THE VOCATIONAL PERSONALITY OF A GROUP OF

MACHINE OPERATORS

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A Thesis

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SYMBOL OR ABBREVIATION   DEFINITION

16 PF . . . . Sixteen Personality Factors

D SCORE . . . . Distortion Score

I.P.I. . . . . Industrial Psychology, Inc.

MMPI . . . . Minnesota Multiphasic Personality Inventory

CHAPTER I

THE PROBLEM AND DEFINITIONS OF TERMS USED

The occupation of machine operator and its relationship to
objective personality testing was the subject of this study.

Objective personality tests have found a definite role in
industry. Research on the validity of these instruments in specific
industrial situations has, however, been very limited. It was the
purpose of this research to validate one such instrument, the "16
Personality Factors" test for a single purpose and in a specific
situation.

I. The Problem

Statement of the problem. One of the primary roles of the
objective personality test in industry is the prediction of job
success. Many tests which are purported to accomplish this are
available to industry. These personality tests often come with
recommended norms which are to be used by the industrial psycholo-
gist to predict job success. Form C of the "16 Personality Factors"
test, as published by Industrial Psychology, Inc., is furnished to

industry with a set of predictive norms.[1] Industrial Psychology, Inc.
also publishes another form, a merit rating form, to evaluate job
success.[2] The question guiding the direction of this research was:
are the predictive norms of Form C of the "16 Personality Factors"
test valid for predicting the job success of a group of machine
operators at Didde-Glaser, Inc. in Emporia, Kansas?

Statement of hypothesis. Few test norms can be applied with
unquestionable reliance on validity research which was developed on a
sample group from some other geographical locality, and, in industry,
probably on an occupational sample whose job duties and requirements
are not the same as the occupational group to which they are to be
applied. More specifically: the personality profile of a group of
machine operators (as measured by the "16 Personality Factors" test)
can be used in the prediction of job success (as measured by the
"Mechanical" merit rating form) when the weights for the norms of
that test are adjusted to meet the unique requirements of the firm
which applies them.

II. Definitions of Terms Used

Personality. For the purpose of this research, personality
was defined as consisting only of those traits which are measured

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[1] Skilled Worker (New York: Industrial Psychology, Inc.,
1960), p. 1.

[2] Mechanical (IPI Merit Rating Series. New York: Industrial
Psychology, Inc., 1953), p. 1.

by Form C of the "16 Personality Factors" test.

16 Personality Factors Test--here-after referred to as the
16 PF. This research was concerned only with Form C of this test
which was developed by Raymond B. Cattell and his associates. Form C
of the 16 PF, as published by Industrial Psychology, Inc. (see
Appendix A), yields twenty-five scores: sixteen personality trait
scores, six complex scores, a D score, and two total-weighted scores.[3]
All scores are expressed as stanines except for the D score which has
a twelve point range and the total-weighted scores which have a
twenty point range.

Personality trait. A personality trait accounts for regular-
ity, or consistency, in behavior.[4] More specifically,

> A trait is a collection of reactions or responses bound by
> some kind of unity which permits the responses to be gathered
> under one term and treated in the same fashion for most
> purposes.[5]

This research was concerned with sixteen of these traits as they are
measured by Form C of the 16 PF. These traits are identified by the
universal index letters of A, B, C, E, F, G, H, I, L, M, N, O, Q1, Q2,
Q3, and Q4. The universal index letters for these traits were used
instead of their names because it was felt that the definitions of
these traits might cause needless semantic confusion. These sixteen

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[3]Skilled Worker, loc. cit.

[4]Calvin S. Hall and Gardner Lindzey, Theories of Personality
(London: John Wiley and Sons, Inc., 1957), p. 396.

[5]Raymond B. Cattell, Description and Measurement of Person-
ality (Yonkers-on-Hudson, New York: World Book Company, 1946),
p. 61.

personality traits are source traits which represent the many under-

lying variables of personality.[6]

Complex score. The six complex scores concerned in this

research are extraversion, stability, level of anxiety, leadership,

research-creative, and initiative-drive. These complex scores are

second order scores derived from clusterings of the sixteen person-

ality traits. These complex scores are observable as surface

traits.[7] (For the method of computation of the six complex scores,

see Table V.)

D score. This is an inconsistency, or lie index, to detect

motivational distortion which might arise during the pre-employment

testing situation.[8]

Machine operator. Since the subjects of this research were

all employees of the same organization, their job duties, work envi-

ronment, method of selection, and method of appraisal were considered

the same. The occupation of machine operator was interpreted

according to the job description written by the employing firm for

their position titled Machine Operator B. In this firm a Machine

Operator B: (1) operates one machine tool well in making standard

parts for precision graphic arts equipment, (2) makes simple setups

from written instructions and blueprints, (3) replaces tools when

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[6]Hall and Lindzey, op. cit., p. 397.

[7]Ibid.

[8]Development of Personality Factor Series (Personality Factor Series. New York: Industrial Psychology, Inc., n.d.), p. 1.

dull, (4) performs routine, preventive maintenance on tools and equipment, (5) controls the quality of work performed, and (6) performs his job duties in a safe manner.[9]

Job success. For the purposes of this study the degree of job success was the stanine rank which was given to the machine operator on the "Mechanical" merit rating form which is published by Industrial Psychology, Inc. (See Appendix B.)

Rating form. This is an objective merit rating of a worker's performance. It provides (1) a systematic analysis of all the important aspects of a worker's performance, (2) a set of uniform standards which all supervisors can apply in a similar manner to all employees, (3) for the supervisor, a reduction of guesswork and favoritism, (4) a method of quantifying each worker's efficiency, and (5) "objective evidence of the relative merits of different employees."[10]

III. Source of Data

The subjects of this research were all of the male employees of Didde-Glaser, Inc. who were employed as machine operators between 1956 and 1968. The firm has a total employment of 500 and is located in Emporia, Kansas, an Eastern Kansas town of a population of 18,000.

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[9]Machine Operator B (Job Description. Emporia, Kansas: Didde-Glaser, Inc., 1967), p. 1.

[10]Subject: IPI Merit Rating Series--In Brief (Notes. New York: Industrial Psychology, Inc., 1953), p. 1.

Very few of the subjects had previous machine shop experience before going to work for the firm. The majority of the subjects came from a farm background and were high school graduates.

CHAPTER II

REVIEW OF THE LITERATURE AND RELATED RESEARCH

Since psychological tests were first applied in an industrial

setting, much has been published concerning their use in industry.

It is unfortunate, in the opinion of the writer, that these published

research studies have, in general, been concerned only with aptitude

testing. Two excellent examples of the wealth of information which is

available concerning aptitude testing are the researches of

Edward L. Thorndike and Robert L. Thorndike. Edward L. Thorndike

administered a battery of aptitude tests to 2,225 children to find

correlates of vocational success.[1] Robert L. Thorndike administered

an aptitude test battery in 1943 to 17,000 subjects and followed these

subjects up in 1955 and 1956 to assess vocational success and

satisfaction.[2]

The two preceding researches are illustrative of the scope of

research that has been done with aptitude testing in industry. The

research and application of personality testing has lagged behind

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[1] Edward L. Thorndike, Prediction of Vocational Success
(New York: The Commonwealth Fund, 1934).

[2] Robert L. Thorndike and Elizabeth Hagen, Ten Thousand
Careers (New York: John Wiley and Sons, Inc., 1959), p. 3.

because of the lack of availability of adequate testing instruments,

qualified researchers, and sympathetic management.

I. Review of Personality

Personality has been approached and defined from various

points of view. This research was directly related to one of these

varieties of personality theory, the elementarianism approach.

The elementarist attempts to understand personality better

by sectioning it into simple and manageable elements. This method of

approach to understanding personality has gained in professional

acceptance because, as Horrocks has stated,

> Elementarianism has leaned heavily upon psychometrics and
> upon statistical techniques and appears to offer the more
> scientifically oriented psychologist a more satisfying rigorous
> approach to the analysis of personality.[3]

Raymond B. Cattell is one of the leading elementarists. He

has defined personality as, "that which permits a prediction of what

a person will do in a given situation." Even though Cattell has studied

personality by sectioning it into elementary traits, the emphasis of

his study has been on the total personality. In other words, Cattell

believed that personality can only be understood when the elements

composing the whole of personality are understood; however, he also

believed that the meaning of a small segment of personality can only

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[3]John E. Horrocks, Assessment of Behavior: The Methodology
and Content of Psychological Measurement (Columbus, Ohio: Charles E.
Merrill Books, Inc., 1966), p. 507.

be understood within the framework of the entire individual.[4] For

these reasons, Cattell preferred to describe abnormal personalities

as types, and normal personalities according to the traits present.[5]

Cattell has defined a personality trait as that which accounts

for regularity or consistency in behavior. These traits may be

common to all people or unique to one individual. These traits,

whether common or unique, can be subdivided into source traits and

surface traits.

A source trait can only be isolated through factor analysis.

This is the element which actually accounts for consistency of

behavior. Source traits can be subdivided and classified as consti-

tutional and environmental or as dynamic (motivation toward a goal),

ability (ability to obtain a goal), and temperament (how the goal

will be pursued).[6]

A surface trait is a collection of source traits, and is that

part of the personality which is observable.[7]

Cattell has listed 171 variables which he believed constitute

the complete personality.[8] All of these traits function in a unitary

[4]Calvin S. Hall and Gardner Lindzey, Theories of Personality
(London: John Wiley and Sons, Inc., 1957), p. 396.

[5]Raymond B. Cattell, Personality: A Systematic Theoretical
and Factual Study (New York: McGraw-Hill Book Company, Inc., 1950),
p. 5.

[6]Horrocks, op. cit., p. 513.

[7]Cattell, Personality: A Systematic Theoretical and Factual
Study, p. 22.

[8]Raymond B. Cattell, Description and Measurement of
Personality (Yonkers-on-Hudson, New York: World Book Company, 1946),
p. 219.

manner to form a whole and unique person. Cattell has labeled these
and assigned a universal index number to each. These universal index
numbers were assigned to the traits to assure that a trait will not
be discarded simply because its definition is outdated. This was
done because through factor analysis each of these 171 traits should
prove independent of the others, and once proven an independent
trait, it will remain an independent trait.[9]

The interaction and unity of all these traits can be viewed
as representing three selves of the same person: (1) the structural
self which is the interaction of all dynamic traits, (2) the real self
which is how the individual would rationally appear to himself, and
(3) the ideal self which is how the individual would prefer to see
himself.[10]

II. Review of the Sixteen Personality Factors Test

The 16 PF is a factor analytic test which was developed by
Cattell and his associates. It is a self administering test which
yields sixteen first order scores, one score for each of the sixteen
source traits measured. The sixteen traits which are measured are
the main dimensions of personality and the list omits "no important
aspect of the total personality."[11] Table I below identifies the

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[9]Ibid.

[10]Horrocks, op. cit., p. 514.

[11]Raymond B. Cattell and Herbert W. Eber, Handbook for the
Sixteen Personality Factor Questionnaire (Champaign, Illinois:
Institute for Personality and Ability Testing, 1957), p. 2.

TABLE I

SOURCE TRAITS MEASURED BY THE 16 PF*

Universal Index Letter	Description of Trait		
	High Score	Versus	Low Score
A	Cyclothymia (Warm, Sociable)	vs.	Schizothymia (Aloof, Stiff)
B	Bright (Intellectual, Cultured)	vs.	Dull
C	Emotional Stability (Ego Strength)	vs.	Dissatisfied Emotionality (Emotional, Immature, Unstable)
E	Dominant	vs.	Submissive
F	Surgency (Enthusiastic)	vs.	Desurgency (Glum)
G	Super Ego Strength (Character)	vs.	Lack of Rigid Internal Standards
H	Parmia (Adventurous)	vs.	Threctia (Shy, Timid)
I	Premsia (Sensitive, Effeminate)	vs.	Harria (Tough, Realistic)
L	Protension (Suspecting)	vs.	Relaxed Security (Accepting, Adaptable)
M	Autia (Intense Inner Mental Life)	vs.	Praxernia (Practical)
N	Shrewdness (Sophisticated, Polished)	vs.	Naivete (Simple)
O	Guilt Proneness (Insecure)	vs.	Confident (Self-Secure)
Q1	Radicalism	vs.	Conservatism
Q2	Self Sufficiency	vs.	Group Dependency
Q3	Controlled	vs.	Uncontrolled
Q4	Tense (Excitable)	vs.	Composed

*Adapted from Raymond B. Cattell and Herbert W. Eber, Handbook for the Sixteen Personality Factor Questionnaire (Champaign, Illinois: Institute for Personality and Ability, 1957), pp. 11-19.

sixteen traits measured according to definition and universal index letter.

The 16 PF can be used to yield additional scores such as complex or composite scores which measure surface traits, or clusters of source traits. Another type of score which can be derived from the test is a total weighted score to be used to compare the individual to a specific group such as an occupational or clinical group.

The test is available in five forms. Forms A and B are long forms; Forms C and D are short forms, and Form E is a low literate form. The results of Forms A, B, and C are considered to be equivalent when expressed as standard scores.[12]

Form C, with which this research was concerned, is often used as a personnel selection tool in industry. For this reason Form C yields an additional score, the D score. The D score is used to detect motivational distortion.[13]

Cattell has favored the use of the 16 PF in industry as a predictive instrument. To aid the industrial psychologist in this task, Cattell and his associates have made available to industry many occupational group profiles; however, it is also realized that regional differences do make a difference.[14]

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[12]Ibid., p. 3.

[13]Ibid., p. 6.

[14]Cattell, Personality: A Systematic Theoretical and Factual Study, p. 420.

III. Review of Merit Rating

There are many methods of accomplishing a merit rating,

and all methods rely on either one or both of the following types

of comparison: (1) man to man, and (2) man to standard.[15]

A merit, or performance, rating can be made for many reasons.

Benjamin (1952) surveyed 130 companies and determined that there

were fifteen reasons for using a merit rating. These were grouped

into three categories, administrative purposes, performance improve-

ment, and research.[16]

Each of the different methods of appraising performance can

be used for more than a single purpose. For instance, a merit rating

can be used to determine salary, to inform the employee of his need

to improve, and to assess the reliability of pre-employment tests.

To accomplish these purposes a merit rating is usually based upon the

employee's personality, performance, and production.[17]

Barrett has classified the different methods of performance

appraisal and analyzed the value of each.[18]

One of the methods of performance appraisal is the forced

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[15]Subject: Development of IPI Merit Rating Series (Notes.
New York: Industrial Psychology, Inc., 1953), p. 1.

[16]Richard S. Barrett, Performance Rating (Chicago: Science
Research Associates, Inc., 1966), p. 6.

[17]Ibid., p. 33.

[18]Ibid., p. 61.

choice type. In a forced-choice rating form, discriminatory state-
ments are matched in terms of social acceptability so that each
appears equally favorable. Another method of performance rating is
the weighted, random check list. The merit rating forms published
by Industrial Psychology, Inc. are a combination of both of these
methods; they are forced-choice, weighted, random check lists.

Industrial Psychology, Inc. (I.P.I.) publishes five merit
rating forms, one for each of five different job families; these
are "Clerical," "Mechanical," "Sales," "Supervisor," and "Technical."
Each of these forms contains sixty statements which are answered by
the rater as either "Yes or True" or "Not True at Present." Each
form also contains bias and conflict statements to detect bias and
inconsistency on the part of the rater.[19] These forms were devised
to consider all the important aspects of the worker's job performance.
Each form considers a worker's production output, work quality, work
habits, job knowledge, potential, attitude, and adjustment to the
work environment. The rating of the worker is expressed as a single
stanine score. These forms are used to reduce guesswork, provide a
systematic analysis of worker's performance as compared to job stan-
dards, differentiate between the merits of different employees, and to
evaluate company programs.[20] This research was concerned with one of
these forms, the "Mechanical."

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[19]Subject: IPI Merit Rating Series--In Brief (Notes.
New York: Industrial Psychology, Inc., 1953), p. 2.

[20]Subject: Steps in IPI Merit Rating Program (Notes.
New York: Industrial Psychology, Inc., 1953), pp. 1-2; Subject:
Development of IPI Merit Rating Series, loc. cit.

IV. Review of the Prediction of Job Success

Prediction of job success through personality assessment is
far from being a new concept. Formal scientific prediction is,
however, a relatively new approach. An example of an early method
of prediction was that advocated by Laird in 1925. Laird advocated
the use of a check list which would be filled out by an interviewer.
The check list would contain such items as "Is he cheerful?" The
next, and last step, was for the interviewer to subjectively compare
the results of the check list to the job and arrive at a conclusion.[21]

A more valid approach to the prediction of job success based
on personality assessment is that employed by Kaback to differentiate
accountants from pharmacists by using the Rorschach group method.[22]
Kaback was successful; however, his method was impractical since it
is time consuming for the candidate employee and tester, and too
few individuals who are trained to administer and interpret the test
are to be found in industry.

Several personality inventories have been used in industry to
assess personality. Among the more successful instruments are the
Bernreuter Personality Inventory, Thurstone Personality Schedule, and
the Rogers Adjustment Inventory.[23] Another widely used instrument is

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[21]Donald A. Laird, The Psychology of Selecting Men (New York:
McGraw-Hill Book Company, Inc., 1925), p. 179.

[22]Goldie R. Kaback, Vocational Personalities: An Application
of the Rorschach Group Method (New York: Bureau of Publications,
Teachers College Columbia University, 1946).

[23]Barrett, op. cit., p. 528.

the Minnesota Multiphasic Personality Inventory (MMPI). The MMPI has been used for such purposes as detecting the differences between clerical workers, saleswomen, and women optical workers.[24]

The Institute for Personality and Ability Testing is responsible for making available to industry much information which can be used in the prediction of job success by utilizing the 16 PF. An example of the wealth of information made available to industry by this corporation is the publication "Typical 16 PF Occupational Profiles (In Stens)." This publication lists twenty-three occupational profiles; information from eight of these occupational profiles is presented in Table II. Other general profiles which were of interest in this research are presented in Table III.

I.P.I., which is closely related to the Institute for Personality and Ability Testing, has also conducted many validity studies on the prediction of job success. In each of these studies the 16 PF was the instrument of prediction, and the criterion of job success was the stanine rank earned by the employee on an I.P.I. Merit Rating Form. In these studies the 16 PF was used as a predictive instrument by using a weighted score grid such as the one for Skilled Worker which is represented in Table IV.

One of the validation studies done by I.P.I. concerned printing plant estimators. In this study the subjects were forty-one

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[24]Willie M. Verniaud, "Occupational Differences in the Minnesota Multiphasic Personality Inventory," *Journal* of *Applied* *Psychology*, XXX (December, 1946), p. 612.

TABLE II

DEVIATIONS OF OCCUPATIONAL GROUP MEANS FROM THE

MEANS OF THE GENERAL POPULATION AS MEASURED BY THE 16 PF TEST*

Occupation	Trait Factor Deviation															
	A	B	C	E	F	G	H	I	L	M	N	O	Q1	Q2	Q3	Q4
Aircraft Engineer Apprentices	−		+						−	−	−					
	−															
Accountants	+						−	+		+		+	+			
													+			
Farmers		−	−	−	−		−	+	+	+		+				+
			−		−							+				
Housewives	+		−		−			+								+
Industrial Plant Foremen					−											
Research Scientists	−	+	+	+	−	−	+	+	−		−			+	+	
	−				−	−										
Salesmen	+						−									
Time Study Experts	+						−				+		+			
											+					

(Signs denote direction of deviation and distance of deviation in half sigmas)

*Adapted from Typical 16 PF Occupational Profiles (In Stens) (Champaign, Illinois: Institute for Personality and Ability Testing, 1966).

TABLE III

GENERAL PROFILES OF JOB SUCCESS*

Mechanical Occupations	Unskilled Jobs	Professional and Skilled Occupations	Ability to Learn and Capacity to Grow in a New Job
E+	B	E+	B+
I-	C+	H+	F-
N+	E-	M+	G+
Q1	G+	N+	Q3+
	M-	Q1+	
	Q3+		
	Q4-		

(A "+" sign following a letter means a high score on the factor; a "-" sign means a low score on the factor.)

    *Adapted from New Prediction Possibilities for Vocational and Educational Counseling with the 16 PF (Champaign, Illinois: Institute for Personality and Ability Testing, 1963), pp. 3-7.

TABLE IV

WEIGHTED PERSONALITY PROFILE

OF THE SKILLED WORKER*

Trait	1	2	3	4	5	6	7	8	9	Weight
A		1	1	1	1					—
B					1	1	1	1		—
C					1	1	2	2	1	—
E				1	1	1	1			—
F		1	1	1	1					—
G					1	1	1	2	2	—
H		1	1	1	1	1				—
I					1	1	1	1	1	—
L		1	1	1	1					—
M					1	1	1	1		—
N				1	1	1	1			—
O					1	1	1	1	1	—
Q1				1	1	1	1			—
Q2					1	1	2	2	2	—
Q3					1	1	2	2	1	—
Q4					1	1	1	1	1	—

Total Weighted Score ___

Complex	1	2	3	4	5	6	7	8	9	Weight
Extraversion	1	2	3	2	2	1	1			—
Stability					1	1	2	3	3	—
Anxiety Level				1	1	2	2	3	3	—
Leadership				1	2	3	3	2	1	—
Research-Creative				1	1	2	3	3	2	—
Initiative-Drive				1	2	3	3	2	1	—

Total Weighted Score ___

*Skilled Worker (New York: Industrial Psychology, Inc., 1960), p. 1.

printing plant estimators who had completed their training and who were employed at that time. In this study correlations of 16 PF scores to the "Technical" merit rating rank were reported as: C=.34, I=.38, M=.33, Q4=.41, and the total, weighted 16 PF score=.48. The other trait scores had correlations from .12 to .32. This study also showed that the average printing plant estimator was high in maturity, stable, dominant, changeable, not too adventurous, suspecting, and average in tough mindedness, conventionality, and extraversion.[25]

In a similar study seventy-four printing plant salesmen were studied. In this study the 16 PF scores were correlated with a combined score representing the salesman's stanine score on the "Sales" merit rating form and the salesman's position in a ranking of all the salesmen involved in the study. The correlations reported were A=.39, E=.36, I=.42, Q2=.35, and total, weighted 16 PF score=.38. Also reported were the following aspects of the average printing plant salesman: he is very stable, a strong participator with people, very dominant, tough minded, self sufficient, suspecting, non-conventional, and extraverted.[26]

Other studies conducted by I.P.I. have shown correlations of 16 PF weighted scores and appropriate merit rating form ranks for

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[25]Validation Study of Printing Plant Estimators (New York: Industrial Psychology, Inc., 1963), pp. 1-2.

[26]Validation Study of Printing Plant Salesmen (New York: Industrial Psychology, Inc., 1963), pp. 1-2.

the following occupations of: salesman=.41, engineer=.61, and policeman=.67.[27]

From information gathered during a 1962 study when he studied the personalities of three occupations, Miller concluded that:

> Similarities within occupational families are a function of (1) shared traits and perceptions of need fulfillments (2) shared traits developed through reinforcement and involvement in the occupation.[28]

Miller also concluded that occupation groups differ because of functions performed and not because of the amount of experience in an occupation.[29]

Information is available from different sources concerning suggestions for conducting studies similar in nature to the subject of this research. Ghiselli suggested that forced choice tests lend themselves best to predicting job success.[30] Ghiselli also suggested that such studies should be conducted on at least fifty to sixty people.[31] Cattell and his associates also had several suggestions for

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[27]Validation Study of Policemen on 16 Personality Factor Test (New York: Industrial Psychology, Inc., 1957), p. 3; Validation Studies in the Salesman Field (New York: Industrial Psychology, Inc., 1960), p. 2; and Validation Study of Engineering Supervisors (New York: Industrial Psychology, Inc., 1959), p. 2.

[28]Sutherland Miller, Jr., "Relationship of Personality to Occupation, Setting, and Function," Journal of Counseling Psychology, IX (Summer, 1962), p. 115.

[29]Ibid., p. 117.

[30]Edwin E. Ghiselli and Clarence W. Brown, Personnel and Industrial Psychology (second edition; New York: McGraw-Hill Book Company, Inc., 1955), p. 209.

[31]Ibid., p. 215.

conducting such research. Cattell suggested that the statistical difference between closely related occupations is usually not great enough to build personality profiles for anything except groups of related occupations.[32] Cattell also suggested that age or sex corrections are not necessary when determining the personality profile of an occupation because the goal of such research was to detect the optimum personality which would predict job success since that was the important aspect of qualifying for a job.[33]

Cattell also encouraged such research as this study is concerned with when he made statements such as the following:

> It is a sad illustration of the meager harvest accuring to pure science from comparatively heavy expenditures on applied science that, in spite of the enormous attention vouchsafed in the last forty years to the psychology of vocational guidance, we still have no figures even for the 'mean' of occupations with regard to....personality factors.[34]

V. Summary

Personality. The elementarist approach to personality study was reviewed. The elementarist approach to understanding personality is based on factor analysis. The goal of elementarianism is to understand the total personality better by understanding the elements

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[32]New Prediction Possibilities for Vocational and Educational Counseling with the 16 PF (Champaign, Illinois: Institute for Personality and Ability Testing, 1963), p. 2.

[33]Cattell and Eber, op. cit., p. 8.

[34]Cattell, Personality: A Systematic Theoretical and Factual Study, p. 418.

which compose personality. An element, or trait, can only be understood correctly when it is studied in the proper context of its function in the total personality.

Raymond B. Cattell is one of the leading advocates of elementarianism. His theory of personality utilized source traits and surface traits to identify and explain the elements of personality.

Elementarianism, particularly Raymond B. Cattell's theory, was directly related to this research because it was his objective personality test (which was constructed to agree with his theory) which was investigated.

16 PF. The construction and application of the 16 PF was discussed, particularly Form C. Other aspects of this test were discussed under the topical headings concerning personality and prediction of job success. This was necessary because the 16 PF is the instrument which was used in this research to predict job success.

Merit Rating. Merit rating was discussed to clarify the construction and application of the instrument which was used as the criterion of job success in this research. The specific instrument in question was the "Mechanical" form of the I.P.I. merit rating series which is a forced-choice, weighted, random check list which yields a single stanine score which represents the total performance of the worker as compared to the standards of the job and other workers on that job.

Prediction of job success. The prediction of job success through the use of objective personality inventories was discussed. Special emphasis was given to relevant predictive norms recommended by the Institute of Personality and Ability Testing because they are one of the publishers of the 16 PF, and because they have been involved in and have encouraged the use of the 16 PF for predicting job success.

Validation studies conducted by I.P.I. were discussed. These were particularly significant because their research design was very similar to the one used in this research. This similarity arises primarily from the use of the same predictive instrument (16 PF), method of prediction (weighted score grid), and criterion of job success (merit rating form).

Suggestions which have been made concerning the design of such studies as this were discussed. None of these authoritive suggestions were contradictory to this research.

Conclusion. The literature reviewed was selected because it was directly relevant to this research. This literature justified the design and purpose of this research. It also presented information, such as Table IV, which was used later in this study.

CHAPTER III

METHODS AND PROCEDURES

The guiding principle in designing and carrying out this

research was to be as practical and efficient as possible and yet

meet the requirements of good research and everyday functionality.

I. Subjects

The subjects of this research were selected from the machine

operators employed by Didde-Glaser, Inc. between 1956 and 1968. All

subjects included in the study were white males. Women and Negros

were excluded from the study because no women were employed in this

occupation by the company and because the only Negro employed in

this occupation had not as yet had his performance evaluated.

The first requirement for inclusion in this study was that

the machine operator must have a performance rating on record of his

work as a machine operator. Closely related but different jobs such

as sheet metal machine operator and advanced machine operator

positions were not included in this study. This initial screening

reduced the number of eligible subjects from approximately 200 to

86. The next requirement for inclusion was that the subject must

have taken the 16 PF. This requirement eliminated two more potential subjects from the study. These first two limitations on the eligibility of each subject were functional in nature.

The last three restrictions were optional in nature but were adopted for the purpose of increasing the validity of the results of this research. These last limitations were: (1) the performance rating of the subject must have been made by his supervisor during either the employee's eleventh, twelfth, or thirteenth month on the job as a machine operator, (2) the performance rating of the employee must have been made with the "Mechanical" form of the I.P.I. Merit Rating Series, and (3) the employee must not have held any other job than machine operator with Didde-Glaser, Inc. before the time that the performance rating used in this study was made. This last requirement was applied to eliminate the possible influence of prior experience with the company and its method of operations.

The total number of subjects included in the study after all limitations were applied was fifty-six. Eight of the subjects included in the study were classified as terminated from the company when the data for this research was gathered; the remaining subjects were still employed by the company, but many of them were no longer working as machine operators.

The mean educational level for the subjects included in this study was 12.14 years. The mean age of this same group was 25.70 years. The author considered this to have been the most homogeneous group available for this study.

II. Criterion of Job Success

The criterion of job success in this study was the performance rank earned by the subject. These performance ranks have a possible range of from one to nine; they are the stanine scores obtained after the "Mechanical" merit rating form was graded. This stanine score is a direct comparison of the individual to the standards of the job and to other people working in the same job area.

The completion of the performance rating on the subjects was done by the subject's immediate supervisor, who completed the form by answering sixty objective statements about the subject's performance. The completed form was then scored by a clerk in the Personnel Department of Didde-Glaser, Inc.

This merit rating system was designed to be completely objective; however, as with any pencil and paper instrument, the score on the merit rating form can be influenced by the motives of the person who completes the form. This source of possible contamination of the data used in this study was accepted because it was considered the best available rating of the overall performance of the subjects used in this study; moreover, the company used these ratings for promotion, salary administration, and termination. More specifically, the company considered this method valid. Because the company treated these ratings as valid, the results of these performance ratings governed, to a large extent, the subject's success with the company.

III.   Prediction of Job Success

The 16 PF was used as the predictor of job success. The

twenty-five scores which this personality test yields were used

in different ways to predict job success.

When used as a pre-employment test, the sixteen trait scores

predict job success and represent the individual's personality

profile. Handling these scores individually is burdensome and

leaves considerable room for erroneous, subjective judgement of the

total personality. For this reason, these sixteen scores were entered

into a weighted score grid, and from the weighting of each of the

individual factors, a total score was derived which yielded a total

prediction of the person's success on the job.

The six complex scores, which were derived from clusterings

of the sixteen trait scores, are also predictors of job success.

Since these scores represent observable behavior patterns, they are

best used to describe the individual to others. This can be quite

useful, and the development of a total score from these complex

scores is very practical and gives a second assessment of the total

personality for the prediction of job success. Table V describes

the method of computation for each of these complex scores.

The last score yielded by the 16 PF, the D score, is a

special score. It measures motivational distortion of the test

results. This score is not normally included in weighted score grids.

TABLE V

COMPUTATION OF COMPLEX SCORES

Extroversion =	A + F + H + M
Stability =	C + E + L + O
Anxiety Level =	$C + O + Q3 + Q4$
Leadership =	$F + G + O + Q3$
Research-Creative =	$(10-A) + C + (10-F) + Q1$
Initiative-Drive =	$E + F + N + Q1$

TABLE USED TO OBTAIN RANK FROM TOTAL SCORE ABOVE

TOTAL	RANK
33-36	9
29-32	8
25-28	7
22-24	6
19-21	5
16-18	4
12-15	3
8-11	2
4-7	1

IV. Statistical Design

The object of this research was to construct the best possible
weighted score grid to predict job success. This was done with the
statistical information gained from a normative and correlational
study. The correlational method used was the Pearson product-moment
correlation.

The first step in the process was to correlate the two total
scores from the 16 PF to the performance rank earned by the subjects.
These scores were derived from the weighted score grids recommended
by I.P.I. (see Table IV). This was done for the purpose of showing
the degree of improvement gained from the construction of the new
score grids.

The second step was to compute the mean, median, range,
standard deviation, and first and third quartiles for the twenty-five
16 PF scores and the performance ratings of all the subjects. This
information was used as background information.

The next step was to perform the necessary correlations for
constructing the score grids. The correlations necessary were for
the sixteen trait scores and six complex scores to the performance
ranks of the subjects. This information was used in assigning the
weights of the score grids.

The fourth step was the construction of the two weighted
score grids. This was done by multiplying the values of the

correlations for each of the factors by ninety, rounding it off to the nearest whole number, and then assigning it to that factor in the score grid. These weights were then distributed in each factor by placing the full weight for the factor on either the first or ninth stanine of that factor, depending on whether or not the correlation of that factor was positive or negative (for example, if the correlation for one of the factors was -.24, then the weighting for that factor would be 22 which would be placed on the first stanine; if the correlation had been positive, the weighting would have been placed on the ninth stanine). After the full weight for the factor had been determined and correctly positioned, it was then distributed through the rest of the stanines for that factor by geometrically decreasing the value as it approached the opposite end of the scale for that factor.

The last step in this procedure was the correlation of the two new sets of total-weighted scores with the performance ranks. The level of significance for the difference of the new correlations and the correlations for the old scoring grids was then found. The hypothesis of this study was considered proven if the level of significance for the difference of these correlations equalled or exceeded .05.[1]

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[1]Henry E. Garrett and Robert S. Woodworth, Statistics in Psychology and Education (New York: David McKay Company, Inc., 1954), p. 241.

CHAPTER IV

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

I. Summary

One of the primary roles of the objective personality test

in industry is the prediction of job success. These personality

tests often come with recommended norms for the prediction of success

in certain occupations; however, these norms often lack the validity

required in a particular situation because of differences in job

functions, geographical location, and work environment.

The purpose of this study was to construct a scoring grid

for the "16 Personality Factors" test (16 PF) which could be used in

the prediction of job success for machine operators.

A survey of the literature which pertained to the problem

was made. The elementarianism theory of personality was reviewed

because it is the basis for Cattell's 16 PF. Merit rating was also

reviewed to clarify the construction and application of the instru-

ment which was used as the criterion of job success in this

research. The prediction of job success through the use of

objective personality inventories was also reviewed with particular

emphasis being placed on studies which used the 16 PF.

The subjects of this research were selected from the machine operators employed by Didde-Glaser, Inc. between 1956 and 1968. The requirements which the subjects had to meet for inclusion in this study were: (1) a performance rating had to be on record of the subject's work as a machine operator, (2) the subject must have taken Form C of the 16 PF, (3) the performance rating of the subject must have been made by his supervisor during either the employee's eleventh, twelfth, or thirteenth month on the job as a machine operator, (4) the performance rating of the employee must have been made with the "Mechanical" form of the Industrial Psychology, Inc. (I.P.I.) Merit Rating Series, and (5) the subject must not have held any other job than machine operator with Didde-Glaser, Inc. before the time that the performance rating used in this study was made. The total number of subjects included in the study after all limitations were enforced was fifty-six.

The criterion of job success in this study was the performance rank given the subject by his supervisor. These performance ranks have a possible range of from one to nine; they are the stanine scores obtained after the "Mechanical" merit rating form was graded. This stanine score is a direct comparison of the individual to the standards of the job and to other people working in the same job area.

The 16 PF, as published by I.P.I., was used as the prediction of job success. The twenty-five scores which this personality test yields were used in different ways to predict job success. The sixteen trait scores were entered into a weighted score grid, and

from the weighting of each of the individual factors, a total was derived. The six complex scores were used in a second weighted score grid which yielded a second total score. The last score, the D score, was not used in the weighted score grids.

The statistical steps involved in completing this study were: (1) correlation of the two total scores from the score grids recommended by I.P.I. to the subject's performance rank, (2) a normative study of the twenty-five 16 PF scores and the performance ratings of the subjects, (3) correlations of sixteen trait scores and six complex scores to the performance ratings, (4) construction of the two new, weighted score grids, and (5) testing for the level of significance in the improvement of the new score grids over the score grids recommended by I.P.I.

The correlations of the scores derived from the scoring grids recommended by I.P.I. (see Table IV) to the performance ratings of the subjects were made and found to be: -.01 for both the total weighted-trait and weighted-complex scores. The results of the normative study which was made of the trait, complex, and D scores is presented in Table VI. This information was not used in the construction of the scoring grids but was included to provide background information. The results of the correlations of the individual scores to the performance ratings are given in Table VII.

The new weighted score grids were constructed according to the procedure outlined in Chapter III. The new scoring grids are presented in Table VIII. The new scoring grids were then used to

determine new total weighted-trait and weighted-complex scores for
each of the subjects (see Table IX for the normative data of the new
weighted score grids). These new scores were correlated to the per-
formance ranks; these correlations were found to be .44 for the
weighted-trait scores and .23 for the weighted-complex scores. The
correlations of the new weighted-complex scores were found to be
significantly different from the method recommended by I.P.I. at the
.20 level. The difference between the correlations of the new
weighted-trait scores and the method recommended by I.P.I. was
significant at the .02 level.

II. Conclusions

The tests of significance for the new weighted score grids
did not completely verify the hypothesis of this study; nevertheless,
the study was considered successful by the author. The author felt
that the study was successful because of the significance of the
weighted-trait score grid. The lack of success of the new
weighted-complex score grid was not attributed to the statistical
design of this research but to the method of computation of the complex
scores. This conclusion was reached because of: (1) the lack of
significance of weighted-complex scoring grid as compared to the
significance of the weighted-trait scoring grid since the complex scores
were derived from the trait scores, (2) the very low correlations of all
the complex scores to the performance ranks, and (3) the lack of
variety in the normative data for the complex scores in Table VI

TABLE VI

NORMATIVE DATA FOR TRAIT,

COMPLEX, AND D SCORES

TEST SCORE	MEAN	STANDARD DEVIATION	RANGE	PERCENTILES		
				25	50	75
D	7.47	2.51	10	5.67	7.39	9.53
A	3.70	1.67	8	2.31	3.42	4.70
B	4.88	1.68	8	3.50	4.38	6.36
C	6.18	1.76	8	5.00	6.19	7.41
E	4.66	1.42	7	3.65	4.75	5.81
F	4.14	1.97	8	2.36	4.00	5.50
G	5.84	1.20	6	5.00	6.03	6.85
H	3.91	1.87	8	2.40	3.70	5.36
I	6.66	1.34	6	5.50	6.68	7.50
L	5.50	1.69	8	4.50	5.32	6.50
M	6.21	1.93	7	5.13	6.71	7.19
N	4.30	1.56	8	3.50	4.28	5.50
O	5.21	1.75	9	4.13	5.23	6.59
Q1	4.77	1.62	8	3.42	4.61	6.05
Q2	5.18	1.52	9	4.10	5.17	6.30
Q3	5.32	1.37	7	4.55	5.25	6.40
Q4	5.11	1.56	8	3.94	4.92	6.28
Extra-version	4.46	.42	6	3.43	4.29	5.17
Stability	5.48	1.13	6	4.73	5.36	6.29
Anxiety Level	5.55	1.31	7	4.79	5.63	6.50
Leader-ship	5.18	1.11	5	4.50	5.20	6.03
Research-Creative	5.96	1.09	6	5.19	6.06	6.83
Initia-tive-Drive	4.32	1.11	6	3.50	4.20	5.17

TABLE VII

CORRELATIONS OF TRAIT AND COMPLEX

SCORES TO PERFORMANCE RANK

TEST SCORE	CORRELATION
A	.22
B	-.22
C	.13
E	.02
F	-.04
G	-.02
H	-.21
I	.22
L	.02
M	-.04
N	.03
O	.04
Q1	-.24
Q2	-.15
Q3	.02
Q4	.30
Extraversion	-.05
Stability	.02
Anxiety Level	.06
Leadership	-.02
Research-Creative	-.10
Initiative-Drive	-.03

TABLE VIII

WEIGHTED PERSONALITY PROFILE

FOR MACHINE OPERATOR

TRAIT	STANINE									WEIGHT
	1	2	3	4	5	6	7	8	9	
A		2	5	8	11	14	16	18	20	—
B	20	18	16	14	11	8	5	2		—
C		1	3	4	6	7	9	10	12	—
E					1	1	2	2	2	—
F	3	3	2	2	1	1				—
G	2	2	2	1	1					—
H	19	16	14	11	9	6	4	1		—
I		2	5	8	11	14	16	18	20	—
L					1	1	2	2	2	—
M	3	3	2	2	1	1				—
N				1	1	2	2	3	3	—
O		1	1	2	2	3	3	4	4	—
Q1	21	18	15	12	9	6	3	1		—
Q2	13	12	11	10	8	6	4	2		—
Q3					1	1	2	2	2	—
Q4		3	7	11	15	18	21	24	27	—

TOTAL WEIGHTED SCORE   —

COMPLEX	STANINE									WEIGHT
	1	2	3	4	5	6	7	8	9	
Extraversion	5	4	4	3	2	1	1			—
Stability	2	2	2	1	1					—
Anxiety Level		1	2	2	3	4	4	5	6	—
Leadership	2	2	2	1	1					—
Research-Creative	9	8	7	6	5	4	3	2		—
Initiative-Drive	3	3	2	2	1	1				—

TOTAL WEIGHTED SCORE   —

See Appendix C for example of how the weighted score grid is filled out.

TABLE IX

NORMATIVE DATA FOR

MACHINE OPERATOR SCORE GRIDS

	WEIGHTED-TRAIT SCORE GRID	WEIGHTED-COMPLEX SCORE GRID
Mean	93.13	13.04
Standard Deviation	14.38	1.61
Range	69	8
Percentiles		
25	84.42	11.95
75	102.84	14.13

which appear to be random results rather than an occupational
profile.

III. Recommendations

Because of this development concerning the complex scores,
the author has recommended that the method of computing complex scores
should be further investigated. The author has also suggested that
action be taken to seek and find methods for improving the performance
rating system. This was done because of the apparent lack of sensi-
tivity in this instrument as shown by its unusually narrow range of
scores among the subjects. It was felt that the improvement of the
performance rating system and method of computation for the complex
scores would increase the validity and reliability of the predictions
made during the pre-employment testing situation. Future research of
this type should also be done with the use of multiple, curvelinear
correlations in constructing the weighted score grids. This last
step should help to make this method of prediction of job success more
valid statistically.

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APPENDIX

This is a questionnaire of your attitudes—what you do, or how you feel about certain situations. Some people feel one way: other people feel another way. Thus, there are no "right" or "wrong" answers to the questions.

Below are five sample questions which you will answer for practice, and to see that you understand what you are to do in the questionnaire proper. There are three possible answers to each question. You should answer either "Yes" or "No" (or "a" or "c"), by placing an X in the appropriate space. Only mark the middle answer, "b" when it is impossible to say Yes or No. Now answer the questions below:

Put an X in the proper ☐ for your answer

	(a)	(b)	(c)
Do you like out-of-door exercise! (a) Yes; (b) Occasionally; (c) No.	☐	☐	☐
Which would you rather be: (a) A machinist; (b) Uncertain; (c) A salesman	☐	☐	☐
When you sleep, do you dream a good deal! (a) Yes; (b) Sometimes; (c) No.	☐	☐	☐
Do you prefer a person who is: (a) Attentive to people; (b) In between; (c) Cool and aloof to people.	☐	☐	☐
Do you find it hard to carry on a conversation, when the radio is on! (a) Yes; (b) Slightly; (c) No.	☐	☐	☐

On the inside pages, you will find more questions similar to those above. As you answer the questions, keep these rules in mind:

(1) Answer the questions as frankly and truthfully as possible. There is no advantage in giving the wrong impression as to how you feel about these activities. Never give an untrue answer about yourself, because you think it is the "right thing to say."

(2) Answer the questions as rapidly as you can. Do not spend time pondering over the questions. Read each question, and then answer it in the way you feel about it. Put down your first reaction, and then go on to the next question.

(3) Place an X in the "Yes" (or "a") answer or the "No" (or "c") answer for most questions. Only check the middle answer ("b"), when it is impossible to say Yes or No. In some cases, it may be hard for you to make a choice, but do the best you can.

(4) Be sure to answer every question. Some of the questions may not be pertinent to your interests, but answer each question. Do not skip any questions. Your answers will be kept confidential.

Now PRINT your name, group and the date in the boxes on the left margin.

STOP HERE—WAIT FOR SIGNAL

It ever was! (a) Yes; (b) In between; (c) No.

Could you stand living alone, far from anyone else, like a hermit! (a) Yes; (b) Occasionally; (c) No.

If a man said the sky was down and winter was hot, what would he call a criminal! (a) A gangster; (b) A saint; (c) A cloud.

When you see "sloppy," untidy people, do you: (a) Accept it; (b) In between; (c) Feel disgusted and annoyed.

Do you sometimes try too much to be nice to waiters and waitresses! (a) Yes; (b) Occasionally; (c) No.

At a party, do you prefer to let others start telling the jokes and stories! (a) Yes; (b) Sometimes; (c) No.

Do you think people should observe moral laws more strictly! (a) Yes; (b) Sometimes; (c) No.

Are most of the people you know really glad to meet you at a party! (a) Yes; (b) Sometimes; (c) No.

Would you rather exercise by: (a) Fencing and dancing; (b) In between; (c) Boxing and baseball.

Do you smile to yourself at the big differences between what people do and what they say they do! (a) Yes; (b) Occasionally; (c) No.

As a child, did you feel sad to leave home and go to school each day! (a) Yes; (b) Occasionally; (c) No.

What do you do if a remark you make is ignored! (a) Let it go; (b) In between; (c) Repeat it till people catch on.

Do you find that you need to avoid excitement because it wears you out! (a) Yes; (b) Occasionally; (c) No.

If you could, which would you rather play! (a) Chess; (b) In between; (c) Bowling.

When you plan to do something yourself, do you try to do it alone, never getting outside help! (a) Yes; (b) Occasionally; (c) No.

Do you refuse to spend time thinking about "what might have been"! (a) Yes; (b) Sometimes; (c) No.

Are you a person who easily drops worries and responsibilities! (a) Yes; (b) Sometimes; (c) No.

(a) (b) (c)   (a) (b) (c)   (a) (b) (c)   (a) (b) (c)   (a) (b) (c)   (a) (b) (c)

Be sure you have marked an answer to each question, and only one answer.

Have you ever, even for a moment, had hateful feelings
toward your parents? (a) Yes; (b) In between; (c) No. _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Would you take a job where you listen all day to complaints from
employees or customers? (a) Yes; (b) In between; (c) No. _ _ _ _ _ _ _ _ _ _ _ _

Which of the following is the opposite of the opposite
of inexact? (a) Casual; (b) Accurate; (c) Rough. _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

Do you always have plenty of energy at those times when
you most need it? (a) Yes; (b) In between; (c) No. _ _ _ _ _ _ _ _ _ _ _ _

Would you feel embarrassed joining a nudist colony? (a) Yes; (b) In between; (c) No. _ _ _ _

Do you seek large gatherings, like parties or dances? (a) Yes; (b) Sometimes; (c) No. _ _ _ _

Do you think: (a) Some jobs don't need to be done as carefully as others;
(b) In between; (c) Any job should be done thoroughly if you do it at all. _ _ _ _ _ _ _ _ _

When you walk down the street, do you sometimes dislike the
way some people look at you? (a) Yes; (b) In between; (c) No. _ _ _ _ _ _ _ _ _ _ _

Which would you rather be: (a) A bishop; (b) In between; (c) A colonel. _ _ _ _ _ _ _ _ _ _

If a neighbor keeps cheating you over small things, do you feel it is
better to humor him than show him up? (a) Yes; (b) Occasionally; (c) No. _ _ _ _ _ _ _ _

Would you rather see: (a) A good movie on hardy pioneering days; (b) In
between; (c) A clever movie farce or skit on the society of the future. _ _ _ _ _ _ _ _ _

When you have been put in charge of something, do you insist either on
having your own way or resigning? (a) Yes; (b) Sometimes; (c) No. _ _ _ _ _ _ _ _ _

When, in your opinion, someone shows bad manners, do you: (a) Say nothing, because you _
are probably being fussy; (b) In between; (c) Let the person see clearly what you think.

When you are introduced to someone, would you rather: (a) Have a friendly argument
on politics and social views; (b) In between; (c) Have him tell you a few jokes. _ _ _ _

Do you think that it is cruel to vaccinate small children, and that parents should have
the right to ask for vaccination to be put off? (a) Yes; (b) In between; (c) No. _ _ _ _ _

Is it better to believe in: (a) Insurance; (b) In between; (c) Personal skill. _ _ _ _ _ _ _ _

When you are going to catch a train, do you get a little hurried, tense or
anxious, though you know you have enough time? (a) Yes; (b) Sometimes; (c) No. _ _ _ _ _ _

In a factory, would you rather be in charge of: (a) Machines;
(b) In between; (c) Talking to and hiring new people.

Which word does not belong with the other two? (a) Cat; (b) Near; (c) Sun.

Is your health a bit uncertain, sometimes forcing you unexpectedly
to alter your plans? (a) Yes; (b) Occasionally; (c) No.

Would you enjoy being waited on by personal servants? (a) Yes; (b) Sometimes; (c) No.

Do you feel awkward in company, so that you never seem to "show up"
as well as you should? (a) Yes; (b) Occasionally; (c) No.

If you had more than enough income for your daily needs, should you give much of the
rest to your Church or some such worthwhile cause? (a) Yes; (b) In between; (c) No.

Do you sometimes get so angry that you think it best not
to try to say anything? (a) Yes; (b) In between; (c) No.

Can you do hard physical work without getting worn out as
soon as most other people? (a) Yes; (b) Sometimes; (c) No.

Do you think that even when it becomes embarrassing, most
witnesses tell the truth? (a) Yes; (b) In between; (c) No.

Do you find it helpful to pace up and down when you think? (a) Yes; (b) Sometimes; (c) No.

Do you think this country would be better to spend
more on: (a) Armaments; (b) In between; (c) Education.

Would you rather spend an evening: (a) In a hard game of cards;
(b) In between; (c) Looking at photos of past vacations.

Would you rather read: (a) A good historical novel; (b) In between;
(c) An essay by a scientist on harnessing world resources.

Are you really sure that there are more nice people than foolish
people in the world? (a) Yes; (b) In between; (c) No.

Are you more planful and energetic than other successful people
in getting your work done? (a) Yes; (b) Occasionally; (c) No.

Are there times when you do not feel in a mood to see anyone?
(a) Very rarely; (b) In between; (c) Quite often.

find it easy to do? (a) Yes; (b) Sometimes; (c) No.

Would you rather be: (a) In a business office organizing people; _ _ _ _ _ _ _ _ _ _ _ _
(b) In between; (c) An architect, drawing plans of buildings.

Black is to gray, as pain is to: (a) Wound; (b) Illness; (c) Discomfort. – – – – – – – – – – –

Are you always a sound sleeper, who does not walk or talk in his sleep? (a) Yes; (b) In between; (c) No.

Can you, if necessary, lie to a stranger and keep a straight face? (a) Yes; (b) Occasionally; (c) No. –

Have you ever been active in organizing a club, team, or social group? (a) Yes; (b) Occasionally; (c) No.

Do you admire more: (a) A clever but undependable person; (b) In _ _ _ _ _ _ _ _ _ _ _ _
between; (c) An average person with will-power to resist temptations.

When you make a just complaint, do you always get satisfaction? (a) Yes; (b) Sometimes; (c) No. –

Are you brought near to tears by discouraging circumstances? (a) Yes; (b) Occasionally; (c) No. – –

Do you think that many foreign countries are actually more _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
friendly than we suppose? (a) Yes; (b) Sometimes; (c) No.

Are there times every day, when you like to enjoy your own thoughts, _ _ _ _ _ _ _ _ _ _ _
away from other people? (a) Yes; (b) In between; (c) No.

Do you sometimes get exasperated with small rules and restrictions which, _ _ _ _ _ _ _ _ _
in calmer moments, you approve of? (a) Yes; (b) In between; (c) No.

Do you think that much modern, so-called "progressive" education, is not as good as the _ _
old common sense idea of "spare the rod and spoil the child"? (a) Yes; (b) Sometimes; (c) No.

Did you learn more in school by: (a) Going to class; (b) In between; (c) Reading a book. – – – –

Do you avoid getting involved in social responsibilities? (a) Yes; (b) Sometimes; (c) No. – – –

When a problem gets too hard and there is a lot to do, do you try? (a) A _ _ _ _ _ _ _ _
different problem; (b) In between; (c) Another approach to the same problem.

Do you get strong emotional moods, for example, anxiety, laughter, anger, _ _ _ _ _ _ _ _ _
etc., from small happenings? (a) Yes; (b) Occasionally; (c) No.

Does your mind fail to work as well at some times, as at others? (a) Yes; (b) In between; (c) No. —

Do you oblige people by keeping appointments at times
convenient to them? (a) Yes; (b) Sometimes; (c) No. — — — — — — — — — — — — — — — —

If Mary's mother is Fred's father's sister, what relation is
Fred to Mary's father? (a) Cousin; (b) Nephew; (c) Uncle. — — — — — — — — — — — — — —

Do you feel critical of many people's work? (a) Yes; (b) Occasionally; (c) No. — — — — — — — —

Are you annoyed by people who say they can do things
better than others? (a) Yes; (b) Occasionally; (c) No. — — — — — — — — — — — — — — —

Do you just love to travel almost anytime? (a) Yes; (b) Occasionally; (c) No. — — — — — — — — —

Have you ever come near fainting at a sudden pain or
at the sight of blood? (a) Yes; (b) In between; (c) No. — — — — — — — — — — — — — — —

Do you spend much time in talking to people on local problems? (a) Yes; (b) Sometimes; (c) No.—

Would you rather be: (a) An engineer; (b) In between; (c) A teacher of social theories. — — — —

Do you often have to hold yourself back from trying to straighten
out other people's problems? (a) Yes; (b) Sometimes; (c) No. — — — — — — — — — — — —

How many of your neighbors do you find boring to talk to?
(a) Most of them; (b) In between; (c) Practically none. — — — — — — — — — — — — — —

If there is propaganda hidden in your reading, are you apt not to notice
it unless someone points it out? (a) Yes; (b) Occasionally; (c) No. — — — — — — — — — —

Do you think that every story should point to a moral? (a) Yes; (b) Sometimes; (c) No. — — — —

Does more trouble arise from people: (a) Changing and meddling with methods that
are already O.K.; (b) In between; (c) Turning down new, up-to-date methods. — — — — — —

Do you sometimes hesitate to use your own ideas because
they seem impractical? (a) Yes; (b) In between; (c) No. — — — — — — — — — — — — — —

Do some prim people seem embarrassed when they see you coming? (a) Yes; (b) Sometimes; (c) No. —

Can you depend on your memory not to let you down, even on details? (a) Yes; (b) Sometimes; (c) No.

Are you sometimes less considerate of other people than they are of you? (a) Yes; (b) Occasionally; (c) No.

Are you slow to say what you feel like saying, as compared to other people? (a) Yes; (b) Sometimes; (c) No.

If the two hands on a watch come together exactly every 65 minutes, the watch is running: (a) Slow; (b) On time; (c) Fast.

Do you get impatient to the point of fury when someone delays you? (a) Yes; (b) Occasionally; (c) No.

Do people say you are a person who will have his own way? (a) Yes; (b) Occasionally; (c) No.

Are you slow to complain if you are not given the right material to work with? (a) Yes; (b) Sometimes; (c) No.

At home, do you: (a) Use spare time chatting and relaxing; (b) In between; (c) Plan to fill it with special jobs.

Are you shy and careful in making friendships with new people? (a) Yes; (b) Occasionally; (c) No.

Do you think that what people try to say in poetry could be put just as well in plain English? (a) Yes; (b) Sometimes; (c) No.

Do you suspect that people who seem friendly to you are sometimes disloyal behind your back? (a) Yes; (b) Occasionally; (c) No.

Do even the most dramatic of your experiences during the year generally leave your personality much the same? (a) Yes; (b) Sometimes; (c) No.

Do you talk slowly? (a) Yes; (b) Sometimes; (c) No.

Do you have almost uncontrollable fears or distastes for some things, for example, an animal, a particular place, etc.? (a) Yes; (b) Sometimes; (c) No.

In a group, would you rather be the person who: (a) Works on technical advances; (b) In between; (c) Keeps the records and sees that rules are followed.

To decide how to vote on some social issue, would you read: (a) A well reviewed, intelligent novel about it; (b) In between; (c) A textbook listing statistical and other facts.

Do you have dreams at night that are quite fantastic? (a) Yes; (b) Occasionally; (c) No.

If you are left in a house absolutely alone for some time, do you tend to get a little anxious? (a) Yes; (b) Sometimes; (c) No.

This *PERFORMANCE* form is an instrument to assist you in evaluating the job performance or efficiency of your employees. It has been designed to provide an organized and systematic procedure, which sets up common standards of judgment which all supervisors can apply uniformly and without bias.

The procedure that you will follow is to rate each of your employees on appropriate *Performance* forms, by answering 60 specific statements pertinent to their job performance. This results in an accurate picture of each employee's overall efficiency in relation to other workers on this job, and also an objective statement of his specific strengths, weaknesses and potential. Thus it is very important that you:

GIVE YOUR CAREFUL AND THOUGHTFUL ATTENTION. Evaluating employee performance is a serious responsibility. A worker's future is greatly influenced by your evaluation. Performance results play a definite part in decisions on job placement, training, promotion, transfer, termination, grievances, assignment of job duties, salary adjustment, employee development.

BE FAIR, OBJECTIVE AND IMPARTIAL. Stick to facts and concrete instances of employee behavior. Disregard your own and others' bias or favoritism about an employee. Consider his day-in, day-out performance over the past months. Do not concentrate on recent experiences, or outstanding examples of good or poor performance. Make use of records on the employee, where applicable.

You should be his immediate supervisor. Should you not know the employee well enough (at least 3 months on this job) do not attempt to rate him; and indicate this in the space provided below.

BE A STRICT JUDGE. Give a favorable answer to a statement only when the employee has merited it. All employees have some favorable traits, and some in which they need improvement. No employee is perfect, nor is anyone lacking in some good qualities. Forget about giving your employees a "break." Evaluate them strictly and objectively. Give them the chance to improve their ratings six months from now.

Your rating results will be checked against standards set up from other supervisors' ratings. Thus if you tend to bias your rating, it will show up in these checks. Also your rating results will be reviewed by your superior and by management in relation to other supervisors, and you may discuss his rating with each employee.

ANSWER EACH STATEMENT INDEPENDENTLY OF OTHER STATEMENTS. Every statement asks about a different aspect of job performance. Answer each statement without regard to your previous answers. Do not spend too much time on any one statement.

There is overlapping between some of the statements, in order to sample various aspects of such performance traits as quantity, quality, job knowledge, etc. However, if you answer all statements factually, you should have no difficulty in being consistent.

ANSWER THE STATEMENTS FOR THE EMPLOYEE'S PRESENT JOB. Rate this employee, not his job importance. Personnel in "better" jobs are not, by definition, better workers. Read the description of this employee's job. Then answer the statements about his performance on these duties.

Disregard length of service, age, education and other factors, which do not directly relate to the employee's job performance. Consider how the employee is actually performing on this job, not his ability or what he might do.

This questionnaire has been constructed so that all statements apply to jobs in this job family. Be sure you answer EVERY statement about every employee.

	YES	NO
Is employee's job title and months on present job correct?...............	☐	☐
Do you know this employee well enough to evaluate his performance?...	☐	☐

Signed_____Title_____

1

Directions: If statement is *"Yes or True"* for this employee, mark an ⊠ in that box. If it is *"Not True at present,"* mark an ⊠ in that box. Be strict in your rating.

1. Turns out work of exceptionally high quality.......................... ☐ ☐
2. Volume of work should be greater................................ ☐ ☐
3. Handles his tools and equipment very skillfully........................ ☐ ☐
4. Is an exceptionally fast worker................................. ☐ ☐
5. Overall job performance does not meet desired standards in every respect.. ☐ ☐
6. Is making unusual effort to get ahead............................ ☐ ☐
7. Makes some obvious mistakes in performing his job.................. ☐ ☐
8. Exceptionally punctual in observing work hours, rest periods, lunch hours, etc... ☐ ☐
9. Needs more time on this job to do difficult phases well................. ☐ ☐
10. Does only what is required of him............................... ☐ ☐

11. Occasionally his efficiency drops toward the end of the day............. ☐ ☐
12. Should take greater pride in his work............................ ☐ ☐
13. I would be surprised if his work did not pass inspection.............. ☐ ☐
14. I would replace him with another worker (if possible) .... ☐ ☐
15. He should be producing more.................................. ☐ ☐
16. "Catches on" very rapidly—detailed instructions not required........... ☐ ☐
17. Actually goes out of his way to be pleasant with everyone............... ☐ ☐
18. Has made noticeable progress in the last six months................. ☐ ☐
19. His quality sometimes suffers, when he works rapidly.................. ☐ ☐
20. One of my best workers....................................... ☐ ☐

21. Should meet job specifications more regularly........................ ☐ ☐
22. Consistently does an excellent job............................... ☐ ☐
23. Should adapt more readily to changes in tools, methods, design, etc......... ☐ ☐
24. Production is well above average................................. ☐ ☐
25. Selected for special jobs requiring high quality workmanship............. ☐ ☐
26. Needs further training on this job............................... ☐ ☐
27. Follows safety rules and regulations without exception................. ☐ ☐
28. Tends to make waste motions in doing his work...................... ☐ ☐
29. Is an extremely thorough worker................................. ☐ ☐
30. Is completely satisfied with every phase of his job.................... ☐ ☐

	YES or TRUE	Not TRUE at present
31. At times must be told to do things that are routine part of assignment.......	☐	☐
32. He stands out as a top producer in this type of work..................	☐	☐
33. Has suggested shortcuts or improvements for doing a job...............	☐	☐
34. Has more rejects than he should..............................	☐	☐
35. Able to handle more than this one job at his present level..............	☐	☐
36. Would not recommend for promotion at this time....................	☐	☐
37. Has trouble meeting production schedules........................	☐	☐
38. An exceptionally steady and reliable worker......................	☐	☐
39. At times his work has to be done over..........................	☐	☐
40. Frequently given "special" jobs to do..........................	☐	☐
41. Is only average in his total job efficiency.......................	☐	☐
42. Does more work than I expect of him...........................	☐	☐
43. Certain phases of his work should be done with more care...............	☐	☐
44. Output is appreciably higher than required by standards................	☐	☐
45. Makes occasional mistakes in performing his job....................	☐	☐
46. Should work more rapidly.................................	☐	☐
47. Perfect attendance in last six months..........................	☐	☐
48. Certain phases of the job are still "over his head"....................	☐	☐
49. Quality of work can be completely trusted........................	☐	☐
50. Does not take suggestions or corrections well at all times..............	☐	☐
51. Turns out unusually large volume of work........................	☐	☐
52. Has to be corrected a "second time" for the same mistake..............	☐	☐
53. During layoff, would be among last on this job to be let go (if possible)	☐	☐
54. At times makes decisions which should be referred to supervisor...........	☐	☐
55. Needs to be prodded on occasion.............................	☐	☐
56. An excellent craftsman in his work............................	☐	☐
57. Tends to "take things easy" without some supervision.................	☐	☐
58. Could handle tools and equipment with more care...................	☐	☐
59. Has practically no spoilage................................	☐	☐
60. I rarely pick him to do rush jobs.............................	☐	☐

Be sure you have marked every statement

EMPLOYEE LAST NAME-INITIAL   JOB TITLE   FORM   PRESENT RATING   LAST RATING   MONTHS ON JOB   YEARS WITH CO.   AGE   PRESENT SALARY IN RATE RANGE   PROPOSED SALARY   APPROVED CHANGE   RECORDS REVIEW   FINAL RATING

(A)   (B)   (C)   (D)   (E)

PERFORMANCE TRAITS	TRAIT SCORES			COMPANY RECORDS	COMMENTS—NOTES (in Step 7)	DISCUSSION WITH EMPLOYEE (in Step 9)
P *Production:* quantity of work volume, output, speed of work meeting production schedules, etc	Below 0-7 ☐	Average 8-21 ☐	Above 22-27 ☐	AGREE ☐		
Q *Quality:* few mistakes, lack of spoilage or rejects, accuracy, good workmanship, thoroughness, etc.	Below 0-8 ☐	Average 9-23 ☐	Above 24-29 ☐	☐		
K *Job Knowledge:* grasp of work and methods, special jobs, adaptability, skill with tools, supervision required, etc.	Below 0-6 ☐	Average 7-18 ☐	Above 19-23 ☐	☐		
H *Personal-Work Habits:* initiative, attendance and punctuality, dependability, safety, care of equipment, friendliness, attitude, health.	Below 0-5 ☐	Average 6-17 ☐	Above 18-21 ☐	☐		
O *Overall:* general competence, progress, promotability, future in company, etc.	Below 0-4 ☐	Average 5-12 ☐	Above 13-15 ☐	☐		

BIAS STATEMENTS *(check if answered according to key)* ☐ ; ☐ ; ☐ .   CONFLICT STATEMENTS *(check if agree):* ☐ ; ☐ ; ☐ ; ☐ ; ☐

STATUS OF EMPLOYEE AND RECOMMENDATIONS

EMPLOYEE PROGRESS	JOB PLACEMENT	TRAINING	SALARY

APPENDIX C

COMPLETION OF THE WEIGHTED SCORE GRIDS

AS COMPUTED FOR THE AVERAGE MACHINE OPERATOR

TRAIT	STANINE									WEIGHT
	1	2	3	4	5	6	7	8	9	
A		2	5	(8)	11	14	16	18	20	8
B	20	18	16	14	(11)	8	5	2		11
C		1	3	4	6	(7)	9	10	12	7
E					(1)	1	2	2	2	1
F	3	3	2	(2)	1	1				2
G	2	2	2	1	1	(X)				0
H	19	16	14	(11)	9	6	4	1		11
I		2	5	8	11	14	(16)	18	20	16
L					1	(1)	2	2	2	1
M	3	3	2	2	1	(1)				1
N				(1)	1	2	2	3	3	1
O		1	1	2	(2)	3	3	4	4	2
Q1	21	18	15	12	(9)	6	3	1		9
Q2	13	12	11	10	(8)	6	4	2		8
Q3					(1)	1	2	2	2	1
Q4		3	7	11	(15)	18	21	24	27	15

TOTAL WEIGHTED SCORE 94

COMPLEX	STANINE									WEIGHT
	1	2	3	4	5	6	7	8	9	
Extraversion	5	4	4	(3)	2	1	1			3
Stability	2	2	2	1	(1)					1
Anxiety Level		1	2	2	3	(4)	4	5	6	4
Leadership	2	2	2	1	(1)					1
Research- Creative	9	8	7	6	5	(4)	3	2		4
Initiative- Drive	3	3	2	(2)	1	1				2

TOTAL WEIGHTED SCORE 15