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August 1985

THE OCCUPATIONAL INTERESTS OF INFORMATION SYSTEMS MANAGERS: A PRELIMINARY STUDY

Working Paper No. 437

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FOR DISCUSSION PURPOSES ONLY

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ABSTRACT

This study, which explores the differences in occupational interest of upper and lower level MIS managers, is an extension of an earlier study by Hill, Tinkham, and Roselle (1984) concerning differences between R&D managers and technical specialists. It focuses upon a managerial sample and presents the hypothesis that lower level MIS managers display a higher technical orientation than upper level MIS managers. Furthermore, it presents an additional hypothesis that upper level MIS managers would exhibit a higher managerial or organizational orientation than do lower level MIS managers. The study explores the factors affecting career development within MIS organizations and the implications for job satisfaction for individuals pursuing management careers within MIS departments.

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INTRODUCTION

This study provides exploratory empirical evidence to highlight the differences in the occupational interests between upper and lower level MIS managers. The focus is to explore the factors that influence the career path of individuals pursuing managerial careers in technical or managerial areas within the departments of the organizations surveyed. In this respect occupational interests are relevant variables when viewed in light of Holland's theory of vocational personality and career development. The issues to be addressed are the effects of occupational interest orientation upon career placement and development as well as upon career satisfaction with the resulting implications for productivity and the individual's personal welfare.

The hypothesis of this paper is that lower level managers will possess a higher abstract or technical orientation while upper-level managers will display a higher people or managerial orientation. The implication is that individuals with a technical orientation are more likely to remain in lower--level managerial positions while those with a managerial orientation are more likely to attain upper level managerial positions. Such career paths can be interpreted to be largely a function of personal preferences and occupational interest patterns.

THEORETICAL BACKGROUND

The inherent conflict between managerial and technical orientations has been observed by a number of scholars. M.K. Badawy (1982) cited the difficulty some technical personnel experience in their transition to management from technical specialist positions. T. DeLong (1982) provided empirical evidence which illustrated the opposing relationship between managerial and technical functions based upon such varied career orientations as managerial, which allows autonomy and creativity or technical-functional, which allows security.[1] E. Schein, W. McKelvey, D. Peters, and J. Thomas (1965) found differences in the interests of NASA engineering and scientific personnel, depending on whether were managerial or technical. Technically inclined personnel were found to be more task-oriented and socially passive; those with a managerial orientation were found to be more interested in responsibility, influence, and interpersonal relations. Georgopoulos and Mann (1962) have formulated a management progression paradigm where the requirements for administrative skills increase and technical skills decline as one progresses up the managerial hierarchy. This reflects the common phenomena experienced by technical personnel as they move up the corporate ladder. Each progression requires a further tradeoff between technical and administrative tasks. At opposite extremes are the nonmanagerial technical specialist whose sole responsibility lies in the performance of technical tasks and the upper level manager whose time is largely spent upon personnel and administrative matters rather than on the details of technical tasks delegated to subordinates. The above mentioned studies provided strong evidence suggesting a

distinct difference in the psychological profile of managerial versus technical personnel. It has been generally implied that whereas technical positions require individuals with an introverted, analytical orientation, managerial positions require those who are extroverted and less prone to concentrate solely upon analytical issues. The varying methodologies suggest the possibility of determining such differences through statistical analysis of psychological profiles of managerial and technical personnel. A number of studies have used psychological test based data to determine such differences. Mossholder (1981) found differences between development and research personnel using the Strong Vocational Interest Blank (SVIB) scales. Hill, Tinkham, and Roselle (1984) found statistically significant differences in the Strong-Campbell Interest Inventory profiles of R&D managers and technical specialists. It is the intent of this paper to continue the evaluation of the psychological profile of individuals who possess conflicting orientations of management and technical interests. The occupational group under study here is that of MIS managers, who have been segmented by lower and upper level management position.

THEORETICAL FRAMEWORK

The underlying hypothesis of this paper rests upon the theories of vocational development presented by John Holland (1985). Roe and Siegelman present the hypothesis that vocational development begins during the early stages of childhood development as a result of formative experiences. Throughout his development, the individual focuses toward a particular interest domain, either person-oriented or thing-oriented. John Holland developeda hexagonal model

illustrating the six major themes that represent an individual's vocational spectrum. The six Holland Themes are:

REALISTIC: Rugged, robust, practical, prefers to deal with things rather than people, mechanically and athletically inclined, enjoys creating things with hands, emotionally unexpressive.prefers to think through problems rather than act on them, not highly person-oriented, enjoys ambiguity, independent, prefers to work alone in long periods of contemplation, enjoys solving technical puzzles.

ARTISTIC: Enjoy creative self-expression, sensitive, emotional, independent, original autonomy seeking, dislikes highly structured situations, rules and regulations, averse to control.

SOCIAL: Concerned with welfare of others, enjoy developing and teaching others, good in group settings, extroverted, cheerful, popular.

ENTERPRISING: Good facility with words, especially selling and leading, energetic, extroverted, adventurous, enjoys persuasion, comfortable exercising social power, concerned with "big picture," averse to contemplative work.

CONVENTIONAL: Prefers ordered, numerical, or verbal work, enjoys large organizations, responds to authority, dislikes ambiguous situations, stable, dependable, concerned with details, control oriented.[4]

Holland proposes a hexagonal model which illustrates a clear dichotomy between the domains of persons and things (see Figure I). In this hexagonal model, the similarity of themes is a function of their distance from one another. Themes opposite one another are most dissimilar while themes adjacent to one another are most similar. This theoretical framework rests upon the assumption that an individuals seeks an occupational environment which based upon these six themes, most closely matches his vocational interests. Each specific occupation makes certain demands upon the individual. The Strong Campbell Interest Inventory (SCII) test is used in this study as this test was developed by John Holland and others to measure his six RIASEC themes.

The dichotomy of basic interests (people or things) directly addresses the apparent conflict between the demands of a technical versus a managerial career. Furthermore, provided with the finer decomposition of the six RIASEC variables of the Basic Interest and Occupational Interest Scales of the Strong Campbell Interest Inventory, Holland's theoretical framework gives a unique opportunity to explore in detail the psychological factors affecting career development of technical personnel seeking managerial careers.

THE DATA

The data were drawn from 107 managerial personnel with technical backgrounds from the MIS departments of various organizations (39 were from a single large midwestern MIS firm). The respondents completed the Campbell-Strong Interest Inventory personnel (which was subsequently computer processed at the University of Minnesota to determine the Holland RIASEC, basic interest, and occupational scales) and a questionnaire regarding personal data including hierarchical position within the company and level of job satisfaction. The sample was not big enough to stratify by age in order to remove the age related effects upon hierarchical level and job satisfaction. However, the sample was of sufficient size to stratify for hierarchical level and level of job satisfaction (see Table I). Sixty-four respondents were classified as lower level managers while forty-three were classified as upper-level managers. Forty-five respondents were classified as having a relatively low level of job satisfaction (56 percent were lower level managers versus 44 percent upper level managers) and 60 were classified as having a relatively high level of job satisfaction (30 percent lower

level managers versus 70 percent upper level managers). Due to the small sample size, further stratification of the data was not possible. Ideally, the two samples would have been further refined. In the lower manager sample, those individuals representing new entrants (few years of experience in management, younger age level, etc.) would be excluded as some could be upper management material in the process of moving up the management ladder. These scores would weaken the RIA/SEC profile of the study. The problem of sample dilution would not exist in the upper level management sample as nonmanagement material would have been successively screened at each successive step in the management hierarchy. It is at the lower management level where the probability of misallocation is greatest. In short, the shortcomings of the data would tend to cause the underestimation of the magnitude of the RIA/SEC differences. Further refinement of the data (larger sample size enabling age stratification of the samples) should increase the statistical significance of these findings.

THE HYPOTHESES

This study was conducted to test the hypothesis that there existed a dichotomy of individual RIASEC and occupational interest scale profiles in lower level managers versus upper level managers. Hill and Collins-Eaglin (1985) emphasized the split RIASEC model in its extreme with Campbell's (1971) study of Nobel Prize winning scientists and corporate presidents. In this case there was a distinct RIA/SEC split. Hill, Tinkham, and Roselle (1984) found a clear distinction between the stronger managerial/social orientation

of R&D managers over the technical/task orientation of technical specialists. The RIA/SEC split should also be displayed at the managerial level but the difference would be diminished in magnitude. The focus of this paper is to determine whether such differences can be found in the managerial ranks and whether those differences influence progression within the managerial hierarchy as they influence the managerial/nonmanagerial career path decision. The hypotheses were:

Hypothesis 1: Lower level managers will score higher on the Realistic, Artistic, and Investigative (RIA) scales than will Upper level managers.

Hypothesis 2: Upper level managers will score higher on the Social, Enterprising, and Conventional (SEC) scales than will Lower level managers.

Hypothesis 3: The level of job satisfaction will be directly correlated to the individual's RIASEC profile fit with the hypothesized "ideal" RIASEC profile corresponding to his/her level of management -- the better the fit, the higher the level of job satisfaction (this is to be controlled for the direct positive correlation between job satisfaction and hierarchical position within an organization. A simple regression on age versus hierarchical position produced: r-square = .18, F-statistic of 22.442 significant at the .0000 level, and the coefficient was positive.) Unfortunately, this appears to be largely the result of the presence of younger low level managers possessing the interests and potential for upper-level management positions as described earlier.)

This RIASEC hypothesis is supported by the general phenomenon of increasing managerial or administrative responsibility and decreasing technical work experienced by persons moving up the management ladder and the fact that a person best suited for any given position must possess the occupational interests most pertinent to the demands of that position.

METHOD

The wealth of data presented by the Campbell-Strong Interest

Inventory necessitated the use of dimensionality reduction procedures. The six basic RIASEC variables (Holland Themes) were analyzed to establish the existence of the RIA/SEC dichotomy. Factor Analysis was applied to study the underlying variance structure of the data set and two-sample statistical procedures (Student t-test, Hotelling t-square) as well as multiple regression and discriminant analysis were used to identify significant differences between the lower and upper level management groups. Subsets of the six RIASEC variables, the twenty-three Basic Interest Scales, were then analyzed to extract the more subtle RIASEC differences from the samples. Multicollinearity is inherent in these variables so Factor Analysis was used to select the "best" variable from each RIASEC subset on the basis of greatest communalities (those variables explaining most of the variance within the data set). Some exploratory analysis of the Occupational Scales was also conducted to study a further decomposition of the RIASEC variables. However, only occupational scales pertaining to technical and business administration related occupations were considered. These 21 variables were selected on the basis of a Student t-test between a sample of managers and technical specialists from another data base in an attempt to create a manageable data base from 170 Occupational Interest Scales.

FINDINGS

The analysis of the six basic Holland Themes (the RIASEC variables) provided limited evidence for the RIA/SEC dichotomy. Only the Artistic theme proved to be significantly different (see Table II), yet, except for the Social theme, all the mean differences were of the hypothesized relationship. These findings seem to indicate

that, in contrast to Hill and Roselle's (1984) study which compared managers and nonmanagers, this managerial sample consists of individuals with similar managerial orientations; using a managerial sample largely eliminated those individuals with nonmanagerial orientations. The major determinant of individual career progression now appears to be the relative strength of his/her scientific or technical orientation -- his/her willingness to forego technical tasks in exchange for managerial duties upon entering the upper levels of management. The use of factor analysis and principal components analysis to study the underlying variance of the data revealed the presence of the RIA/SEC split factor in the form of a second factor or component. (The factors selected were unrotated. The varimax and promax rotations also produced similar interpretable factors -- see Tables V and VI). This second factor or component accounts for 29.2 percent to 38.01 percent of the variance in the data (see Tables III and IV.) The first factor can be construed as describing the typical profile of an individual pursuing a managerial career within the technical and R&D departments of midwestern MIS firms. The second factor or component can be construed as representing the technical or scientific orientation (high RIA, low SEC). This is significant in that it is consistent with the hypothesis that it is the strength of the managers' technical orientation which would cause them to remain, by choice, at a lower level of management where they would still be exposed to the technical, task-oriented responsibilities they prefer. Furthermore, since the data are comprised of individuals who by nature are highly technically oriented, one can hypothesis that their technical

orientation provides the major career path determinant in this sample - for both a lower or upper level management decision. While causality is difficult to infer, the above would imply that, when considering a sample of R&D managers, an individual's managerial orientation is secondary to a technical or scientific orientation. Subsequent components produced by the PCA reveal additional subtleties in the data. The third component seems to reflect the opposing Realistic or Social relationship of Holland's hexagonal model whereas the fourth component reflects the opposing Investigative or Enterprising relationship. The fifth and sixth components can be described as reflecting Artistic and Realistic orientations respectively. A larger data base should allow a more precise definition of these exploratory components. Since the RIA/SEC factor is secondary the RIA/SEC split at the managerial level proved to be too subtle to be detected by the analysis of the six basic Holland Themes alone.

The unrotated factors were rotated using the varimax and promax methods in an attempt to identify the Investigative factor influencing the data. While the resulting factors are difficult to interpret and those which were unrotated better suit the hypothesis of this paper, those which were rotated present an alternative set to use. Only subsequent analysis of larger data bases will resolve this issue. The varimax (orthogonal) rotation (see Table V) created two factors which explained 22.4 and 21.9 percent of the variance respectively. The first factor can be construed as reflecting a strong SEC orientation and a weak RIA orientation but overall as being strongly Conventional. The second factor represents a strong

Investigative direction with an overall weak SEC and stronger RIA leaning. The promax (oblique) rotation (see Table V) produced two moderately correlated factors (correlation between the factors was .4401). The first represents a strong SEC and a weak RIA orientation. The second represents a strong RIA and a weak SEC orientation. While these factors present some differences to the unrotated factor model with its clear second RIA/SEC split factor, they nonetheless offer a similar set of underlying relationships within the data to suggest some form of the RIA/SEC dichotomy.

The analysis of the Basic Interest Scales was used to reveal the more subtle RIASEC differences by using a finer subset of variables that would reflect such differences in greater magnitude. However, by definition, the Basic Interest Scales (BIS) for each RIASEC category are highly correlated so factor analysis was used to extract those variables which provided the most explanatory power on the basis of greatest communality. After extensive testing and analysis, a final, "best fit" model was selected (see Table VII). The difference of the BIS variables selected proved to be statistically significant at the .004 level as determined by the multivariate Hotelling's t-squared test (see Table VII). While subset variables for the Realistic and Conventional measures were not found, proxies for the Investigative, Artistic, Social, and Enterprising were found. A discriminant analysis was used to evaluate further the discriminatory and predictive properties of the selected BIS variables. While the linear discriminant function proved significant and the predictive ability of the model using the Chi-Square test was shown to be significant at the .0003 level, a

puzzling anomaly was detected (see Table VII). The component correlation coefficient on the Investigative variable was positive and in conflict with the general hypothesis of the RIA/SEC split. Otherwise, the other correlations were consistent with the hypothesis. Further study is necessary to determine the significance of this contradictory finding (again, the presence of younger lower level managers possessing the potential for upper level management may be skewing the data).

The Occupational Interest Scales (OIS) variables were also analyzed to search for more specific RIASEC differences in the sample. The OIS variables chosen were preselected on the basis of earlier analysis of a similar data base to reduce the complexity of handling 170 OIS variables. Business and scientific variables were selected to highlight the differences between the samples (due to the difficulties of creating the data base and partial oversight, no artistic variables were included - it can be assumed that such OIS variables would have also proven significantly different between samples). While most of the managerial OIS variables proved significantly different, the two scientific or technical OIS variables were not. However, only two scientific or technical OIS variables were used; since they reflected the specific backgrounds of the sample, no differences were expected. Subsequent analysis should involve the use of additional OIS variables reflecting the entire RIASEC spectrum in order to evaluate the significance of the OIS findings fully. Nevertheless, use of the multivariate Hotelling's t-squared test as well as the univariate Student t-test showed business-related variables to be discriminatory between samples (see

Table VIII). The upper-level managers scored considerably higher than lower-level managers on OIS variables, reflecting a managerial orientation.

A measure of job satisfaction was used as a shadow variable in an attempt to detect how closely a person's occupational interests matched the responsibilities of his position. The hypothesis was that if the job was not a good match with his occupational interests, the individual would display a lower level of job satisfaction. Exploratory use of the univariate Student t-test was used (see Table IX). The first comparison involved the differences between satisfied and dissatisfied lower-level managers. One business-oriented BIS and four business-oriented OIS variables were discriminatory. The satisfied lower-level managers displayed a higher managerial orientation, which is consistent with their holding managerial positions. One technically oriented OIS variable mean was also greater for satisfied lower-level managers, reflecting that while a business orientation was necessary, satisfied lower-level managers also had a strong technical interest. The second comparison involved satisfied and dissatisfied upper-level managers. While a managerial BIS variable mean (Enterprising) was higher for satisfied upper-level managers, consistent with the hypothesis, two nonmangerial BIS variable means (Realistic and Investigative) were also higher. Such a finding suggests further intricacies within the data regarding individuals who manage to reconcile the apparent conflicts between managerial and technical orientations. Finally, the last comparison involved the differences between satisfied upper and lower-level managers. The Artistic BIS variable mean was greater for lower level

managers and the Social BIS variable mean was greater for upper-level managers, consistent with the hypothesis. However, the Investigative BIS variable mean was greater for upper-level managers. Apparently, the Investigative Holland Theme seems to reflect the ability of an individual with a technical background to overcome the apparent conflict between his technical/scientific and managerial orientations.

Discriminant analysis was used in an attempt to determine the existence of a viable relationship between job satisfaction and a "best fit" BIS model (see Table VII for original "best fit" BIS model). The BIS model was first used to test the Holland Theme differences between satisfied and dissatisfied lower/ middle level managers (see Table X). An altered BIS model was used with 71.R Agriculture substituted for 77.I Mathematics (the original best fit model proved significant at only the .217 level for the discriminant function and .396 for the Chi-squared). The linear discriminant function was significant at the .19 level. However, the chi-Square test proved significant at the .085 level. The Realistic and Artistic BIS variables had positive loadings whereas the Social variable had a negative loading. This was consistent with the hypothesis. However, the Enterprising BIS variable also had a positive loading. This finding may not necessarily be contradictory to the hypothesis since the sample comprised managerial personnel; it is consistent that managerial persons possessing a stronger managerial orientation would be more satisfied with managerial responsibilities. Discriminant analysis using the BIS model was then applied to the upper level management sample (see Table XI). The

discriminant function was only significant at the .60 level but the Chi-Square was significant at the .072 level. Finally, the "best fit" BIS model was applied to the entire sample to explore the more general RIASEC relationship between job satisfaction and vocational interests within a general management sample (see Table XII). The findings of the discriminant analysis were significant at the .075 level and the Chi-square at the .016 level. While the results of the upper management analysis were neither meaningful nor statistically significant, the findings of discriminant analysis upon the lower/middle management sample as well as upon the combined samples suggest a direct relationship between the individual's vocational interest profile fit with his job and his/her level of job satisfaction. This should be taken in light of the fact that with samples of insufficient size, the difficulty of finding significant relationships is especially difficult.

CONCLUSIONS

While the findings of this study generally support the RIA/SEC dichotomy originally proposed, the evidence also seems to indicate the presence of an underlying RIA/SEC dichotomy within the data with the Realistic and Investigative Holland Theme being a key factor in the resolution of the managerial/technical conflict experienced by technical specialists who enter managerial positions. Nevertheless, there exist clear differences in the psychological profile between upper and lower-level management, namely two factors which determine the career progression of the technical individual seeking a managerial career within MIS organizations. The first factor as

described in the hypothesis is the strength of the individual's technical/scientific orientation as reflected in the Realistic and Artistic Holland Themes and the subset BIS and OIS variables. An individual who scores high on Artistic and Realistic means would be less likely to voluntarily seek an upper-management position. The second factor is the strength of the individual's managerial orientation. An individual scoring high on the Social, Enterprising, and Conventional Holland Themes and the subset BIS and OIS variables would be more inclined to seek an upper-management position. However, in the case where an individual scores highly on the Artistic, Social, Enterprising, and Conventional Holland Themes, the relative strength of his Realistic and Investigative scores also related to satisfaction with upper level management. Higher relative scores on the Realistic and Investigative means, according to these data, indicate the individual's ability to cope with the managerial/technical conflict. While the job satisfaction findings were exploratory, the results indicated a direct positive correlation between an individual's job satisfaction and the closeness between his managerial position and his/her hypothesized "best fit."

These findings have a clear implication for the management of those MIS departments which rely upon management teams developed from technical staffs. The dilemma created by the inherent conflict between technical/scientific and managerial orientations is well documented; firms have devised various means to resolve the problem of grooming future managers from technical staffs. Extensive management development programs, management aptitude tests, and numerous training sessions address the symptoms of this basic

problem. Many management aptitude tests examine candidates for managerial aptitude and potential without addressing the problem of the technical/managerial conflict. This paper proposes the possibility of identifying not only individuals with managerial potential, but technically inclined individuals possessing the unique psychological profile that allows them to resolve their conflicting orientations. A technically inclined individual possessing managerial interests is not, by those characteristics alone to ensure, success as an upper-level manager. Holland's Theory of Vocational Choice provides the hexagonal RIASEC model which provides measures to detect such a conflict. The Holland Theme based measures (RIASEC, BIS, and OIS) variables upon which the data are based directly address the opposing relationships of the technical and managerial domains. The preliminary results of the job satisfaction study indicate that while an individual may possess the managerial talent to attain an upper-level management position, unresolved internal conflict between his technical and managerial orientations will lead to a low level of job satisfaction with its resulting negative implications for productivity as well as the individual's personal welfare.

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TABLE I:

The Hierarchical stratification was based upon individual responses to a question which asked the respondent to indicate his current position within the firm:

Code	Description	# respondents	
5	Top: CEO, President	0	
4	Executive: Vice President	14	"upper level"
3	Upper Level Management	50	n=64 mean=3.2188
			The separation was made at this point.
2	Middle Level Management	27	
1	Lower Level Management	16	"lower level"
			n=43 mean=1.6279

The Job Satisfaction stratification was based upon another individual response:

Code	Description	# respondents	
1	Dissatisfied	0	
2		0	
3		4	
4	Moderately Satisfied	13	"Dissatisfied"
5		28	n=45 mean=4.5333
			The separation was made at this point
6		36	
7	Very Satisfied	24	"Satisfied"
			n=60 mean=6.4000

Descriptive figures:

variable	mean	std dev
AGE	42.752	7.3860
HIERARCHY	2.5794	.90112
JOB SATISFACTION	5.6000	1.0884

Note: The mean for JOB SATISFACTION in the upper level management stratum was 5.8548 (std dev=.93820) while the mean was 5.2326 (std dev=.1.1920)in the middle/lower level stratum.

TABLE II:

Hotelling's T-square: T-SQUARE = 4.1063 D-SQUARE = .15966
Equality of Stratum Means: DF = 6,100 F = .65179 SIG = .6886

	Means for Stratum			
Variable	lower level managers (1)	upper/middle level managers (2)	Student t (df = 105)	Sig
65. REALISTIC	55.419	54.547	.46196	.6451
66. INVEST	53.674	52.750	.60316	.5477
67. ARTISTIC	47.116	43.313	1.8808	.0628
68. SOCIAL	44.558	43.922	.33290	.7399
69. ENTERPRISING	50.674	50.984	-.19893	.8427
70. CONVENTIONAL	52.465	53.188	-.53582	.5932

TABLE III:

Principal Components Analysis

Test	Statistic	df	Significance	N=107 out of 107
Independence	120.71	15	0.	
Equicorrelation	57.421	14	.0000	

	Principal Components					
	(1)	(2)	(3)	(4)	(5)	(6)
Component	2.2803	1.3189	.95029	.59619	.44502	.40931
% Variance	38.01	59.99	75.82	85.76	93.18	100.00
Independence	52.820	23.335	4.0509	.17574		
df	14	9	5	2		
Significance	.0000	.0055	.5421	.9159		
65. REALISTIC	.44212	.12608	-.61557	.16062^{-1}	.13954	.60369
66. INVESTIGATIVE	.41232	.50910	-.13083	.46444^{-1}	-.46240	.54914^{-1}
67. ARTISTIC	.37141	.46553	.47178	-.10681^{-1}	.64915	.35374^{-1}
68. SOCIAL	.43149	-.21181	.56379^{-1}	.33752	-.48147	-.32459^{-1}
69. ENTERPRISING	.44091	-.32566	.11438^{-1}	-.83520	-.41398	.11447^{-1}
70. CONVENTIONAL	.34057	-.59773	-.16503	.40056	.33435	.47672

TABLE IV:

Factor Analysis:

Two Initial Unrotated Factors Using Principle Axis Method

N=107 Kaiser's Statisitic=.52339
Maximum % change in communality estimates=15.55 after 3 iterations

Variable	Initial Values	Communality Step = 3	Scaled Factor Loadings (1)	(2)
65. REALISTIC	1.0	.30729	.54795	.83956^{-1}
66. INVESTIGATIVE	1.0	.63116	.60437	.51565
67. ARTISTIC	1.0	.37818	.47929	.38531
68. SOCIAL	1.0	.29966	.52638	-.15027
69. ENTERPRISING	1.0	.39180	.57128	-.25581
70. CONVENTIONAL	1.0	.64973	.50417	-.62893
		Eigenvalue	1.7528	.90498
		% Variance	29.2	44.3

Scaled Factor Scores Using Regression Method

Variable	(1)	(2)
CONSTANT	0	0
65. REALISTIC	.14062	.36776^{-1}
66. INVESTIGATIVE	.37418	.45091
67. ARTISTIC	.20751	.19543
68. SOCIAL	.16493	-.48022^{-1}
69. ENTERPRISING	.23849	-.14503
70. CONVENTIONAL	.32033	-.55686

TABLE V:

Factor Analysis

Pairwise Varimax (Orthogonal) Rotation on Two Factors (see table IV) with Normalized Loadings

Iteration	(1)	(2)
Criterion	.52290	1.9047

Variable	Communality	(1)	(2)
65. REALISTIC	.30729	.33514	.44156
66. INVESTIGATIVE	.63116	.75296^{-1}	.79088
67. ARTISTIC	.37818	.76150^{-1}	.61023
68. SOCIAL	.29966	.48262	.25832
69. ENTERPRISING	.39180	.58831	.21376
70. CONVENTIONAL	.64973	.79972	-.10093
	Sum of Squares	1.3424	1.3155
	% Variance	22.4	44.3

Scaled Factor Scores Using Regression Method

Variable	(1)	(2)
CONSTANT	0	0
65. REALISTIC	.75414^{-1}	.12426
66. INVESTIGATIVE	-.44986^{-1}	.58422
67. ARTISTIC	.13063^{-1}	.28475
68. SOCIAL	.15187	.80263^{-1}
69. ENTERPRISING	.27221	.61772^{-1}
70. CONVENTIONAL	.61753	-.17708

TABLE VI:

Factor Analysis

Pairwise Promax (Oblique) Rotation Four on Two Factors with Normalized Loadings

Rotation of Factors

Iteration	(1)	(2)
Criterion	.52290	1.9047

Variable	Communality	(1)	(2)
65. REALISTIC	.71335	.45960	.70860
66. INVESTIGATIVE	1.13929	-.14315	1.0547
67. ARTISTIC	1.1018	-.11082	1.0438
68. SOCIAL	.78849	.84071	.28574
69. ENTERPRISING	.89322	.93617	.12959
70. CONVENTIONAL	1.3801	1.1083	-.38961
	Sum of Squares	3.0555	2.9543

Scaled Factor Scores Using Regression Method

Variable	(1)	(2)
CONSTANT	0	0
65. REALISTIC	.46525	.57071
66. INVESTIGATIVE	-.10928	.39341
67. ARTISTIC	.40174	.55492
68. SOCIAL	.57096	.32579
69. ENTERPRISING	.49519	.17059
70. CONVENTIONAL	.40801	-.22014

$^{-1}$

Correlations Between Factors = .4401

TABLE VII:

Discriminant Analysis

Equality of Covariances: df=10, 37997. F=1.0297 Significance=.4149

Linear Discriminant Functions

Variables	lower level managers (1)	upper/middle level managers (2)
CONSTANT	-107.27	-113.75
77. I MATHEMATICS	1.5806	1.6329
81. A ART	.65693	.62032
85. S ATHLETICS	.37295	.41046
92. E BUSINESS MANAGEMENT	1.3726	1.4276
GENERALIZED VARIANCE	.20387+8	.15855+8
N	43	64

Canoncial Analysis

Component	.16390
Correlation	.3753
% Variance	100.00
77. I MATHEMATICS	.63926-1
81. A ART	-.44751-1
85. S ATHLETICS	.45857-1
92. E BUSINESS MANAGEMENT	.67231-1

Hotelling's T-square/Mahalonobis Distance

df=4,102 T-square=17.210 D-Square=.66913 F=4.1795 Sigificance=.0036

Variable	Stratum Means (1)	(2)	Univariate Statistics Student t(df=105)	Significance
77. I MATHEMATICS	56.860	59.172	-1.7614	.0811
81. A ART	46.279	41.078	2.5695	.0116
85. S ATHLETICS	48.047	53.422	-2.7818	.0064
92. E BUSINESS MANAGEMENT	55.628	58.469	-2.0453	.0433
N	43	64		

Confusion Matrix

N=107 df=1 Chi-Square=13.107 Significance=.0003

		Predicted (1)	(2)
Expected	(1)	28	15
	(2)	19	45

TABLE VIII:

Hotelling's T-square: T-SQUARE = 21.838 D-SQUARE = .84909
Equality of Stratum Means: DF = 10,96 F = 1.9966 SIG = .0419

Means for Stratum

Variable	lower level managers (1)	upper/middle level managers (2)	Student t (df = 105)	Significance
95. RC AIRFORCE OFFICER	41.558	45.156	-1.6666	.0986
99. RC NAVY OFFICER	38.930	43.188	-2.2112	.0292
142. IRC SYSTEMS ANALYST	45.000	47.047	-1.0043	.3175
144. IRC COMPUTER PROGRAMMER	41.628	40.188	.69055	.4914
206. SRE RECREATION LEADER	31.395	36.000	-2.2731	.0251
210. SE SCHOOL ADMINISTRATOR	32.581	35.672	-1.4252	.1571
228. E PUBLIC ADMINISTRATOR	32.860	36.016	-1.2022	.2320
233. E PERSONNEL DIRECTOR	35.326	40.625	-2.4234	.0171
241. EC PURCHASING AGENT	40.326	45.844	-2.8722	.0049
257. CE IRS AGENT	37.930	41.938	-2.1369	.0349
N	43	64		

TABLE IX:

Job Satisfaction Comparisons using Univariate Student t-test

Comparison I: Satisfied(1) versus Dissatisfied(2) Lower/Middle Level Managers.

Variables	Stratum Means (1)	(2)	Student t-test	Significance
92. E BUSINESS	57.833	54.040	-1.7555	.0866
95. AIRFORCE OFFICER	45.833	38.480	-2.5011	.0165
99. NAVY OFFICER	41.778	36.880	-1.8718	.0684
142. SYSTEMS ANALYST	42.360	48.667	-2.0197	.0500
233. PERSONNEL DIRECTOR	380833	320800	-1.6709	.1024
241. PURCHASING AGENT	44.222	37.520	-2.2238	.0317

Comparison II: Satisfied(1) versus Dissatisfied(2) Upper Level Managers.

Variables	Stratum Means (1)	(2)	Student t-test	Significance
75. R MECHANICAL ACTIVITIES	55.881	51.500	-1.7107	.0923
79. I MEDICAL SERVICE	45.595	42.550	-1.6774	.0987
91. E SALES	51.167	46.500	-2.1035	.0396

Comparison III: Satisfied Lower/Middle Level Managers(1) versus Satisfied Upper Level Managers(2)

Variables	Stratum Means (1)	(2)	Student t-test	Significance
79. I MEDICAL SERVICE	42.167	45.595	-1.8203	.0739
81. A ART	46.722	41.690	1.7557	.0844
85. ATHLETIC	45.667	52.286	-2.3294	.0233

TABLE X:

Job Satisfaction Comparision Between Satisfied(1) and Dissatisfied(2) Lower/Middle Level Managers.

Discriminant Analysis

Equality of Covariances: df=10, 6293.9 F=1.1359 Significance=.3305

Linear Discriminant Functions

Variables	(1)	(2)
CONSTANT	-78.6555	-82.120
71. R AGRICULTURE	.24447	.27966
81. A ART	.78469	.78876
85. S ATHLETICS	.72433	.65348
92. E BUSINESS MANAGEMENT	1.3620	1.4508
GENERALIZED VARIANCE	.25086+6	.20106+8
N	25	18

Canoncial Analysis

Component	.17276
Correlation	.3838
% Variance	100.00

71. R AGRICULTURE	.42773-1
81. A ART	.49422-2
85. S ATHLETICS	-.86118-1
92. E BUSINESS MANAGEMENT	.10788

Mahalonobis Distance: D-Square=.67685 F=1.6412 Sigificance=.1839

Confusion Matrix

N=43 df=1 Chi-Square=2.9784 Significance=.0844

		Predicted (1)	Predicted (2)
Expected	(1)	15	10
	(2)	6	12

TABLE XI:

Job Satisfaction Comparision Between Satisfied(1) and Dissatisfied(2) Upper Level Managers.

Discriminant Analysis

Equality of Covariances: df=10, 6750.1 F=1.4424 Significance=.1548

Linear Discriminant Functions

Variables	(1)	(2)
CONSTANT	-119.10	-122.69
77. I MATHEMATICS	2.0718	2.1198
81. A ART	.48396	.49135
85. S ATHLETICS	.11622	.76584-1
92. E BUSINESS MANAGEMENT	1.5776	1.6222
GENERALIZED VARIANCE	.85537+7	.15569+8
N	20	42

Canoncial Analysis

Component	.48924-1
Correlation	.2160
% Variance	100.00
77. I MATHEMATICS	.10316
81. A ART	.15870-1
85. S ATHLETICS	.85158-1
92. E BUSINESS MANAGEMENT	.95740-1

Mahalonobis Distance: D-Square=.21666 F=.69717 Sigificance=.5971

Confusion Matrix

N=62 df=60 Chi-Square=3.2504 Significance=.0714

		Predicted (1)	Predicted (2)
Expected	(1)	12	8
	(2)	15	27

TABLE XII:

Job Satisfaction Comparison Between All Satisfied(1) and Dissatisfied(2) Managers.

Discriminant Analysis

Equality of Covariances: df=10, 42312. F=.96822 Significance=.4688

Linear Discriminant Functions

Variables	(1)	(2)
CONSTANT	-105.78	-111.12
77. I MATHEMATICS	1.5574	1.6108
81. A ART	.66285	.65979
85. S ATHLETICS	.31650	.27960
92. E BUSINESS MANAGEMENT	1.3812	1.4559
GENERALIZED VARIANCE	.20939+8	.17941+8
N	45	60

Canoncial Analysis

Component	.87944-1
Correlation	.2843
% Variance	100.00

77. I MATHEMATICS	.90008-1
81. A ART	-.51674-2
85. S ATHLETICS	-.62168-1
92. E BUSINESS MANAGEMENT	.12589

Mahalonobis Distance: D-Square=.35226 F=2.1986 Sigificance=.0745

Confusion Matrix

N=105 df=103 Chi-Square=5.8746 Significance=.0154

		Predicted (1)	Predicted (2)
Expected	(1)	28	17
	(2)	23	37