1989

Personal characteristics of executives in different management levels

Virginia L. Kinon
San Jose State University

Follow this and additional works at: https://scholarworks.sjsu.edu/etd_theses

INFORMATION TO USERS

The most advanced technology has been used to photograph and reproduce this manuscript from the microfilm master. UMI films the text directly from the original or copy submitted. Thus, some thesis and dissertation copies are in typewriter face, while others may be from any type of computer printer.

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleedthrough, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send UMI a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

Oversize materials (e.g., maps, drawings, charts) are reproduced by sectioning the original, beginning at the upper left-hand corner and continuing from left to right in equal sections with small overlaps. Each original is also photographed in one exposure and is included in reduced form at the back of the book. These are also available as one exposure on a standard 35mm slide or as a 17″ x 23″ black and white photographic print for an additional charge.

Photographs included in the original manuscript have been reproduced xerographically in this copy. Higher quality 6″ x 9″ black and white photographic prints are available for any photographs or illustrations appearing in this copy for an additional charge. Contact UMI directly to order.

Order Number 1337818

Personal characteristics of executives in different management levels

Kinon, Virginia L., M.S.

San Jose State University, 1989

U·M·I

PERSONAL CHARACTERISTICS OF EXECUTIVES

IN DIFFERENT MANAGEMENT LEVELS

A Thesis

Presented to

the Faculty of the Department of Psychology

San Jose State University

In Partial Fulfillment

of the requirements for the Degree

Master of Science

by

Virginia L. Kinon

May 1989

APPROVED FOR THE DEPARTMENT OF PSYCHOLOGY

_____
Dr. Jay Rusmore

_____
Dr. James Asher

_____
Dr. Preston Probasco

APPROVED FOR THE UNIVERSITY

_____
M. Lou Lewandowski

TABLE OF CONTENTS

/

LIST OF TABLES

LIST OF FIGURES

vi

Personal characteristics of Executives in
Different Management Levels
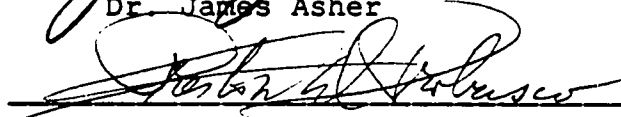
Virginia L. Kinon

San Jose State University

PERSONAL CHARACTERISTICS OF EXECUTIVES

Abstract

In a study of 208 public utility managers, hierarchical
regression analysis was used to examine the relationship
between job performance and intellectual, personality, and
interest factors for each of three distinct management
levels. For entry level managers, all personality and
interest factors were significant at $p < .05$, while
intellectual factors were significant at $p < .01$. All
factors, except the "Realistic" and "Social" interest
factors were significant ($p < .05$) for middle level
managers. For upper level managers, all factors except
"General Intelligence" were significant. The "Realistic,"
"Social," and "Investigative" interest factors were
significant at the $p < .05$ level. The intellectual
factor of "Creatvity" and the personality factors of
"Maturity," "Group Leadership," and "Original Thinking"
were significant at the $p < .01$ level. The findings of
this study demonstrate not only that relationships exist
between intellectual, personality, and interest factors on
the one hand and job performance on the other hand, but
that these relationships vary for each level of
management.

CHAPTER I

Personal Characteristics of Executives in
Different Management Levels

The selection of effective managers is an ongoing
problem for organizations and of interest to Personnel
Pychologists. A great deal of research has focused on
identifying the intellectual, interest, and personality
characteristics of management.

The relationships between these personal
characteristics and management success are some of the
most significant, yet least utilized by organizations in
management selection. Although business leaders are
aware of the necessity of objective, systematic, and
empirically based selection methods, organizations
continue to hire and promote managers using subjective
and inconsistent methods.

In addition, other factors such as current economic
conditions and increased competition from well managed
foreign businesses have made the identification and
selection of effective managers crucial to the survival
of American business. Therefore, determining the
personal characteristics that contribute to management
success and utilizing this information in the development
of objective, empirically based selection strategies has
become much more than an academic exercise. Moreover,
the increased dissatisfaction of organizational

officials with inconsistent, subjective, and often
unsubstantiated selection strategies, further illustrates
the need for continued comprehensive research in this
area.

Management level

Until recently, researchers have treated managers as
one "homogeneous" group. Current research, however,
indicates that it is more appropriate to examine the
managerial position in terms of distinct levels, each
requiring different responsibilities, tasks, skills, and
abilities.

In light of the demand on organizations to select
and promote qualified managers, and recent research on
this topic, a profile of the "average manager" is not
sufficient. What is necessary is continued research on
personal characteristics as they relate to different
levels of management.

Statement of the Problem

A small number of studies have attempted to draw out
the relationship between personal characteristics and
specific levels of management. However, the findings of
these studies have been inconsistent. This may be due,
in part, to the use of different criteria for determining
management levels (e.g., organizational level, title,
reporting structure, salary, etc.). Also, the
contribution of a particular test to multiple prediction
may have been overlooked. Each test of a characteristic

is considered as standing on its own as a predictor.
While these measures may fail to have predictive utility
on their own, when combined with other predictors they
may be quite powerful.

Finally, little has been done to determine whether
there are differences in the importance of these
characteristics within management levels.

In response to these needs the present study
examines personal characteristics, using intellectual,
personality, and interest measures, to determine 1) which
characteristics are important in predicting success at
each level of management (i.e, entry level, middle, and
upper level), and 2) the importance of these
characteristics (variables) within the three management
levels. The following research hypothesis addresses
these issues.

Hypothesis. The hypothesis under investigation
states that there will be significant relationships
between cognitive, personality, and interest variables
and job performance within each of three levels of
management.

CHAPTER II

SURVEY OF RELATED LITERATURE

A comprehensive review of the literature reveals some disagreement as to the utility of intellectual, personality, and interest characteristics in predicting managerial success.

After reviewing hundreds of studies conducted between 1919 and 1972, Ghisselli (1966, 1973) reported that managerial success had been most accurately forcast by tests of intellectual ability, perceptual accuracy, and personality and interest inventories. Similarly, Carter (1952), Miner (1960), Poe and Berg (1952), and Wagner (1960) were able to distinguish between high and low performing supervisors using objective measures of aptitude, personality, and interest.

On the other hand, after reviewing predictive validity studies, Korman (1968) concluded that intelligence, as measured by verbal ability tests, is a fair predictor of first-line supervisory ability, but not of high-level managerial performance. He also found leadership ability tests and objective personality and interest inventories to be of little value in predicting managerial success. An earlier research review by Guion and Gottier (1965) on the validity of personality measures in personnel selection, supports Korman's conclusions.

While these studies do not provide a clear answer regarding the utility of objective measures of personal characteristics in predicting management success, they do provide a foundation from which to proceed. Research reported thus far treats managers as one homogeneous group, or catagorizes managers by levels using various criteria (e.g., salary, title, etc.). As a result, the predictive power of these characteristics may have been obscured by combining management levels, or by using different criteria unrelated to the tasks and responsibilities required at different management levels.

Management Levels

The previously stated hypothesis indicates that the significance of intellectual, personality, and interest characteristics, as measured by objective tests will be examined in terms of three management levels. Several studies addressing this issue serve as the foundation for this study.

Goodstein and Schrader (1963), who developed a managerial key for the California Pychological Inventory that differentiated personnel with three management levels (top management; N=106, middle management; N=243 and first line supervisors; N=252), also concluded that treating managers as a homogeneous group is not sufficient and that differences within the management group constitute an often neglected source of variance.

Similarly, Guilford (1952) examined differences between executives (N=200) and supervisors (N=143) using

the Guilford series of personality tests. A comparison of these groups on each trait (scale) produced significant differences between executives and supervisors on eleven of the thirteen scales.

Grimsley and Jarrett (1973) employed a matched group (N=100) concurrent validity design to determine whether aptitude, personality, and interest measures could differentiate top from middle managers. The results indicate that measures of intellect, personality and, to a lesser extent, interest successfully differentiated top from middle managers. Eight of the ten aptitude measures were significant, with Pearson correlations ranging from .18 (Verbal Comprehension) to .48 (Verbal Reasoning). Nine of the eighteen personality measures were significant, with correlations ranging from .17 (Objectivity) to .45 (General Activity). However, only three of sixteen interest measures were significant, with correlations ranging from -.19 (Artistic) to .20 (Computational). The results of a two year follow-up study (N=100) by Grimsley and Jarrett (1975) supported their earlier findings, and pointed to the stability of these predictors over time.

CHAPTER III

METHOD

Subjects

The subjects and the data used were those collected during a research project with a California public utility in the late 1950's (Rusmore and Childress, 1981). The sample was composed of 208 male executives representing operating management levels in the organization. In order to assure that the management job levels were equally represented, higher job levels were over represented relative to the pyramidal organizational structure. Departments were proportionately represented.

The management job levels were divided into three levels and were based on the breadth of responsibility within the organization rather than job title, reporting structure or salary. Management level 1, representing entry level management positions, consisted of managers responsible for supervising the activities of non-management personnel (e.g., technical, clerical, and other support staff). Management level 2, which represented middle management, consisted of managers that were responsible for supervising entry or first level managers (e.g., supervisors, unit managers). Finally, management level 3, representing upper level management, consisted of managers that were responsible for supervising middle managers (e.g., department, area managers).

Measures

Measures of intellect, personality, and interest collected in the original testing were used in this study as independent variables. The five tests of mental ability used were: The School and College Ability Test (SCAT) form UA (Educational Testing Service, 1958); the Abstract Reasoning Test, form A (Bennett, Seashore and Wesman, 1952), and three researcher-constructed tests--Anagrams, Consequences, and Unusual Uses. Interest was assessed using the Strong Campbell Vocational Interest Blank (Campbell and Hansen, 1959). Instruments used to evaluate personality were the Gordon Personal Inventory (Gordon, 1956), and the Gordon Personal Profile (Gordon, 1953). All tests were completed by the subjects. Refer to Appendix A for a detailed description of the published tests.

In addition, a performance rating of each subject by his manager (boss) was used as the dependent variable. The performance rating concerned the subject's job performance, ability, and personality. Global, rather than detailed measures of performance were used in order to simulate the evaluation process used by managers when evaluating their employees. (refer to Appendix B).

Preliminary Analysis of the data

A preliminary analysis was performed to ensure the fitness of the data with regards to the assumptions of linearity, normality and homoscedasticity. Examination of the frequency distributions, skewness values (SPSS –

FREQUENCIES), and scatterplots (SPSS - SCATTERGRAM) revealed that the variables were well behaved with respect to these assumptions.

Factor Analysis

Factor Analysis was used to reduce the large number of intellectual, personality, and interest variables (59) to a more manageable set. The Principle Factor Analysis, PA2, in the Statistical Package for the Social Sciences (SPSS: Nie, Hull, Jenkins, Steinbrenner, and Bent, 1975) was used. Separate factor analyses were conducted for each set of variables (i.e., intellectual, personality, and interest).

At this point, the correlation matricies for each set of variables were inspected to determine the factorability of R. Inspection of these matricies revealed the majority of correlations in excess of .30 (i.e., intellectual: 89%; personality: 62%; and interest: 55%). It was, therefore, concluded that patterns in response to variables could be expected.

Eigenvalues and squared multiple correlations (SMC's) for each set of unrotated factors were examined for multi-collineartity and singularity. The Eigenvalues within each set of factors were not dangerously close to zero (i.e, Intellectual: 0.074; personality: 0.184; and interest; 0.104). Similarly, the SMC's were less than 1.0, with the highest SMC's for intellectual, personality, and interest factors .850, .728, .945, respectively. As a result of these findings the presence of multicol- linearity and singularity was ruled out.

Personality, intellectual, and interest factors were rotated orthogonally using VARIMAX. However, due to the relationship among the intellectual variables ($r= -.51$), an oblique factor solution was also performed. The oblique solution represented the more meaningful solution and was selected to represent the intellectual variables.

From the factor analysis of nine intellectual variables, two factors were extracted, "General Intelligence" and "Creativity" (Table 1).

Three factors were extracted from the factor analysis of eight personality variables: "Maturity," "Group Leadership," and "Original Thinking" (Table 2).

From the factor analysis of forty-two interest variables, three factors were extracted, "Investigative," "Realistic," and "Social" (Table 3). Due to space constraints, the six variables with the largest eigenvalues within each factor appear in Table 3. In the following text the derived latent variables are indicated by quotation marks. Refer to Appendix C for a more detailed description of the variables contained within the personality and interest factors.

Table 1

Factor Analysis of Intellectual Variables
Oblique Solution (N=208)

FACTOR 1: General Intelligence*

Variable	Variable Name	Factor Loading
Var 2	Anagrams: Productivity	.958
Var 3	Anagrams: Unique	.922
Var 8	SCAT: Verbal	.491
Var 9	SCAT: Quantitative	.563
Var 11	Abstract Reasoning	.487

FACTOR 2: Creativity*

Variable	Variable Name	Factor Loading
Var 4	Consequences: Remote	−.483
Var 5	Consequences: Obvious	−.446
Var 6	Unusual Uses: Productivity	−.929
Var 7	Unusual Uses: Unique	−.981

* The correlation between factors 1 and 2 is −.51.

Table 2   14

Factor Analysis of Personality Variables
Orthogonal Solution (N=208)

FACTOR 1: Maturity

Variable	Variable Name	Factor Loading
Var 17	Responsibility	.674
Var 18	Emotional Stability	.798
Var 20	Cautiousness	.507

FACTOR 2: Group Leadership

Variable	Variable Name	Factor Loading
Var 16	Ascendancy	.742
Var 19	Sociability	.672
Var 22	Personal Relations	.539

FACTOR 3: Original Thinking

Variable	Variable Name	Factor Loading
Var 16	Ascendancy	.509
Var 21	Original Thinking	.566
Var 23	Vigor	.470

Table 3   15

Factor Analysis of Interest Variables
Orthogonal Solution (N=208)

FACTOR 1: Investigative

Variable	Variable Name	Factor Loading
Var 31	Architect	.861
Var 47	Mathematician	.824
Var 56	Physician	.819
Var 57	Physicist	.813
Var 33	Artist	.803
Var 36	Banker	.783

FACTOR 2: Realistic

Variable	Variable Name	Factor Loading
Var 37	Carpenter	.872
Var 30	Chemist	.856
Var 45	Lawyer	.843
Var 58	Police	.778
Var 60	Painter	.773
Var 48	Math Teacher	.770

FACTOR 3: Social

Variable	Variable Name	Factor Loading
Var 71	Vocational Counselor	.913
Var 64	Public Administrator	.867
Var 54	Personnel Manager	.855
Var 69	Soc. Science Teacher	.835
Var 68	School Superintendant	.834
Var 49	Minister	.831

Multiple Regression Analysis

Multiple regression analysis (SPSS - REGRESSION) was used to examine the relationship between the dependent (Bosses' Rating) and independent variables (personality, intellectual, and interest factors) for each of the three management levels, as well as across all management levels. Hierarchical inclusion was used to control the entry of the independent variables into the equation in the following order: 1) general intelligence, 2) creativity, 3) maturity, 4) affiliation, 5) original thinking, 6) investigative/enterprising, 7) realistic, and 8) social.

The rationale for this inclusion order was based on the research surveyed in this study which suggests that intellectual and personality measures are most indicative of management level. The predictive value of interest measures received the least support in the literature.

As part of the analysis, residual scatterplots were inspected for violations of linearity, normality, and homoscedasticity. Inspection of these scatterplots revealed well behaved distributions of residuals.

In addition, tolerances (1-SMC) were also examined to ensure the absence of multicollinearity and singularity. All tolerances were relatively high, with the lowest value being .714. The presence of multicollinearity and singularity was, therefore, ruled out.

CHAPTER IV

RESULTS

Hierarchical Regression Analysis

Hierarchical regression analysis across all management
levels (Table 4) revealed that all factors of intelligence,
personality, and interest were significant ($p < .001$) when
regressed on performance (i.e., Bosses' Rating of the
subject's performance). Similar patterns were indicated
within each management level.

The results of the hierarchical regression analysis for
management level 1 are shown in Table 5. The personality
and interest factors were significant at $p < .05$, while the
intellectual factors were significant at $p < .01$.

For management level 2 all variables, except the
"Realistic" and "Social" interest factors, were significant
at the $p < .05$ level (Table 6).

Within management level 3, all factors except "General
Intelligence" were significant (Table 7). The "Realistic"
and "Social" factors were significant at the $p < .05$ level,
while "Creativity," "Maturity," "Group Leadership,"
"Original Thinking," and "Investigative" were significant
at the $p < .01$ level.

In addition, the variable means and standard deviations
for each management level did not vary substantially
(Appendix D).

Table 4

Hierarchical Multiple Regression Across Management levels
Multiple R's For Each Variable Entering The Equation (N=208)

Variable Name	Multiple R	F
General Intelligence	.265	15.4767 ***
Creativity	.339	13.3402 ***
Maturity	.342	9.0114 ***
Group Leadership	.394	9.3188 ***
Original Thinking	.409	8.1039 ***
Investigative	.409	6.7198 ***
Realistic	.422	6.1789 ***
Social	.423	5.4275 ***

Significance:

* $p < .05$
** $p < .01$
*** $p < .001$

Table 5

Hierarchical Multiple Regression For Management level 1
Multiple R's For Each Variable Entering The Equation (N=77)

Variable Name	Multiple R	F
General Intelligence	.341	9.8623 **
Creativity	.350	5.1566 **
Maturity	.349	3.4878 *
Group Leadership	.395	3.3351 *
Original Thinking	.405	2.7786 *
Investigative	.425	2.5693 *
Realistic	.433	2.2761 *
Social	.446	2.1052 *

Significance:

* $p < .05$
** $p < .01$
*** $p < .001$

Table 6

Hierarchical Multiple Regression For Management level 2
Multiple R's For Each Variable Entering The Equation (N=65)

Variable Name	Multiple R	F
General Intelligence	.273	5.0647 *
Creativity	.346	4.2027 *
Maturity	.372	3.2633 *
Group Leadership	.402	2.8977 *
Original Thinking	.438	2.8001 *
Investigative	.442	2.3529 *
Realistic	.451	2.0724
Social	.451	1.7832

Significance:

* $p < .05$
** $p < .01$
*** $p < .001$

Table 7

Hierarchical Multiple Regression For Management level 3
Multiple R's For Each Variable Entering The Equation (N=66)

Variable Name	Multiple R	F	
General Intelligence	.092	.5403	
Creativity	.383	5.4174	**
Maturity	.413	4.2453	**
Group Leadership	.477	4.4935	**
Original Thinking	.478	3.5468	**
Investigative	.482	2.9805	**
Realistic	.489	2.6036	*
Social	.490	2.2450	*

Significance:

* $p < .05$
** $p < .01$
*** $p < .001$

Standardized Regression Weights

Standardized Regression Weights (β) were examined to determine the significance as well as the importance (i.e., the size of the regression weights) of the factors within each management level.

The Standardized Regression Weights for factors across all management levels are shown in Table 8. "Creativity" ($p < .05$) was the most important, followed by "Group Leadership" ($p < .05$), "General Intelligence," "Original Thinking," and "Realistic."

Within Management Level 1 (Table 9), "General Intelligence" ($p < .05$) was most important followed by "Investigative," "Creativity," "Social," and "Maturity."

For Management Level 2 (Table 10), "Original Thinking" was most important followed by "General Intelligence," "Creativity," "Group Leadership," and "Maturity."

Table 11 indicates that for Management Level 3 "Creativity" ($p < .01$) was most important, followed by "Group Leadership" ($p < .05$), "Maturity," and "General Intelligence."

In addition to the tabular results, a profile was generated to summarize the results of this study. Figure 1 graphically represents the relationship of the standardized regression weights within each management level. Examination of these profiles revealed, visually, the differences between levels with respect to the importance of each factor.

Table 8

Standardized Regression Weights (β) Across Management Levels
For Each Variable Entering The Equation (N=208)

Variable Name	Standardized Regression weight	F
General Intelligence	.8048	2.4561
Creativity	-1.4479	7.9930 **
Maturity	.2743	.3404
Group Leadership	1.3000	5.8263 **
Original Thinking	.9648	3.6462
Investigative	.1043	.5650
Realistic	.6582	2.1800
Social	.2680	.3157

Significance:

* $p < .05$
** $p < .01$
*** $p < .001$

Table 9

Standardized Regression Weights (β) For Management Level 1
For Each Variable Entering The Equation (N=77)

Variable Name	Standardized Regression weight	F
General Intelligence	1.8048	3.8840 *
Creativity	-.9647	1.0850
Maturity	.6434	.6483
Group Leadership	.6504	.4995
Original Thinking	.1538	.2196
Investigative	- .9403	1.5954
Realistic	.3321	.1420
Social	.8844	.9258

Significance:

* $p < .05$
** $p < .01$
*** $p < .001$

Table 10

Standardized Regression Weights (β) For Management Level 2
For Each Variable Entering The Equation (N=65)

Variable Name	Standardized Regression weight	F
General Intelligence	1.0831	1.3202
Creativity	-1.0547	1.0408
Maturity	.8302	.7680
Group Leadership	.9924	.7880
Original Thinking	1.8771	2.1457
Investigative	.3922	.1940
Realistic	.7598	.4755
Social	.9017	.1040

Significance:

* $p < .05$
** $p < .01$
*** $p < .001$

Table 11

Standardized Regression Weights (β) For Management Level 3
For Each Variable Entering The Equation (N=66)

Variable Name	Standardized Regression weight	F	
General Intelligence	.9073	.8190	
Creativity	2.3370	8.1330	**
Maturity	.9322	1.2160	
Group Leadership	.9401	4.0060	*
Original Thinking	.0789	.0050	
Investigative	.4883	.3790	
Realistic	.4310	.4230	
Social	.1589	.0380	

Significance:

* $p < .05$
** $p < .01$
*** $p < .001$
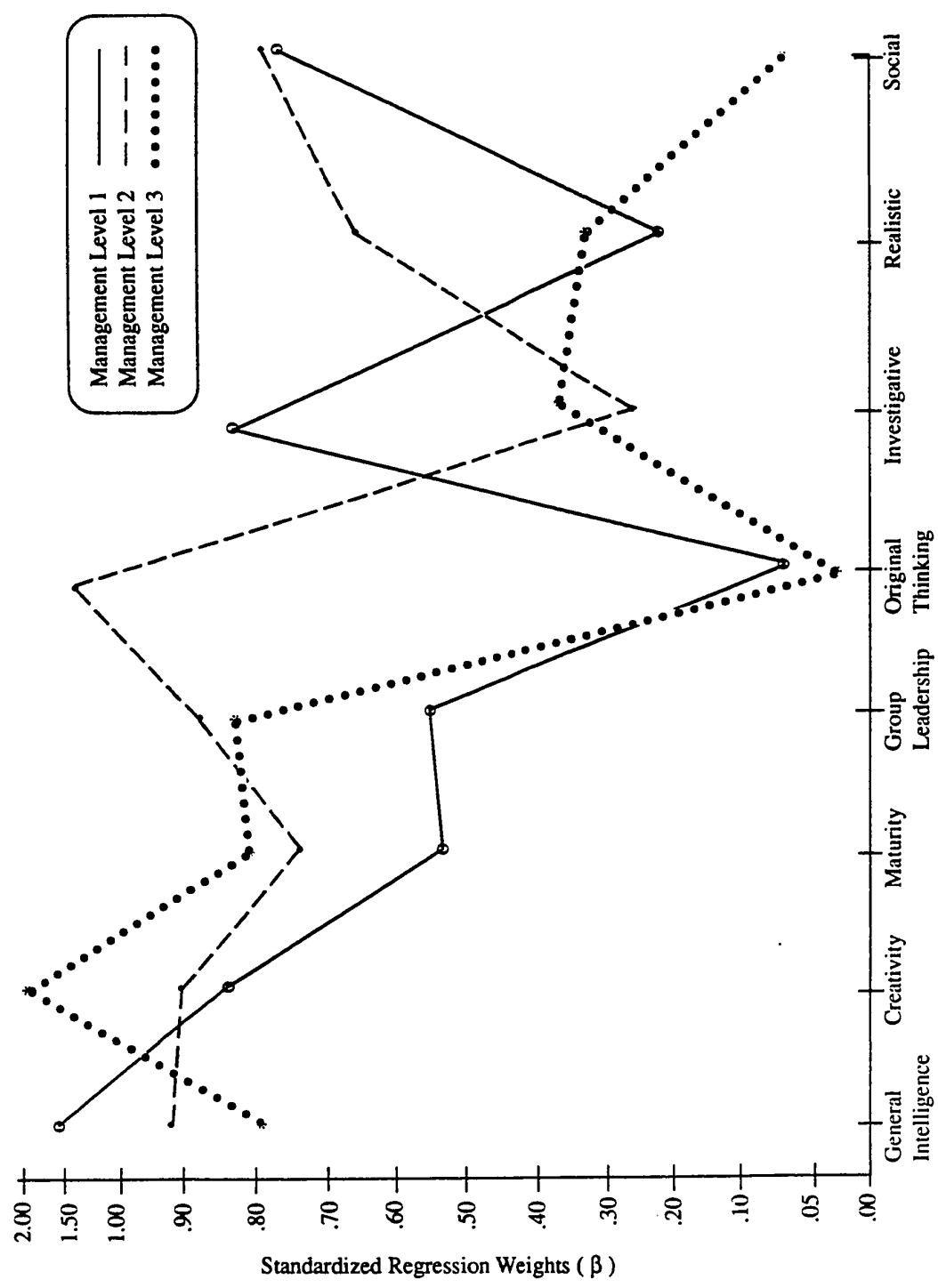
Figure 1: Standardized Regression Weights (β) for each management level

Squared Semi-Partial Correlation

Squared Semi-Partial Correlations (Sr^2) were also examined to determine the percentage of variance contributed by each factor. The Squared Semi-Partial Correlations for the three management levels and across management levels are presented in Table 12.

"General Intelligence" accounted for the largest percentage of variance in management levels 1 and 2, and across management levels (12%, 7.4%, and 7% respectively), while "Creativity" accounted for the largest percentage of variance in management level 3 (20.5%), and a moderate percentage in Management Level 2 and across management levels (4.7% and 4.5% respectively).

Of the personality variables only "Group Leadership" accounted for a moderate amount of the variance (6.3%) for management level 3. The remainder of the personality variables accounted for very small percentages of variance ranging from 0% to 3.8%.

Similarly, the interest factors accounted for only minute percentages of the variance (0% - 2%).

In addition to the tabular results, pie charts were generated to summarize the variance contribution of each factor (Figure 2).

Table 12

Squared Semi-Partial Correlations (Sr^2) For Each Management
Level For Each Variable Entering The Equation

Variable Name	Across Mgrs. (N-208)	Management Level (Sr^2)		
		1 (N=77)	2 (N=65)	3 (N=66)
General Intelligence	.070	.120	.074	.006
Creativity	.045	.010	.045	.205
Maturity	.002	.010	.019	.000
Group Leadership	.038	.030	.024	.063
Original Thinking	.012	.010	.030	.000
Investigative	.000	.020	.004	.001
Realistic	.011	.010	.007	.005
Social	.001	.011	.000	.008

General Intelligence
Creativity

Maturity
Group Leadership
Original Thinking

Investigative
Realistic
Social

Management Level 3

Across All Management Levels
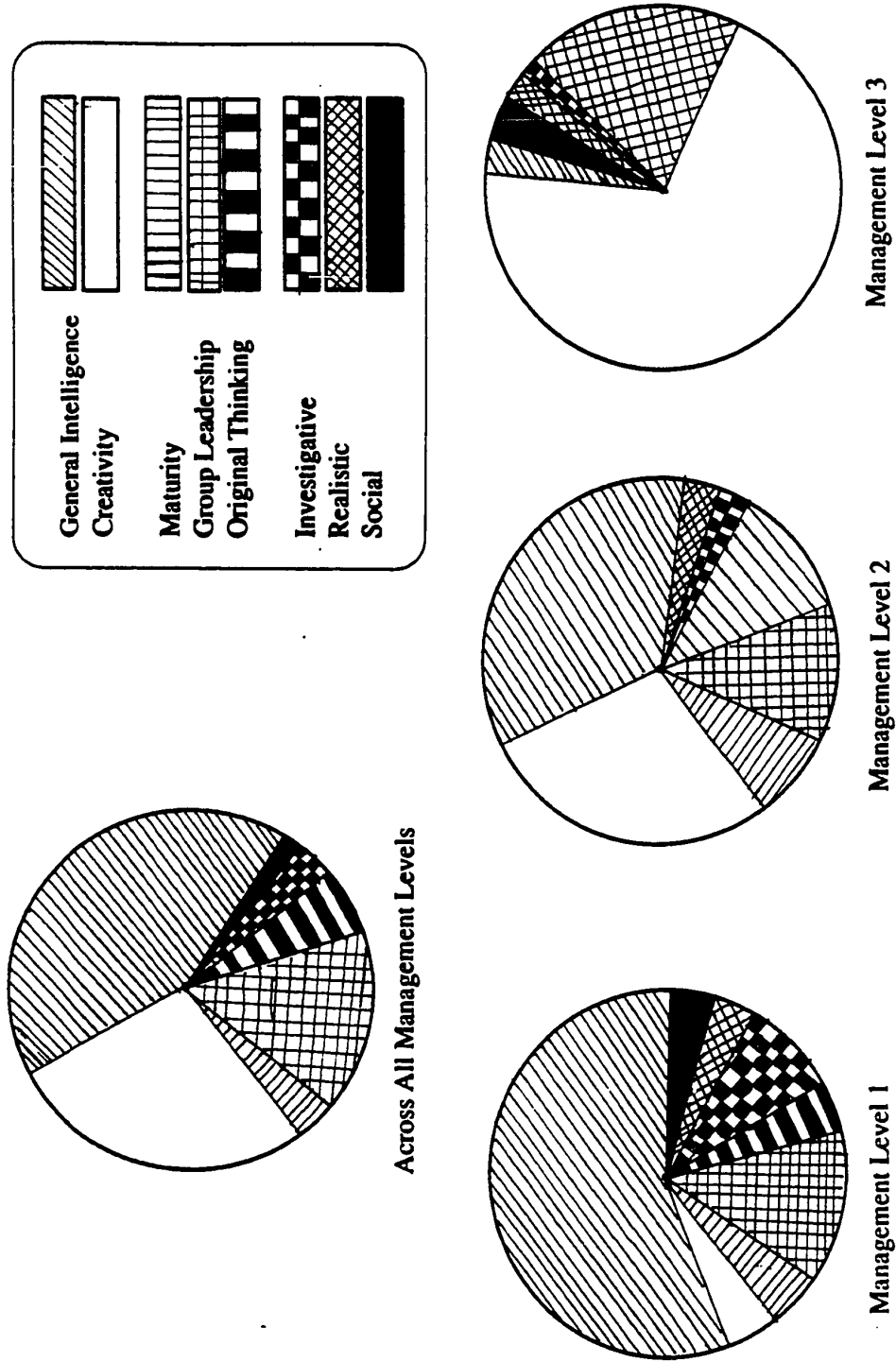
Management Level 2

Management Level 1

Figure 2: Squared Semi-Partial Correlations (sr^2) For Each Variable Entering the Equation (Across Management Levels And For Each Management Level)

CHAPTER V

DISCUSSION

Previous studies have evaluatated the relationship of
cognitive, personality, and interest characteristics with
performance in an attempt to predict management success.
The results of these studies have been disappointing in
their inconsistency. One reason for this inconsistency is
the difference in criteria used to define management
levels. These studies either treat managers as one
homogeneous group or separate them into levels using
arbitrary criteria such as job title, salary or reporting
structure.

In the present study, the relationship of cognitive,
personality, and interest factors were examined at three
levels of management as well as across management levels
(i.e., homogenious grouping) to determine whether
variations in patterns existed when management levels were
considered. By separating management into levels defined
by the breadth of responsibility, the factors studied began
to show different patterns at each level of management.
This became important in that it suggested that possession
of certain characteristics were associated with successful
performance at different management levels.

Entry level managers' (level 1) performance was
significantly related to all factors of intelligence,
personality, and interest (Table 5). Mid-level managers'

(level 2) performance, on the other hand, was not significantly related to the "Social" and "Realistic" interest factors (Table 6). Upper level managers' (level 3) performance was significantly related to all factors except "General Intelligence" (Table 7).

It was observed that as one moved from entry level management to upper level management the percentage of variance contributed by the "General Intelligence" factor decreased from 12% to 0.6%, while the percentage of variance contributed by the "Creativity" factor increased from 1% to 20.5%. In addition, the "Group Leadership" factor increased from 3% to 6.3% as one moved toward upper level management (Table 12). The remaining factors seemed to contribute very little variance. One reason for this may be that while the multiple factors are related to a manager's performance, the "General Intelligence," "Creativity," and "Group leadership" factors are most important to success at different levels.

In considering intelligence, it appeared that while the "General Intelligence" factor was necessary for all management levels, its contribution became relatively less important as one progressed toward upper management. This would fit with the observation that lower level managers required more concrete thinking and problem solving to perform their jobs, while upper level managerial tasks related more to the use of abstract thinking and creativity in the development of new concepts and directions for the organization.

The trend toward an increasing need for "Group

Leadership," though modest (3% to 6.3%), became more important as one progressed to higher levels of management. This would seem reasonable because middle and upper level managers are placed in more situations requiring self-assurance, assertiveness, and gregariousness than entry level managers.

The standardized regression weights indicated a similar pattern with respect to the "General Intelligence," "Creativity," and "Group Leadership" factors (see Figure 1). Further examination of Figure 1 reveals additional trends.

At first glance, the lack of importance (i.e., small standardized regression weights) of the "Orginial Thinking" factor for upper level managers seemed puzzling, especially when it appeared higher for middle managers. However, when the factor definition of "Original Thinking" was compared with that of "Creativity," the reason became apparent. The former involved developing and working with ideas and methodology necessary for solving finite problems, while the latter was concerned with abstract thinking and development of ideas. Upper level managers are responsible for creating broad objectives, the details of which are worked out by mid-level managers and implemented by entry level managers.

The other characteristic which seemed to fluctuate in importance was the "Social" interest factor. This factor appeared to be of little importance for upper level managers and of greater importance to entry and middle level managers. The "Social" factor represented interests that revolved around working with people. Upper level

managers tend to have limited contact with people. In
contrast, entry and middle level positions require that
managers work with and develop their subordinates.

From the standpoint of practical application, these
results represent valuable supplementary information that
can be utilized by organizations in management selection.
Moreover, these results indicate that assessment of
managers by level, using breadth of responsibility, is more
appropriate than treating managers as a homogeneous group
or using arbitrary criteria to determine management levels.
Together these findings represent a possible objective
approach which could be integrated with the standard
subjective methods to improve selection of key personnel.
Before this method could be implemented, questions beyond
the scope of the present study must be answered through
further research.

Whether these personal characteristics are innate or
develop through training and on the job experiences must be
addressed. This could be determined through longitudinal
studies of management promotions. Assessing these
characteristics as managers are promoted to each management
level and collecting data on the training received would
allow researchers to determine whether 1) there is a
significant increase in these characteristics as managers
are promoted, 2) training influenced these changes, and 3)
there are significant differences in the characteristics
for promoted and non-promoted managers.

It must also be asked, are these characteristics
universal or specific to the type of industry (i.e.,

financial, retail, manufacturing, etc.)? Studies should be conducted across organizations to determine whether the characteristics associated with management success are universal or specific to an industry.

Finally, will the importance of the characteristics in the present study change with a heterogeneous sample or will they remain stable across sex and race? In the present study the sample was composed of male executives, which was representative of managers in the 1950's. Future studies, by virtue of the composition of the present workforce, will contain a more heterogeneous sample.

These questions are of more than academic value. Once these questions are answered, through carefully planned longitudinal studies, organizations will have a useful objective method for selecting key personnel. Until then, organizations will continue to feel the detrimental effects of subjective, inconsistent, and often unsubstantiated selections of managers.

CHAPTER VI

SUMMARY

Current economic conditions and increased competition from efficiently managed foreign businesses have made the identification and selection of effective managers crucial to the survival of American business. Unfortunately, the selection of effective managers continues to be a problem for organizations and of interest to personnel psychologists.

In an attempt to improve selection, researchers have focused on identifying the personal characteristics of successful management personnel. However, the results of this research have been inconsistent. One reason for this inconsistency is the criteria used to determine management levels. These studies either treated managers as one homogeneous group or separated them into levels using arbitrary criteria. The present study focuses on management levels based on the breadth of responsiblity rather than the arbitrary criteria.

In a study of 208 public utility managers, hierarchical regression analysis was used to examine the relationship between job performance and intellectual, personality, and interest factors for each of three distinct management levels. The findings of this study have demonstrated not only that relationships exist between intellectual, personality, and interest factors

and job performance, but that these relationships vary for each management level.

For entry level managers, personality and interest factors were significant at $p < .05$, while the intellectual factors were significant at $p < .01$. All variables, except the "Realistic" and "Social" interest factors were significant at the $p < .05$ level for middle level managers.

For upper level managers, all factors except the "General Intelligence" factor were significant. The "Realistic" and "Social" interest factors were significant at the $p < .05$ level, while "Creativity," "Maturity," "Group Leadership," "Investigative," and "Original Thinking" were significant at the $p < .01$ level.

In particular, as one moves from entry level to upper management, the percentage of variance contributed by the "General Intelligence" factor decreases from 12% to 0.6%, while the percentage of variance contributed by the "Creativity" factor increases from 1% to 20.5%. The "Group Leadership" factor also increase from 3% to 6.3% as one moves toward upper management. The remaining factors contibute very little variance. Moreover, examination of the standardized regression weights support these findings.

These results provide a promising starting point for the development of an objective method for selecting managers. Further research must be conducted in the form of longitudinal studies across organizations, utilizing promotion, training, and performance informaton to

determine whether these characteristics are 1) innate or developed, and 2) universal or specific to types of organizations.

References

Anastasi, Anne. (1982). Psychological Testing (5th ed.).
    New York: Macmillan Publishing Co, Inc.

Bennett, G.K. (1952). Seashore, H.G., & Wesman, A.G.
    Differential Aptitude Test: Abstract Reasoning (Form
    A): Manual. New York: The Psychological Corporation.

Buros, O.K. (Ed.). (1975). The Fifth Mental Measurements
    Yearbook. Lincoln: University of Nebraska, Buros
    Institute of Mental Measurements.

Campbell, D.P. & Hansen, J.C. (1959). Strong Campbell
    Interest Inventory: Manual. California: Stanford
    University Press.

Carter, G.C. (1952). Measurement of supervisory behavior.
    Journal of Applied Psychology, 36, 393-395.

Educational Testing Service. (1958). Cooperative School and
    College Ability Tests (Form UA): Manual. Princeton, NJ:
    Author.

Ghiselli, E.E. (1956). Differentiation of individuals in
    terms of their perdictability. Journal of Applied
    Psychology, 40, 374-377.

Ghiselli, E.E. (1966). The validity of occupational
    aptitude tests. New York: Wiley & Sons.

Ghiselli, E.E. (1973). The validity of aptitude tests in
    personnel selection. Personnel Psychology, 26, 461-477.

Goodstein, L.D. & Schrader, W.J. (1963). An empirically derived managerial key for the California Psychological Inventory. Journal of Applied Psychology, 47(1), 42-45.

Gordon, L.V. (1953). Gordon Personal Profile: Manual. New York: Harcourt, Brace, and World, Inc.

Gordon, L.V. (1956). Gordon Personal Inventory: Manual. New York: Harcourt, Brace, and World, Inc.

Grimsley, G. & Jarrett, H.F. (1973). The relation of past managerial achievement to test measures obtained in the employment situation: methods and results. Personnel Psychology, 26, 31-48.

Grimsley, G. & Jarrett, H.F. (1975). The relation of past managerial achievement to test measures obtained in the employment situation: Results II. Personnel Psychology, 28, 215-231.

Guilford, J.S. (1952). Temperament traits of executives and supervisors measured by the Guilford Personality Inventories. Journal of Applied Psychology, 36, 228-233.

Guion, Robert M., & Gottier, Richard F. (1965). Validity of personality measures in personnel selection. Personnel Psychology, 18, 135-164.

Hull, C.H., & Nie, N.H. SPSS Update 7-9. New York: Mcgraw-Hill, 1981.

Kerlinger, F.N., & Pedhauzer, E. (1973). Multiple Regression in Behavioral Research. New York: Holt, Rinehart and Winston.

Korman, A.K. (1968). The prediction of managerial performance: a review. Personnel Psychology, 21, 295-322.

Miner, J.B. (1960). The Kuder Preference Record in management appraisal. <u>Personnel Psychology</u>, <u>13</u>, 187-196.

Nie, N.H., Hull, C.H., Jenkins, J.G., Steinbrenner, K. & Bent, D.H. (1975). <u>Statistical Package for the Social Sciences</u> (2nd ed.). New York: McGraw-Hill.

Poe, W.A. & Berg, I.A. (1952). Psychological test performance of steel industry production supervisors. <u>Journal of Applied Psychology</u>, <u>35</u>, 234-237.

Rusmore, J.T. & Childress, M.E. (1981, February). <u>Comparison of two cluster analysis methods for grouping jobs</u>. Paper presented at the annual meeting of the California State Psychological Association, Sacramento, CA.

Tabachnick, B.G. & Fidell, L.S. (1983). <u>Using Multivariate Statisitics</u>. New York: Harper and Row.

Wagner, E.E. (1960). Predicting success for young exectutives from objective test scores and personal data. <u>Personnel Psychology</u>, <u>13</u>, 181-186.

APPENDIX

APPENDIX A

DESCRIPTION OF PUBLISHED TESTS

The following are descriptions of the published tests used in this study. These descriptions were extracted from sources other than the test publisher or developer.

School and College Ability Test (Anastasi, 1982)

The School and College Ability Test (SCAT) is oriented specifically toward the prediction of academic achievement, and yields a Verbal, Quantitative, and Total score.

The Verbal score is derived from a verbal analogies test. The items in this test differ from traditional analogy items in that the respondent must choose from pairs of words rather than just the fourth word.

The Quantitative score is derived from a comparison test designed to assess the respondent's understanding of fundimental number operations. These items require a minimum of reading and emphasize insight and resourcefulness rather than traditional computational procedures.

The SCAT's orientation toward the measurement of developed abilities is more or less true of all intelligence tests. That is, the test scores reflect the nature and amount of schooling received rather than the individual's "capacity" independently of relevant prior experiences.

The reported reliability coefficients for Verbal, Quantitative, and Total scores are uniformly high with

reliabilities clustering around .90. In addition, correlations between alternate forms administered in immediate succession are in the .80's for Verbal and Quantitative scores and in the .90's for Total scores.

In view of the stated purpose for which the SCAT was developed, its predictive validity against academic achievement is relevant. Correlations with an achievement battery, the Sequential Tests of Educational Progress (STEP), range between .60 and .80. Quantitative scores tend to correlate higher than verbal scores with mathematics achievement and Verbal scores tend to correlate higher than Quantitative scores with achievement in all other subject areas. Total SCAT scores generally yield validity coefficients as high or higher than either of the two sub-scores. Data available on correlations between SCAT scores and grade-point average, although lower in magnitude, follow the same patterns with regard to Verbal and Quantitative scores as do the SCAT-STEP correlations.

Finally, it should be noted that the correlations between SCAT Verbal and Quantitative scores are relatively high, with correlations in the .70's. This relationship may result from the item types employed in the two sub-tests, which involve the ability to detect and utilize relations in symbolic and abstract content. As with other intelligence tests, SCAT was designed primarity as a measure of general intelligence and only secondarily as an indicator of intraindividual aptitude differences.

<u>Differential Aptitude Tests: Abstract Reasoning Test</u>
<u>(Anastasi, 1982)</u>

The Differential Aptitude Tests (DAT) is one of the most widely used multiple aptitude test batteries. The DAT is composed of eight tests: Verbal Reasoning, Numerical Ability, Abstract Reasoning[1], Clerical Speed and Accuracy, Mechanical Reasoning, Space Relations, Spelling, and Language Usage.

The DAT manual provides a full account of the test construction procedures followed in developing the battery. Although not utilizing factor analysis in its contruction, the authors of the DAT were guided in their choice of tests by the accumulated results of factorial research.

The norms were derived from over 64,000 students in public and private school systems distributed over 33 states and the District of Columbia. The standardization sample was selected by a two-stage sampling procedure so as to be representative of the entire high school population in the United States.

With the exception of Clerical Speed and Accuracy, all DAT test are powerful tests. Realiability coefficients are high and permit interpretation of inter-test differences with considerable confidence. By combining information on

---

[1] For the purpose of the present study only the Abstract Reasoning test was utilized. The Abstract Reasoning Test is a 25 minute non-verbal, multiple choice measure of reasoning ability.

test reliabilities with intercorrelations among tests, the test authors determined that the proportion of differences in excess of chance between each pair of tests. These percentages ranged from 25 to 57, most falling in the 30's and 40's. That is, for all possible test pairs, from one fourth to one half of the respondents in the representative samples obtained larger score differences between tests than would be expected from errors of measurement.

The amount of validity data available on the Differential Aptitude Tests is overwhelming and includes several thousand validity coefficients. Most of these data are concerned with predictive validity in terms of achievement in both academic and vocational programs. Many of these coefficients are high, even with intervals as long as three years between test and criterion data.

Gordon Personal Profile (Buros, 1975)

The Gordon Personal Profile is intended to measure five aspects of personality considered to be "especially significant in the daily functioning of the normal person." Four of these aspects are said to be "relatively independent, psychologically meaningful factors" and the fifth (total or overall self-evaluation) to have been "found to have value in its own right." The main features of the profile are : a) factorial derivation of the traits being measured; b) use of both internal and external validating procedures; c) frequent cross validations against external criteria; d) use of forced-choice resonses; and e) the more-than-average validity data

reported in the manual.

The test consists of 18 sets of four descriptive phrases (tetrads), all four factors being represented in each tetrad. This tetrad arrangement is preferable to forced-choice sets composed of only two or three items because the greater sense of freedom of choice is more acceptable to the respondent. The subject responds to each tetrad by choosing the phrase which is least like himself and that which is most like himself. A natural consequence is that a respondent may not score high or low simultaneously on all four factors, but this is believed not to constitute "a practical limitation" and the evidence seems to support this view.

The force-choice technique is stated to be less subject to faking and more valid than the conventional questionnaire method, particularly for low criterion individuals. The validity data are certainly more impressive than that typical of questionnaires. On fakability, two studies are reported in which changes on some profile scores occured between guidance and employment conditions, but these changes were smaller than those usually obtained with questionnaires under comparable conditions.

Illustrations of the profile's possible use for educational and personnel purposes are given, accompanied by sample profiles but, especially for personnel work, the author insists that they are "illustrations only" and that, for the present, the user must establish his own critical scores. He does, however, consider that the data he

reports (e.g., differences between occuational groups) indicate that the test is likely to prove useful. Validation data on the meaning of the scales is well reported and quite extensive.

In all this is a carefully constructed test which is easily administered and scored. For a personality test, reliabilities are encouraging, especially those for the total score. Validity data are above average, yet the author commits no extravagances. The manual is clearly written and well organized and their are no significant omissions.

Gordon Personal Inventory (Buros, 1975)

The Gordon Personal Inventory follows a rationale and format similar to those of the Gordon Personal Profile. The four traits measured, based on factor studies and typical items, are: cautiousness (C), "does not care much for excitment," "does not act on the spur of the moment"; original thinking (O), "a very original thinker," "likes to work primarily with ideas"; personal relations (P), "speaks nothing but the best about other people," "believes that all people are basically honest"; and vigor (V), "a very energetic worker," "full of vigor and vitality."

The items are arranged in tetrads of two favorable and two unfavorable items as in the Gordon Personal Profile. The time required is 10 to 15 minutes.

Factor analysis of items, internal consistency analysis, and judgments of item social desirability were used in building the test. Empirical item selection was

apparently not used. Intercorrelations among scales are generally lower than the Profile, though there is a moderate correlation (r=.37) between C and P in student samples. Correlations of the inventory with the Profile are low to moderate. None of the correlations exceeds .47.

The manual is conscientiously prepared. The reliabilities of the scales are satisfactory, ranging from .77 to .84. There are a variety of norms. Validity studies in several different settings are cited. Validity data are not quite as extensive as for the Profile, and the external validity of the inventory does not seem as well established by the data available. Omission of empirical item selection in constructing the test may have limited its external validity. Most of the validity correlations do not rise above the .30's. There are some high negative correlations with external criteria. For example, sales criteria were correlated substantially and negatively with C in one sample and with P in another.

No illustrative individual cases are provided for the inventory. The question of distortion is dealt with in the same manner as for the Gordon Personal Profile, and there are data indicating only small changes under differing motivational conditions, although not as much data as for the Profile. In addition, item transparancy seems somewhat more of a problem than with the Profile.

In summary, the Gordon Personal Inventory measures four normal personality traits by a method very similar to that devised for the Gordon Personal Profile. There is considerable evidence of validity, although it is somewhat

less satisfactory than for the Profile. The manual is of
high quality. The inventory seems generally as
satisfactory a measure of traits of this type as other
self-report devices which are available, although the
external validities reported are frequently quite modest.

Strong Campbell Vocational Interest Blank (Anastasi, 1982)

The Strong Campbell Vocational Interest Blank (SVIB)
introduces two principal procedures in the measurement of
occupational interests. First, the items deal with the
respondent's liking or disliking for a wide variety of
specific activities, objects, or types of persons that the
respondent commonly encounters in daily living. Second,
the responses were empirically keyed for different
occupations. The SVIB was one of the first tests to employ
criterion keying of items. It was found that persons
engaged in different occupations were characterized by
common interests that differentiated them from persons in
other occupations. These differences in interests extended
not only to matters directly related to job activities, but
also to school subjects, sports, hobbies, types of plays,
or books the individual enjoyed, social relations, and many
other facets of everyday life. It, therefore, proved
feasible to develop an inventory that explored an
individual's interests in familiar things to determine how
closely his or her interests resembled those of persons
successfully engaged in particular occupations.

The SVIB consists of 325 items grouped into seven
parts. In the first five parts, the respondent records

their preferences by marking "L" (Like), "I" (Indifferent),
or "D" (Dislike). Items in these five parts fall into the
following catagories: occupations, school subjects,
activities, amusements, and day-to-day contact with various
types of people. The remaining two parts require the
respondent to express a preference between paired items,
and marking a set of self-descriptive statements "Yes,"
"No," or "?."

The inventory provides respondents with scores on the
following scales: General Occupational Themes, Basic
Interests, Occupations[2], and Academic Orientation.

The General Occupational Themes scales consist of six
themes: Realistic, Investigative, Artistic, Social,
Enterprising, and Conventional. Each theme characterizes
not only a type of person, but also the type of working
environment that such a person would find acceptable. The
numerical scores on these scales are reported with
reference to the whole sample (N=600) and interpretive
phrases (e.g., high, very low) are based on the
distribution of the subgroup.

The twenty-three Basic Interest scales are classified
under the six General Occupational Themes (e.g., science is
contained within the investigative theme). Like the
Occupational Theme scores, the Basic Interest scores are
expressed in terms of the whole sample.

---

2 For the purpose of the present study only the Occupation-
al Scales were utilized.

The Occupational Scales, which constitute the main body of the SVIB provides scores on forty-two occupations. The scores on these scales are reported with reference to the criterion groups for each occupation rather than the whole sample. These scores indicate the degree of similarity between the individual's responses and those of the criterion group for each occupation. In addition, code letters preceeding each occupational title indicate the General Occupational Themes that predominate in that occupation. This classification was based principally on the mean scores on the General Occupational Themes scales obtained by each occupational criterion sample, and on the correlations of the occupational scales with each of the theme scales.

Items for each Occupational scale were selected and weighted on the basis of differences in item-response percentages between the occupational criterion sample and the reference sample.

The SVIB has been subjected to a continuing research program that has yielded extensive data about its reliability and validity. Median retest reliabilities over a thirty day period for General Occupational Themes, Basic Interest scales and Occupational scales are all in the high .80's. Long term stability of the Occupatinal scales for periods ranging from one year to over twenty years is also high with correlations falling mostly in the .60's and .70's. In addition, the stability overtime of the mean occupational profiles was examined. The SVIB was administered to different samples of men holding the same

jobs in the same organization separated by a thirty year interval. This procedure was followed with four occupational groups: corporation presidents, bankers, school superintentents, and ministers. The mean occupational profiles obtained over this interval were similar. Similar results have been obtained with the Basic Interest scales.

Concurrent validity is indicated by the degree of differentiation among different occupational samples, and between occupational samples and reference samples. Also, predictive validity has been checked in several samples over long intervals. The results indicate substantial correspondence between the initial occupational profile and the occupation eventually pursued.

APPENDIX B

PERFORMANCE RATING FORM

Summary Rating Development

The summary items were phrased in general terms pertaining to performance, ability, personality and potential. These items were drawn from a collection of performance rating forms published by the American Management Association and from recommendations of the research group.

A preliminary intercorrelational study of these items revealed that the "Ability," "Performance," and "Personality" items could be scored as one group and the items representing "Potential" could be scored as a second group. There was considerable overlap between the two general groups. However, to preserve any distinction which might exist, the two summary scales, "Performance" and "Potential," were scored and treated separately.[1]

Scoring

For each statement, there were five (5) possible ratings (responses). Ratings were assigned numerical values from 1 to 5, where 5 represents the most favorable rating and 1 the least favorable rating.

[1] For the purpose of this study, only the performance scales were used and are presented in the appendix.

SUMMARY RATINGS

Instructions

For each of the following questions, place an "X" before the statement which best describes the person.

JOB PERFORMANCE

Consider the manner in which he carries out responsibilities and duties assigned to him. Consider, also, how consistently he applies himself and the quality of the results he obtains.

Which of the following terms best describes the overall performance of this person on this job?

_____Far exceeds job requirements.

_____Exceeds job requirements.

_____Meets job requirements.

_____Partially meets job requirements.

_____Does not meet job requirements.

Which statement best indicates how satisfied you are with the present job performance of this person?

_____Exceedingly well satisfied.

_____Well satisfied.

_____Generally satisfied.

_____Somewhat satisfied.

_____Very disappointed

ABILITY

Consider his adaptability, resourcefulness, and ability to apply his job knowledge in a variety of circumstances.

_____Exceptionally capable, has expert knowledge of the work; is ingenious at finding new and better ways of doing a job.

_____Is quite capable and proficient; generally makes good contributions to solving job problems.

_____Handles normal work in a competent manner. Sometimes needs guidance in major activities.

_____Somewhat uncertain; often needs help solving ordinary job problems. Needs development in ability to weigh and evaluate problems.

_____Quite limited in ability to apply job principles and knowledge in new situations. Generally relies on precedent; seldom original.

Ability Rating continued:

Consider his knowledge and understanding of the basic fundimentals, techniques, and procedures necessary to do his job. Consider, also his ability to integrate the various components of his job into a harmonious, smoothly operating whole.

If at the time this person was assigned to his present job you knew as much about his <u>ability</u> as you know now, how would you have recommended assignment to his present job?

_____Highest possible recommendation.

_____Excellent recommendation.

_____Average recommendation.

_____Low average recommendation.

_____Would not have recommended.

PERSONALITY CHARACTERISTICS

Consider his ability to meet and work with other people.

If at the time this person was assigned to his present job you knew everything pertaining to his personality characteristics that you now know, how would you have recommended assignment to his present job?

_____Highest possible recommendation.

_____Excellent recommendation.

_____High average recommendation.

_____Low average recommendation.

_____Would not have recommended.

PLEASE NOTE:

Copyrighted materials in this document have
not been filmed at the request of the author.
They are available for consultation, however,
in the author's university library.

These consist of pages:

60-64, Appendix C

U·M·I

APPENDIX D

VARIABLE MEANS AND STANDARD DEVIATIONS
FOR EACH MANAGEMENT LEVEL

D1. Variable Means And Standard Deviations For Each
Management Level.

Variable Name	Managment Level					
	Level 1 (N=77)		Level 2 (N=65)		Level 3 (N=66)	
	Mean	SD	Mean	SD	Mean	SD
General Intelligence	-.395	.873	.186	1.035	.279	.823
Creativiy	.254	.896	-.124	.988	-.174	1.018
Maturity	.053	.893	-.072	.898	.008	.857
Group Leadership	-.101	.904	-.061	.949	.178	.763
Original Thinking	-.174	.811	-.049	.771	.251	.773
Investigative	.038	1.004	-.006	1.081	-.038	.922
Realistic	.382	.907	-.105	.891	-.342	1.067
Social	-.201	.986	.073	1.038	.162	.952

D1. Variable Means And Standard Deviations For Each Management Level.