and medium educa-
tion--low achievement motivation. Groups who are high in satisfaction

are low education--medium achievement motivation and medium
education--high achievement motivation.   Groups who are both
high and low in satisfaction are high education--medium achieve-
ment motivation.

The final significant interaction with the Self-Actualization
dimension of the SDi is shown in Figure 5.   High satisfaction

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Insert Figure 5 About Here

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workers are in groups which are low education--medium self-
actualization and medium education--high self-actualization.   Low
satisfaction groups are low education--high self-actualization
and medium education--low self-actualization.   The high education
groups which were both high and low on satisfaction were not
differentiable on the self-actualization dimension.

Discussion

The purpose of this study was to investigate the influence
of personal characteristics on inputs to the work situation on
attitudinal responses to the work situation.   Relationships were
found between a satisfaction measure used as an index of response
to the situation and personality dimensions.   Interactions were
found between the satisfaction measures, education level and
personality characteristics.   The measure of education level
attained did not have a direct relationship to job satisfaction
in this sample.

This study is a demonstration of a relationship which is deserving of further empirical investigation and theoretical development. As Vroom (1964) stated, "There has been little attempt to deal with the relationship between personality variables and job satisfaction in theoretical terms and most of the empirical work represents an effort to establish a relationship between measures of adjustment or neuroticism and job satisfaction" (p. 161). The present study has not dealt with abnormal personality characteristics as reflected by measures of adjustment or neuroticism. It utilized an empirically keyed instrument specifically designed to index personal differences among normal human adults.

The relationships between the satisfaction measure and the personality measures indicate high satisfaction for individuals who are capable and willing to take charge in an active, directing manner. This is true in the direct relationships and it is also true in the interactions. One can speculate that the inter- action effect corresponds to an "appropriate" level of education for persons with certain personality characteristics in this work situation. The figures (Figures 1 - 5) could be interpreted to indicate that a high school education in combination with the positive, confident personality scores is optimal for satisfaction from the situation.

It is a reasonable presumption that the personality job attitude relationships found here are specific to this work organi- zation. Their generality to other work environments awaits further

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investigation. A theoretical framework which will encompass
such relationships should only be constructed after considerable
empirical evidence exists.

Footnote

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Table 1

Univariate F's for the Main Effect of Education on the

SDI Variables*

SDI Variables	Univariate F	Significance Level
Supervisory Ability	2.91	N. S.
Intelligence	3.17	.05
Initiative	1.33	N. S.
Self-Assurance	2.34	N. S.
Decisiveness	1.42	N. S.
Masculinity-Femininity	1.02	N. S.
Maturity	3.65	.05
Working Class Affinity	3.35	.05
Achievement Motivation	2.90	N. S.
Self Actualization	.58	N. S.
Need for Power	1.72	N. S.
Need for Reward	.85	N. S.
Need for Security	3.70	.05

* Multivariate analysis of variance not significant.

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Table 2

Univariate F's for the Main Effect of Satisfaction on the SDI Variables*

SDI Variables	Univariate F	Significance Level
Supervisory Ability	4.63	.05
Intelligence	1.06	N. S.
Initiative	8.99	.01
Self-Assurance	2.74	N. S.
Decisiveness	10.19	.01
Masculinity-Femininity	4.63	.05
Maturity	1.95	N. S.
Working Class Affinity	3.65	N. S.
Achievement Motivation	6.04	.01
Self-Actualization	2.14	N. S.
Need for Power	.96	N. S.
Need for Reward	1.02	N. S.
Need for Security	3.77	N. S.

* Multivariate analysis of variance significant at $p < .05$.

Table 3

Univariate F's for the Interaction Effect of Education

and Satisfaction on the SDI Variables*

SDI Variables	Univariate F	Significance Level
Supervisory Ability	4.73	.01
Intelligence	6.17	.01
Initiative	1.23	N. S.
Self-Assurance	3.15	.05
Decisiveness	1.93	N. S.
Masculinity-Femininity	.32	N. S.
Maturity	1.08	N. S.
Working Class Affinity	.25	N. S.
Achievement Motivation	5.85	.01
Self-Actualization	4.39	.05
Need for Power	.10	N. S.
Need for Reward	.60	N. S.
Need for Security	1.86	N. S.

* Multivariate analysis of variance significant at $p < .01$.
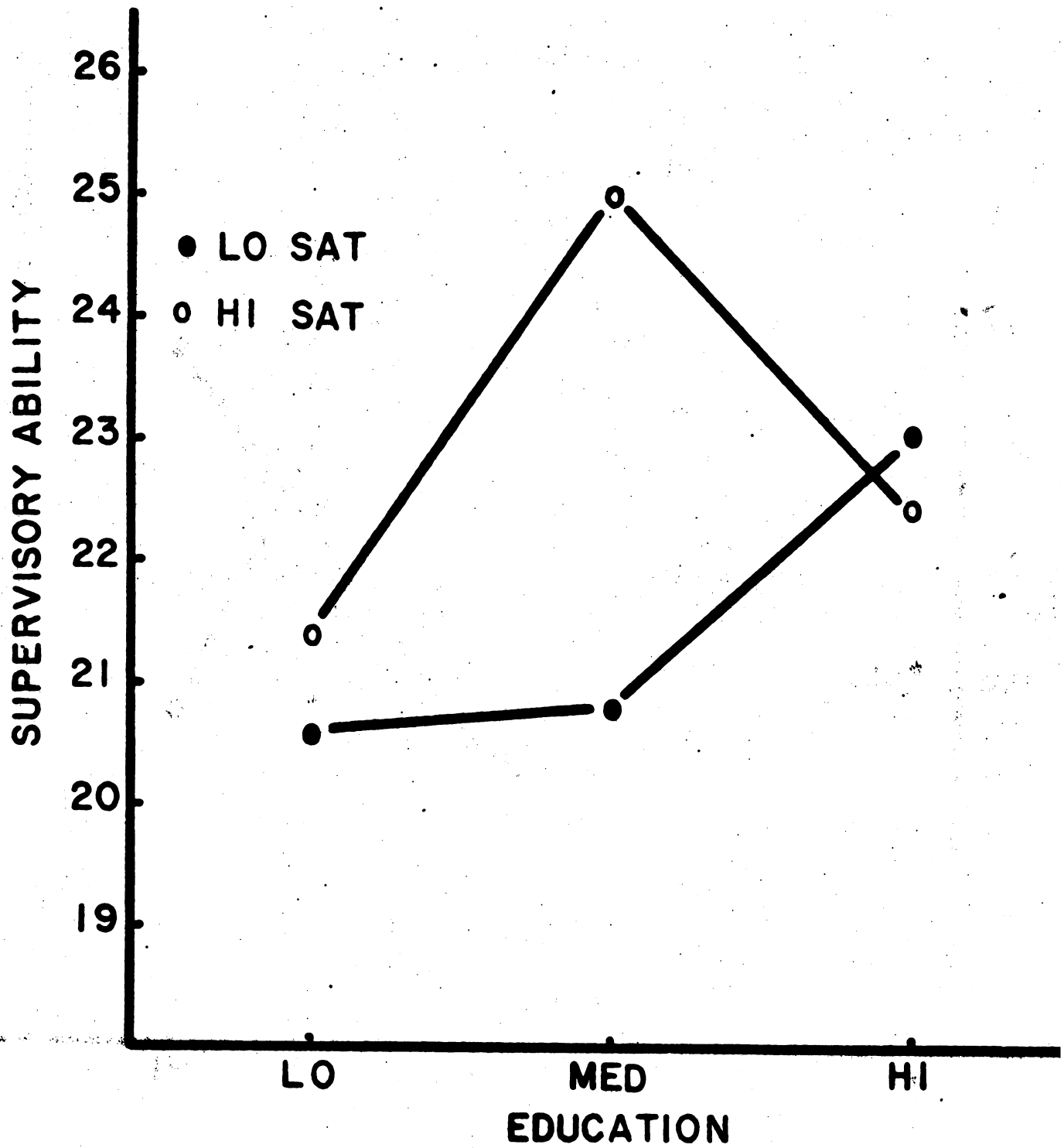
Figure 1., Supervisory Ability of groups divided on Education and
Satisfaction.
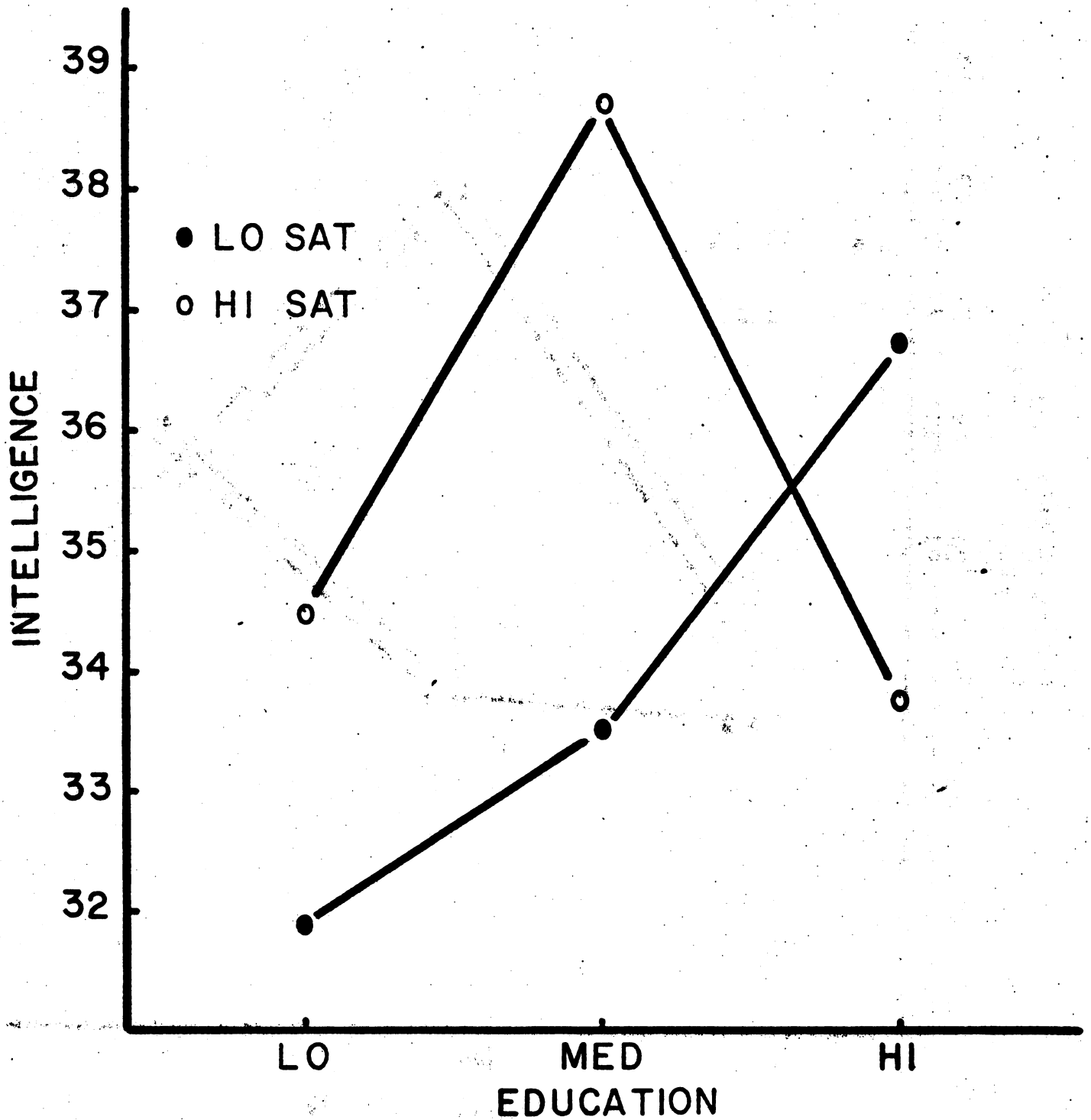
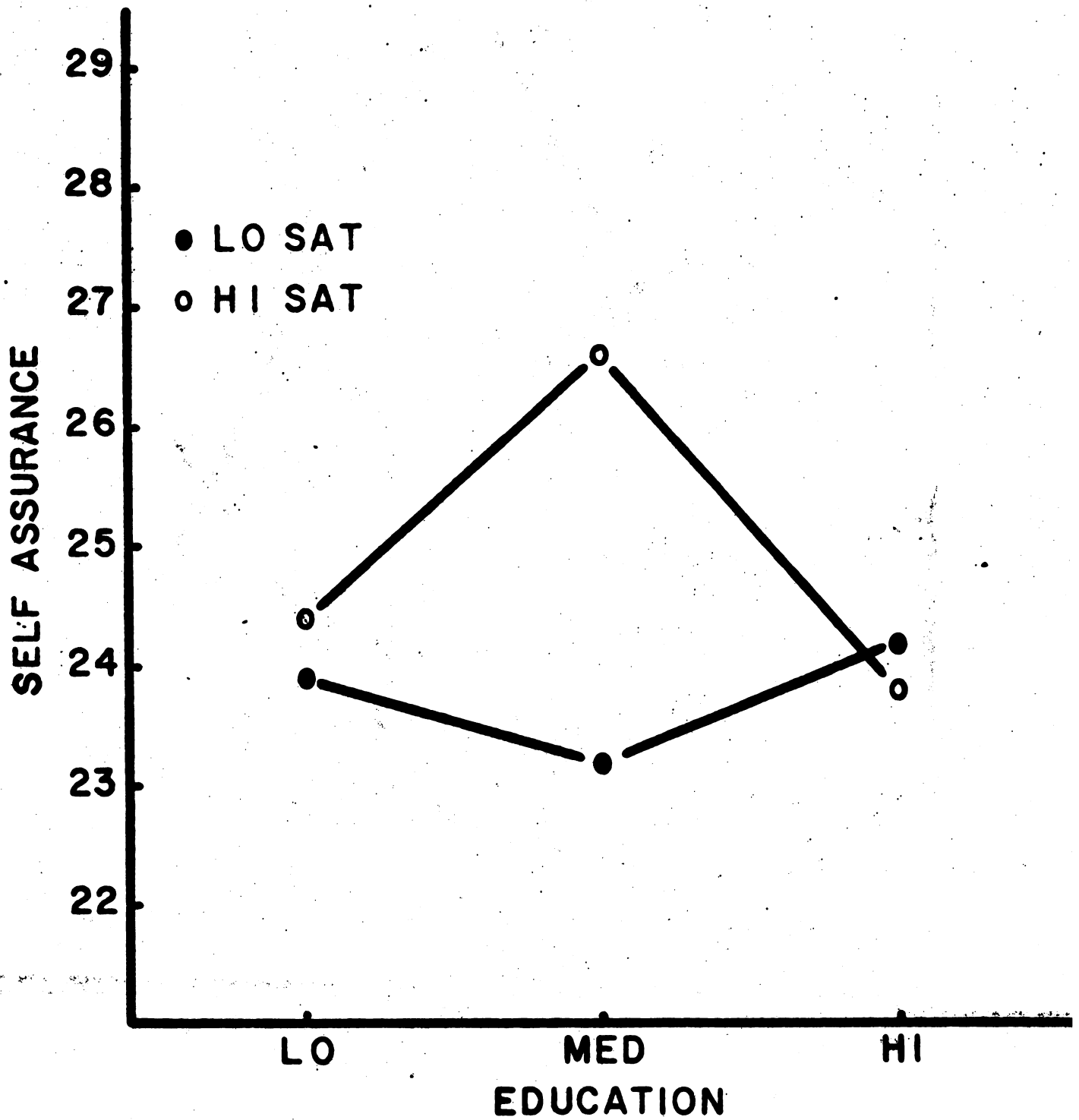Figure 2. Intelligence of groups divided on Education and Satisfaction.

Figure 3. Self Assurance of groups divided on Education and Satisfaction.
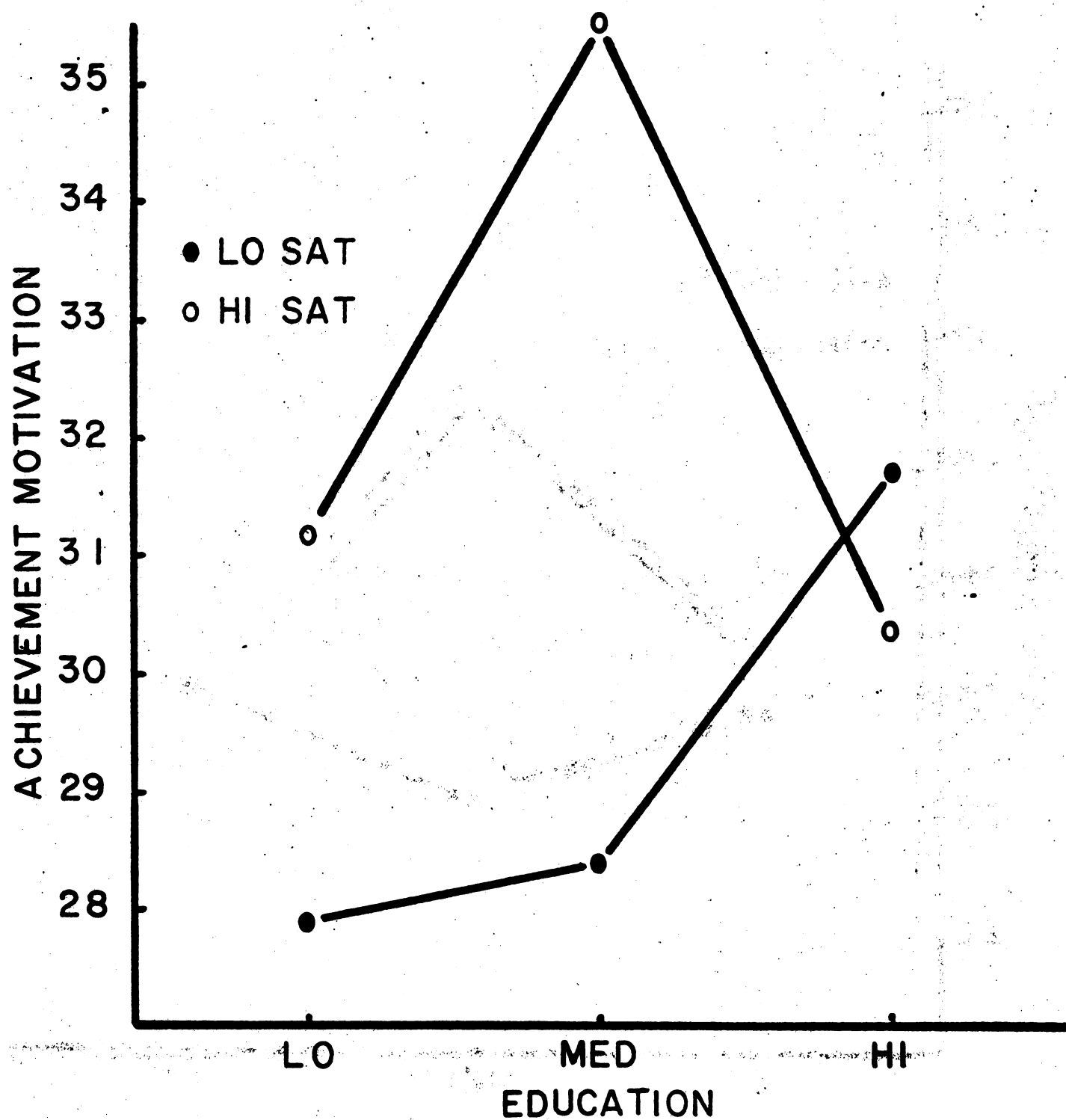
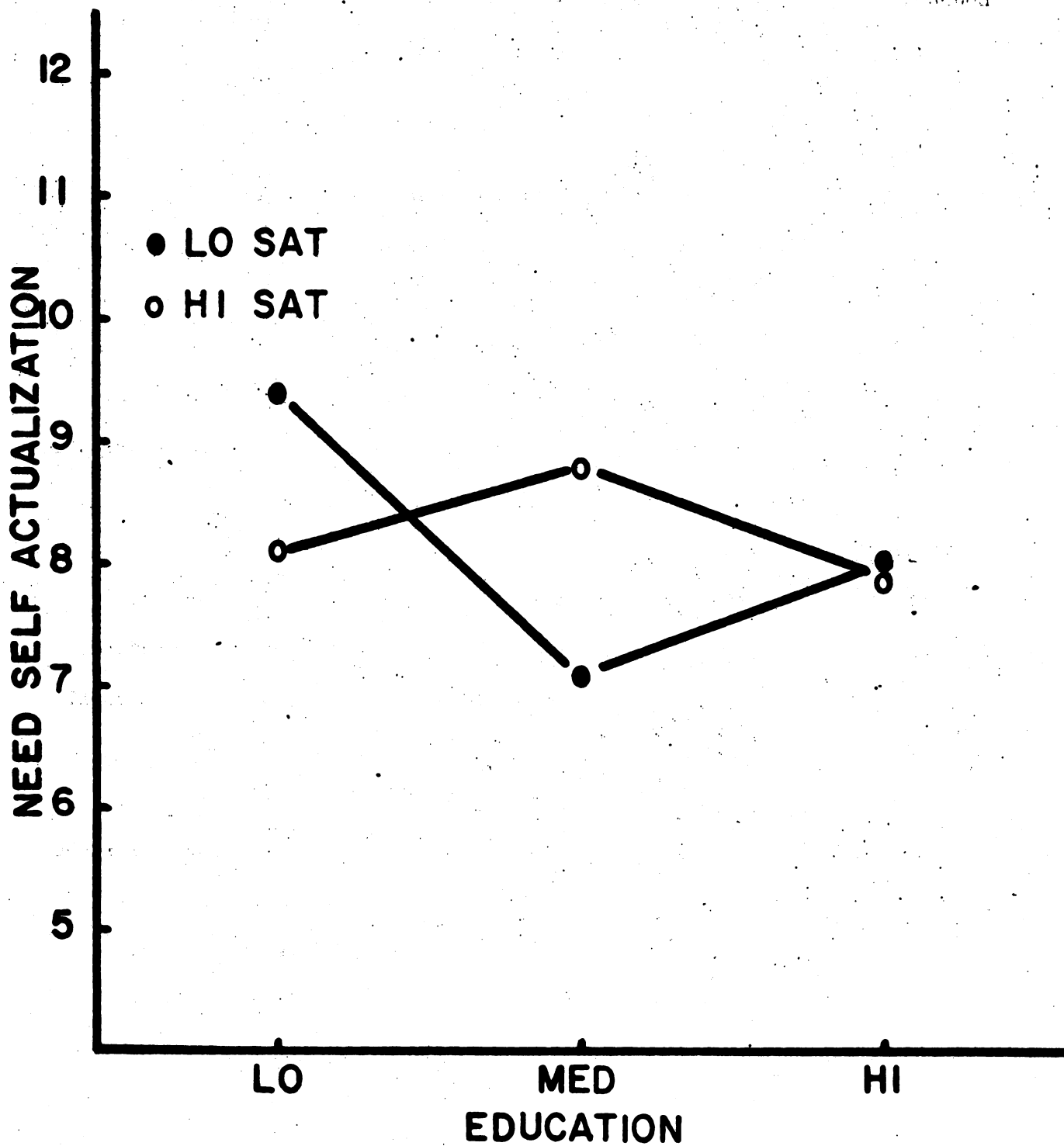Figure 4. Achievement Motivation of groups divided on Education and Satisfaction.

Figure 5. , Need for Self Actualization of groups divided on Education and Satisfaction.

Conclusions

The data in the preceding sections represent only a part of the
individual-difference information available from the data of the research
project from which they are taken. Future reports will include additional
analyses and they will focus on other aspects of the data. Relationships
between individual-differences variables and structural variables in the
organization will be examined as well as changes in individual and aggregated
measures over time.

Implications for research

Both the within-person perspective and work-reward preferences deserve
additional empirical investigation. The within-person measure of preferences
used in this set of studies has been demonstrated to be related to personal
characteristics on the one hand and responses to the work situation on the
other. Additionally it was a viable tool for subgrouping workers. Thus,
it shows promise as both a predictive and a descriptive instrument. Further
empirical data analyses (not yet reported) indicate that there are sig-
nificant relationships between the JOI scales and performance ratings.
Future studies should assess the usefulness and the stability of these
relationships.

Whether or not the JOI measure is utilized it is imperative that
research be conducted which will more thoroughly explore the importance
of workers' phenomenological frame of reference. How the worker approaches
the job, what rewards he expects and desires, and how he intends to perform
all have influences on job responses which remain relatively unexplored.

The reward preferences and expectations with which the job is approached may work as direct influences or they may act as moderators of the inter-relations among the characteristics of the job and the job responses. To tease out these relationships in field settings will require a variety of subjects and a variety of jobs. Perhaps, the more individualized approaches afforded by within-person measurements and the single-subject designs often utilized by researchers in behavior modification will provide insights into these complex intrapersonal processes.

With the report in section five that personality and background variables are related to an attitudinal response to the job the spectre is raised once again that job attitudes are under the influence of personal characteristics rather than job characteristics. The extent to which these job attitudes reflect personal characteristics, job characteristics, or interaction of the two can only (and should) be determined by studies done across many job situations with the same set of variables.

Implications for application

Suggestions for applications from research studies in the social sciences should always be assumed to be very tentative. Our current taxonomy of social situations does not allow us to move unerringly from the research site to the application site. Nonetheless, it is helpful to recognize the potentials for application from our research. Such applications as are undertaken should, of course, be carefully evaluated to assure that the proposed results are occurring. It is in this spirit that the present discussion is included in this report.

Opportunities for application came from both descriptive and predictive uses of the measures in these studies. Organizations will, of course, continue

to make measurements periodically of such variables as organizational

commitment and job satisfaction. Those measures are often made to provide

descriptor information. Monitoring changes in these variables over time

is helpful to avoid problems which may be undetected by less systematic

monitoring.

These studies suggest the use of work-reward preference information

as another useful descriptor. Changes in the hierarchy of preferred

rewards could indicate increasing or decreasing effectiveness of current

incentives or increasing or decreasing appropriateness of current work

conditions.

Another suggestion for application from these data is in the predictive

use of individual differences. There are two cases from these studies

which suggest that predictive use could be made of these variables to increase

the level of job satisfaction. If the Navy deems personal satisfaction with

the work situation to be an important goal, then such predictive use should

be attempted. It is extremely important to note here that the analyses in

this report are concurrent. That is, both the predictors and the criterion

(satisfaction in this case) were measured at the same point in time. If a

truly predictive use is to be made of these measures, it will be necessary

to ascertain whether the concurrent relationships are valid for temporal

prediction. If so, then the combinations of work-reward preferences desig-

nated in section three and the combinations of personal variables shown in

section five can be used in selection and placement decisions.

As a third, and final, suggestion for application there is the

possibility (suggested by the data in section two) to fit the rewards of

the job more closely to the preferences of the workers. By identifying age

and rank as variables related to work-reward preferences we should be able

to structure the work rewards so that they will meet the desires of various subgroups of workers. We can provide them with those categories of work rewards which they desire to make their work situation more compatible to their individual differences.