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For the past five decades, business and industry have used psycho-
logical tests as a method of improving employee selection and placement.
These tests include those designed to measure such entities as intelli-
gence, aptitude, interest, and personality (Chruden, H. J., and Sherman,
A. W. Jr., 1963).

The present study is an investigation of the Edwards Personal Pre-
ference Schedule (EPPS) as a tool for employee selection and placement.
The EPPS measures the relative strength of the following fifteen needs:
achievement, deference, order, exhibition, autonomy, affiliation, intra-
ception, succorance, dominance, abasement, nurturance, change, endurance,
heterosexuality and aggression. A statement representing each of the
fifteen traits is paired twice with statements representative of each of
the other fourteen traits in a paired comparison, forced choice techni-
que.

If the EPPS is to be of help in employee selection it should diff-
erentiate between different groups of employees. Most of the research
on the EPPS (Taylor, 1957; Dunnette, 1960; and Gray, 1963) has shown
that people in different occupations do differ on several of the EPPS
traits.

The present study asks three questions concerning the EPPS score differences. 1. Do the shapes of the profiles for six job classifications (salesmen, manager trainees, foremen, assistant foremen, personnel staff managers, and technical staff managers) in the same company differ? 2. If so, which traits are responsible for the differences in profile shapes? 3. What is the typical profile for each group?

The subjects in the present study were two hundred thirty-one male salaried employees of a medium sized southern textile firm.

The subjects were administered the EPPS either at the time they applied for a job or when they were being considered for a promotion.

The following results were obtained:

1. The profile shapes of the six groups did differ. Personnel staff managers differed most from the other groups in profile shape. Manager trainees and technical staff managers had the most similarly shaped profiles.

2. The traits responsible for the differences in shape were: deference, order, intraception, abasement, endurance, and heterosexuality.

3. A typical profile for each of the six groups was described.

A COMPARISON OF PERSONALITY PROFILES

OF EMPLOYEES IN SELECTED

JOB CLASSIFICATIONS IN

A TEXTILE COMPANY

by

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APPROVAL PAGE

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Introduction

For the past five decades business and industry have used psychological tests as a method of improving employee selection and placement with the belief that employee efficiency can be improved and turnover reduced by employing persons with the best psychological characteristics for the job. Included in the psychological characteristics considered are intelligence, interest, aptitude, and personality. It is presently conceded that a person's personality characteristics are as important in job performance as are the other characteristics. Just as a person may fail in his job because of a lack of knowledge or interest, he also may fail because of his personality traits. Tiffin and McCormick (1956) state, "Various investigations have shown that personality and adjustment factors are responsible for the ineffectiveness of job performance of many people, rather than lack of relevant aptitudes or technical competence."

Personality traits are also important in job satisfaction. Schaffer (Schaffer (1956) found that the job satisfaction of an employee may be predicted from the amount of need satisfaction which he receives from his job. People tend to choose those jobs which they believe have the most likelihood of satisfying their needs. This was pointed out by Siegelman and Peck (1960). They found that persons in occupations having different job-role requirements (chemists, ministers, and military officers) have different personality patterns.

Since personality characteristics appear to be important in employee satisfaction and performance, many businesses administer personality inventories to their prospective employees. One widely used personality inventory is the Edwards Personal Preference Schedule (EPPS). The EPPS was first standardized using college students and later using the general adult population. It is one of the few personality "tests" designed to be used with the general population rather than in mental institutions.

There have been a number of studies showing that people in different occupations have different profiles on the EPPS. Taylor (1957) found that upper-class students in accounting, marketing, and management differed significantly from each other and from the general college norm on several of the fifteen scales. Gray (1963) found that teachers differed significantly from both accountants and mechanical engineers on some of the fifteen scales, but found no significant differences between accountants and mechanical engineers.

The EPPS has also revealed trait or need differences within the same occupation. Dunnette and Kirchner (1960) compared two types of salesmen from the same company. They found that those salesmen who called mainly on retail outlets scored higher on the order scale and lower on the affiliation scale of the EPPS than those salesmen who called mainly on warehouses and industry.

There is also evidence that the EPPS differentiates between successful and unsuccessful employees. Rawls and Rawls (1968) compared successful and unsuccessful executives and found several significant differences.

Successful executives scored higher on the dominance, heterosexuality, and aggression scales and lower on the deference and order scales of the EPPS than did unsuccessful executives.

The above research indicates that the EPPS can be a helpful tool in employee selection and placement. However, the above studies show only that the groups studied differ on some of the fifteen scales. If the EPPS is to be a helpful tool in employee selection and placement, three questions need to be asked.

1. Do the EPPS profile shapes of different groups differ?

2. If so, on which traits do the groups differ?

3. What is the typical profile for each group?

Most previous research has not considered the first question and asked only the second. They only tested for differences on a trait by trait basis. The researchers seemed to assume that if two groups differ on one or two traits they will naturally have different profiles. Although it may be true that two groups which differ on one or two traits may have different profile shapes, it is also possible that the shapes of the profiles will not differ.

Most of the previous research also has failed to consider the third question; "What is the typical profile for the group?" The only attempts made to define typical profiles has been to describe the manner in which groups differed from each other. However, describing how a group differs from other groups does not describe the profile of the group, nor does it allow for a comparison of that group with groups not included in the same study. For example, if salesmen scored significantly higher on dominance than did accountants, and a prospective employee also scored high on dominance, the EPPS scores would be of little help to a personnel manager in determining profile similiarity.

In order to determine if the profile of the prospective employee is the same as that of salesmen, the personnel manager would have to ask two additional questions: 1. How high did salesmen score on dominance? 2. How did the salesmen's score on dominance compare with their scores on other traits? With the answers to these two questions and a knowledge of the prospective employee's profile, the personnel manager would be able to determine if the profile of the prospective employee was more similar to that of salesmen, accountants, or a third occupation.

Taylor's (1957) study was an attempt to describe a group's typical profile. After finding significant group differences in EPPS trait scores he compared the group's scores to the college norm. The ways in which a group's scores differed from the college norm was considered to be the group's typical profile. Taylor's approach is in the correct direction but falls short of identifying a typical profile. It only describes how the profiles differ from the norm; not what the profile is.

The present study attempts to answer all three of the following questions:

1. Do the shapes of the EPPS profiles for six job classifications (salesmen, manager trainees, foremen, assistant foremen, personnel staff managers, and technical staff managers) in the same company differ?

2. If so, which traits are responsible for the differences in shape? On which traits do the groups differ?

3. What are the typical profiles for the different groups?

METHOD

Instrument of Study

The instrument of study used in the present investigation was the EPPS. The EPPS measures the relative strength of the following fifteen needs or traits: achievement, deference, order, exhibition, autonomy, affiliation, intraception, succorance, dominance, abasement, nurturance, change, endurance, heterosexuality, and aggression. See Appendix A for definitions of these traits.

Statements representative of each of the fifteen EPPS traits are paired twice with statements representative of each of the other four-teen traits. The subject is to choose one statement from each pair which he believes best exemplifies him. The number of times a subject chooses statements representative of a particular trait is his score on that particular trait.

Subjects

The subjects were two hundred thirty-one male salaried employees of a medium-sized southern textile firm. There were forty-four salesmen, twenty-nine manager trainees, nineteen foremen, sixty-three assistant foremen, seventeen personnel staff managers, and fifty-nine technical staff managers. The salesmen called mainly on retail outlets. The manager trainees were hired for future positions in management and at the time of the study were in trainee status. The foremen and assistant foremen were production department heads. The personnel staff managers included persons in personnel administration. The technical staff managers

included accountants and other persons in technical fields at the staff
level. A personnel official of the company helped in the classification
of the employees.

Procedure

The EPPS was administered as part of a battery of tests to the sub-
jects either at the time they applied for a job or when they were being
considered for a promotion. All subjects understood that the test re-
sults would be considered by management in deciding whether or not the
subjects were hired or promoted.

Each individual's EPPS scores, along with the age to the nearest year
and the last year of formal education finished, were obtained from the
personnel files of the company. The means and standard deviations of
each group's scores, age, and education level are listed in Appendix B.

Although the groups differed on both age and education levels,
neither of these factors was significantly correlated with the EPPS scores
(See Appendix C).

RESULTS

The EPPS scores were analyzed using a two factorial repeated measures design proposed by Greenhouse and Geiser (1959). The results (Table 1) indicate a statistically significant difference for the trait main effect and a statistically significant group-trait (Shape) interaction (P<.01). No other significant differences were found.

Differences Between Groups

A simple effects analysis (Winer, 1962) was made to determine which traits were responsbile for the interaction effect. The groups were found to differ in level on the following traits: deference, order, intraception, abasement, endurance, and heterosexuality (Table 2).

A post-hoc analysis was performed to determine how the groups compared on each of the above traits. Group differences within traits are summarized in Tables 3-8. Where the reference group is lower on a trait than the other groups is shown by "L". "H" shows where the reference group is higher on a trait than are the other groups. (See Appendix D, Tables 38-43 for the ordered means and more detailed tables.

Salesmen (Table 3). Salesmen scored lower on order than did all other groups except personnel staff managers. Other differences between salesmen and the remaining groups are found in the discussions of foremen, assistant foremen, and personnel staff managers.

Manager Trainees (Table 4). A comparison of manager trainees and technical staff managers revealed no significant differences on any of the fifteen scales. Differences which were found between manager trainees and the other groups will be included in the discussions of the appropriate groups.

TABLE 1

ANALYSIS OF TRAIT SCORES AND GROUPS

Source of Variation	SS	df	MS	F
Between Ss	3.13	223		
A (groups)	0.00	5	0.00	0.00
Ss within groups	3.06	218	0.01	--
Within Ss	97577.00	3136		
B (traits)	27657.77	14	1975.56	105.08**
AB (shape)	5088.78	70	72.70	3.87**
B X Ss within groups	57344.04	3052	18.80	--
Total	97580.60	3359		

** = P<.01

Note: Because of the nature of the Method of Unweighted Means, the sums of squares of the component parts of the Within Ss do not sum to equal the Within Ss sums of squares.

TABLE 2

ANALYSIS OF SIMPLE EFFECTS FOR GROUPS WITHIN TRAITS

Source of Variation	S S	DF	MS	F
Groups + Groups X Traits	5088.78	75		
Groups for Achievement	53.05	5	10.57	.60
Groups for Deference	377.33	5	75.47	4.30**
Groups for Order	579.94	5	115.95	6.61**
Groups for Exhibition	200.37	5	40.15	2.29
Groups for Autonomy	264.07	5	52.81	3.01
Groups for Affiliation	170.39	5	34.08	1.94
Groups for Intraception	356.36	5	71.27	4.06**
Groups for Succorance	134.29	5	26.86	1.53
Groups for Dominance	191.79	5	38.36	2.19
Groups for Abasement	830.27	5	166.05	9.47**
Groups for Nurturance	259.66	5	51.93	2.96
Groups for Chance	201.57	5	40.31	2.29
Groups for Endurance	423.64	5	84.72	4.83**
Groups for Heterosexuality	984.15	5	196.83	11.22**
Groups for Aggression	61.65	5	12.33	.70

** = P<.01

TABLE 3

COMPARISON OF SALESMEN WITH OTHER GROUPS

	Ach	Def	Ord	Exh	Aut	Aff	Int	Suc	Dom	Aba	Nur	Chg	End	Het	Agg
MT			L												
F		L	L											H	
AF		L	L					L						H	
PSM						L				H			H		
TSM			L												

TABLE 4

COMPARISON OF MANAGER TRAINEES WITH OTHER GROUPS

	Ach	Def	Ord	Exh	Aut	Aff	Int	Suc	Dom	Aba	Nur	Chg	End	Het	Agg
S			H												
F		L												H	
AF		L						L						H	
PSM			H			L				H			H		
TSM															

TABLE 5

COMPARISON OF FOREMEN WITH OTHER GROUPS

	Ach	Def	Ord	Exh	Aut	Aff	Int	Suc	Dom	Aba	Nur	Chg	End	Het	Agg
S		H	H												L
MT		H													L
AF															L
PSM		H	H											H	L
TSM		H													L

TABLE 6

COMPARISON OF ASSISTANT FOREMEN WITH OTHER GROUPS

	Ach	Def	Ord	Exh	Aut	Aff	Int	Suc	Dom	Aba	Nur	Chg	End	Het	Agg
S		H	H							H					L
MT		H								H					L
F															H
PSM		H	H							H				H	L
TSM										H					L

TABLE 7

COMPARISON OF PERSONNEL STAFF MANAGERS WITH OTHER GROUPS

	Ach	Def	Ord	Exh	Aut	Aff	Int	Suc	Dom	Aba	Nur	Chg	End	Het	Agg
S							H			L			L		
MT		L					H			L			L		
F	L	L								L			L	H	
AF	L	L								L			L	H	
TSM		L					H			L			L		

TABLE 8

COMPARISON OF TECHNICAL STAFF MANAGERS WITH OTHER GROUPS

	Ach	Def	Ord	Exh	Aut	Aff	Int	Suc	Dom	Aba	Nur	Chg	End	Het	Agg
S		H													
MT															
F		L												H	
AF									L					H	
PSM		H						L	H			H			

Note: (L) = Reference trait lower than compared traits.
        (H) = Reference trait higher than compared traits.

Foremen and Assistant Foremen (Tables 5 and 6). Only one difference between foremen and assistant foremen was found. Foremen scored lower on heterosexuality than did assistant foremen. Both foremen and assistant foremen, with one exception, were higher on deference and lower on heterosexuality than were the other four groups. The exception was that assistant foremen and technical staff managers did not differ statistically on deference.

Personnel Staff Managers (Table 7). The following differences were found between personnel staff managers and the other five groups:

1. Personnel staff managers scored significantly lower on order than did all other groups except salesmen.

2. Personnel staff managers scored significantly lower on abasement and endurance than did all other groups.

3. Personnel staff managers scored higher on intraception than did all groups except foremen and assistant foremen.

Technical Staff Managers (Table 8). The differences between technical staff managers and the other five groups were described in the above discussions. However, to reiterate, the main difference was between technical staff managers and personnel staff managers.

Distance Function. The distance function 'D' was calculated for each pair of profiles to see which profiles were most similar (Nunnally, 1967). The results (Table 9) indicate that the profiles of manager trainees and technical staff managers were the most similar. The profiles of foremen and personnel staff managers were the least similar in shape. For other specific comparisons of profile similarity see Table 9.

TABLE 9

DISTANCES BETWEEN GROUPS IN ASSENDING ORDER

Names of Compared Groups	Distance Function (D)
1 - Manager trainees - Technical staff managers	2.83
2 - Salesmen - Manager trainees	4.67
3 - Foremen - Assistant foremen	5.10
4 - Assistant foremen - Technical staff managers	5.52
5 - Salesmen - Technical staff managers	5.98
6 - Salesmen - Personnel staff managers	6.10
7 - Foremen - Technical staff managers	7.73
8 - Manager trainees - assistant foremen	7.79
9 - Manager trainees - Personnel staff managers	8.40
10- Personnel staff managers - Technical staff managers	9.07
11- Manager trainees - Foremen	9.62
12- Salesmen - Assistant foremen	9.72
13- Salesmen - Foremen	10.81
14- Assistant foremen - Personnel staff managers	12.33
15- Foremen - Personnel staff managers	13.06

Differences Between Traits

The simple effects analysis also revealed significant intra-trait differences for each group (P .01). Table 10 shows the analysis. Tables 11-25 show how each trait compared to all other traits for each group. (See Tables 44-48 in Appendix D for further analysis of these differences).

The highest scores for all groups except personnel staff managers were on dominance, achievement, and endurance. Personnel staff managers' highest scores were on dominance, achievement, and intraception.

Generally, there were no statistically significant differences between achievement, dominance, and endurance (Tables 11, 19, and 23 respectively). The following exceptions were noted:

1. Salesmen scored higher on dominance than on achievement and endurance.

2. Personnel staff managers scored higher on dominance than on endurance.

The six groups generally scored significantly higher on the dominance scale than on all other scales except achievement and endurance (Table 19). There is one exception to this statement: There were no statistical differences between dominance and intraception for foremen, assistant foremen, or personnel staff managers.

Endurance was generally higher than all other traits except achievement and dominance for all groups except personnel staff managers (Table 23). The following exceptions were found:

TABLE 10

ANALYSIS OF SIMPLE EFFECTS FOR TRAITS WITHIN GROUPS

Source of Variation	SS	DF	MS	F
Traits + Groups X Traits	32746.55	84		
Traits for Salesmen	5597.18	14	399.80	21.27**
Traits for Manager Trainees	4964.03	14	354.57	18.86**
Traits for Foremen	5808.58	14	414.90	22.07**
Traits for Assistant Foremen	4736.83	14	338.35	18.00**
Traits for Personnel Staff Managers	6892.59	14	492.33	26.18**
Traits for Technical Staff Managers	4747.21	14	339.09	18.75**

** = P<.01

TABLE 11

COMPARISON OF ACHIEVEMENT WITH OTHER TRAITS

	S	MT	F	AF	PSM	TSM
Def	H	H			H	H
Ord	H	H			H	H
Exh		H	H	H		H
Aut	H	H	H	H	H	H
Aff		H		H		H
Int	H					H
Suc	H	H	H	H	H	H
Dom	L					
Aba	H	H		H	H	H
Nur	H	H		H	H	H
Chg		H		H		H
End						
Het	H	H	H	H		H
Agg	H	H	H	H	H	H

TABLE 12

COMPARISON OF DEFERENCE WITH OTHER TRAITS

	S	MT	F	AF	PSM	TSM
Ach	L	L			L	L
Ord						
Exh						
Aut			H	H		H
Aff				H		
Int					L	
Suc	H	H	H	H	H	H
Dom	L	L		L	L	L
Aba				H		
Nur						H
Chg	L					
End	L	L		L		L
Het			H	H		
Agg			H	H		H

TABLE 13

COMPARISON OF ORDER WITH OTHER TRAITS

	S	MT	F	AF	PSM	TSM
Ach	L	L			L	L
Def						
Exh	L			H		
Aut			H	H		H
Aff	L			H		
Int	L				L	
Suc	H	H	H	H	H	H
Dom	L	L	L	L	L	L
Aba						H
Nur						H
Chg	L					
End	L	L	L	L		L
Het	L		H	H		
Agg				H		H

TABLE 14

COMPARISON OF EXHIBITION WITH OTHER TRAITS

	S	MT	F	AF	PSM	TSM
Ach		L	L	L		L
Def						
Ord	H			L		
Aut	H			H		H
Aff						
Int				L		
Suc	H	H		H	H	H
Dom	L	L	L	L	L	L
Aba	H				H	
Nur	H					
Chg						
End		L	L	L		L
Het						
Agg	H			H		

TABLE 15

COMPARISON OF AUTOMONY WITH OTHER TRAITS

	S	MT	F	AF	PSM	TSM
Ach	L	L	L	L	L	L
Def			L	L		L
Ord			L	L		L
Exh	L		L			L
Aff	L		L			L
Int	L	L	L	L	L	L
Suc	H				H	H
Dom	L	L	L	L	L	L
Aba			L	L	H	
Nur			L	L		
Chg	L	L	L	L		L
End	L	L	L	L		L
Het	L	L				L
Agg						

TABLE 16

COMPARISON OF AFFILIATION WITH OTHER TRAITS

	S	MT	F	AF	PSM	TSM
Ach		L		L		L
Def				L		
Ord	H			L		
Exh						
Aut	H		H			H
Int				L		L
Suc	H	H	H	H	H	H
Dom	L	L	L	L	L	L
Aba	H			H		
Nur	H					
Chg						
End		L	L	L		L
Het		H				
Agg	H			H		

TABLE 17

COMPARISON OF INTRACEPTION WITH OTHER TRAITS

	S	MT	F	AF	PSM	TSM
Ach		L				L
Def					H	
Ord	H				H	
Exh						
Aut	H	H	H	H	H	H
Aff				H		H
Suc	H	H	H	H	H	H
Dom	L	L				L
Aba	H				H	H
Nur	H				H	H
Chg						
End		L				L
Het			H	H		
Agg	H		H	H	H	H

TABLE 18

COMPARISON OF SUCCORANCE WITH OTHER TRAITS

	S	MT	F	AF	PSM	TSM
Ach	L	L	L	L	L	L
Def	L	L	L	L	L	L
Ord	L	L	L	L	L	L
Exh	L	L		L	L	L
Aut	L				L	L
Aff	L	L	L	L	L	L
Int	L	L	L	L	L	L
Dom	L	L	L	L	L	L
Aba	L			L	L	
Nur	L		L	L	L	L
Chg	L	L		L	L	L
End	L	L	L	L	L	L
Het	L	L		L	L	L
Agg	L				L	L

TABLE 19

COMPARISON OF DOMINANCE WITH OTHER TRAITS

	S	MT	F	AF	PSM	TSM
Ach	H					
Def	H	H		H	H	H
Ord	H	H	H	H	H	H
Exh	H	H	H	H	H	H
Aut	H	H	H	H	H	H
Aff	H	H	H	H	H	H
Int	H	H				
Suc	H	H	H	H	H	H
Aba	H	H	H	H	H	H
Nur	H	H	H	H	H	H
Chg	H	H	H	H	H	H
End	H				H	
Het	H	H	H	H	H	H
Agg	H	H	H	H	H	H

TABLE 20

COMPARISON OF ABASEMENT WITH OTHER TRAITS

	S	MT	F	AF	PSM	TSM
Ach	L	L		L	L	L
Def					L	
Ord						L
Exh	L				L	
Aut			H	H	L	
Aff	L				L	
Int	L			L	L	L
Suc	H			H		H
Dom	L	L	L	L	L	L
Nur					L	
Chg	L				L	L
End	L	L	L	L	L	L
Het	L			H	L	
Agg				H		

TABLE 21

COMPARISON OF NURTURANCE WITH OTHER TRAITS

	S	MT	F	AF	PSM	TSM
Ach	L	L		L	L	L
Def						L
Ord						L
Exh	L					
Aut			H	H		
Aff	L					
Int	L			L	L	L
Suc	H		H	H	H	H
Dom	L	L	L	L	L	L
Aba					H	
Chg	L	L				L
End	L	L	L	L		L
Het			H			
Agg				H		

TABLE 22

COMPARISON OF CHANGE WITH OTHER TRAITS

	S	MT	F	AF	PSM	TSM
Ach		L		L		L
Def	H					
Ord	H					
Exh						
Aut	H	H	H	H		H
Aff						
Int			L			
Suc	H	H		H	H	H
Dom	L	L	L	L	L	L
Aba	H				H	H
Nur	H	H				H
End		L	L	L		L
Het				H		
Agg	H	H		H		H

TABLE 23

COMPARISON OF ENDURANCE WITH OTHER TRAITS

	S	MT	F	AF	PSM	TSM
Ach						
Def	H	H		H		H
Ord	H	H	H	H		H
Exh		H	H	H		H
Aut	H	H	H	H		H
Aff		H	H	H		H
Int		H				H
Suc	H	H	H	H	H	H
Dom	L				L	
Aba	H	H	H	H	H	H
Nur	H	H	H	H		H
Chg		H	H	H		H
Het		H	H	H		H
Agg	H	H	H	H		H

TABLE 24

COMPARISON OF HETEROSEXUALITY WITH OTHER TRAITS

	S	MT	F	AF	PSM	TSM
Ach	L	L	L	L		L
Def			L	L		
Ord	H		L	L		
Exh						
Aut	H	H				H
Aff			L			
Int			L	L		
Suc	H	H		H	H	H
Dom	L	L	L	L	L	L
Aba	H			L	H	
Nur			L			
Chg				L		
End		L	L	L		L
Agg	H					H

TABLE 25

COMPARISON OF AGGRESSION WITH OTHER TRAITS

	S	MT	F	AF	PSM	TSM
Ach	L	L	L	L	L	L
Def			L	L		L
Ord				L		L
Exh	L			L		
Aut						
Aff	L			L		
Int	L		L	L	L	L
Suc	H				H	H
Dom	L	L	L	L	L	L
Aba				L		
Nur				L		
Chg	L	L		L		L
End	L	L	L	L		L
Het	L					L

Note: (L) = Reference trait lower than compared traits.
      (H) = Reference trait higher than compared traits.

19

1. Endurance did not differ from exhibition, affiliation, intraception, or change for salesmen.

2. Endurance did not differ from deference or intraception for foremen.

3. Endurance did not differ from deference for assistant foremen.

Endurance was higher than only two other traits, succorance and abasement, for personnel staff managers.

Achievement was higher than most of the other traits for all groups except foremen (Table 11). Several exceptions were found:

1. Achievement did not differ from exhibition, affiliation, intraception, or change for salesmen.

2. Achievement did not differ from exhibition, affiliation, intraception, change, or heterosexuality for personnel staff managers.

Foremen scored higher on achievement than on exhibition, autonomy, succorance, heterosexuality, and aggression.

The groups generally scored lower on succorance than on the other traits (Table 18). There were a few exceptions to this statement:

1. Succorance did not differ from autonomy, abasement, nurturance, or aggression for manager trainees.

2. Succorance did not differ from exhibition, autonomy, abasement, change, heterosexuality, or aggression for foremen.

3. Succorance did not differ from autonomy or aggression for assistant foremen.

4. Succorance did not differ from abasement for technical staff managers.

All groups except personnel staff managers and manager trainees were significantly lower on autonomy than on the other traits (Table 15). Several exceptions were noted:

1. No statistical differences between autonomy and aggression were found.

2. Autonomy did not differ from deference, order, abasement, or nurturance for salesmen.

3. Autonomy did not differ from exhibition, or heterosexuality for foremen.

4. Autonomy did not differ from affiliation or heterosexuality for assistant foremen.

5. Autonomy did not differ from abasement or nurturance for technical staff managers.

Manager trainees scored lower on autonomy than on achievement, intraception, dominance, change, endurance, and heterosexuality. Personnel staff managers scored higher on autonomy than on abasement and lower on autonomy than on achievement, intraception, and dominance.

A few other general patterns can be found:

1. Personnel staff managers scored higher on intraception than on deference, order, autonomy, succorance, abasement, nurturance and change (Table 17).

2. Abasement was lower than most of the other traits for salesmen and personnel staff managers (Table 20).

3. Salesmen scored higher on change and lower on nurturance and aggression than on most of the remaining traits (Table 21).

4. Foremen scored lower on heterosexuality than on most of the other traits (Table 24).

5. Assistant foremen scored lower on aggression and heterosexuality than on most of the other traits (Tables 24 and 25).

No other general patterns are observed. For other specific comparisons see Tables 11-25.

DISCUSSION

Review of Purpose

The present study attempted to answer three questions concerning the EPPS and six classifications of workers (salesmen, manager trainees, foremen, assistant foremen, personnel staff managers, and technical staff managers) in a medium sized southern textile firm.

1. Are the shapes of the EPPS profiles for the six groups different?

2. If so, which traits are responsible for the differences in shape?

3. What is the typical profile for each group?

Discussion of Results

Shape. The shape of a profile is a graphical description of the overall profile. Profile shape is determined by the relative levels or rank-orders of the scores comprising that profile. An EPPS profile shape is comprised of the relative levels of the fifteen trait scales.

It is possible for two groups to differ significantly from each other in level on one or two of these scales but not differ in overall profile shape. For example: Groups A and B differ significantly on scale Y. An investigation of the individual scale scores, however, reveals that the rank-order of the scores of the two groups are exactly the same. Since profile shape is a graphic description of these rank-orders, it is probable that the profiles do not differ in shape.

If two or more groups have the same profile shapes, the profiles must be parallel. Conversely, if the profiles are not parallel, they must be considered to be different in shape.

The results shown in Table 1 indicate a group-trait interaction effect, i.e., intraception is scored higher than endurance by personnel staff managers, but endurance is scored higher than intraception by manager trainees. Since an interaction effect, by definition, is a deviation from parallelism; it may be concluded that the six groups in the present study differ in profile shape. The rank orders of the traits are shown in Table 26.

Traits contributing to the differences in shapes. The information in Table 2 indicates that six traits (deference, order, intraception, abasement, endurance, and heterosexuality) were responsible for the differences in profile shapes. How the six groups differed from each other on these traits is shown in Tables 3-8. Only two generalizations can be drawn from Table 2 and Tables 3-8.

1. As already stated, deference, order, intraception, abasement, endurance, and heterosexuality were responsible for the significant differences in profile shape.

2. Given the fifteen EPPS traits, the six groups studied differed on their scores on six traits above.

The profile shapes of the six groups are in Figure 1. Only the above six differentiating traits are used in these profiles.

TABLE 26

NAMES AND RANKS OF TRAITS FOR EACH GROUP

| Salesmen	Manager Trainees	Foremen	Assistant Foremen	Personnel Staff Managers	Technical Staff Managers
Dom -1	Dom -1	Dom -1	End - 1	Dom -1	Dom -1.5
Ach -2	End -2	End -2	Dom - 2	Int -2	End -1.5
End -3	Ach -3	Ach -3	Ach - 3	Ach -3	Ach -3
Chg -4	Chg -4	Int -4	Int - 4	Het -4.5	Int -4
Exh -5	Het -5.5	Def -5	Def -5	Chg -4.5	Chg -5
Int -6	Int -5.6	Ord -6	Ord -6	End -6	Ord -6
Aff -7	Ord -7	Aff -7	Aba -7	Aff -7	Def -7
Het -8	Aff -8	Nur -8	Chg -8	Exh -8	Nur -8
Def -9	Exh -9	Chg -9	Nur -9	Def -9	Exh -9
Nur -10	Def -10	Aba -10	Exh -10	Nur -10	Aff -10
Agg -11	Aba -11	Exh -11	Aff -11	Aut -11	Aba -11
Ord -12	Agg -12	Agg -12	Het -12	Agg -12	Nur -12
Aut -13	Nur -13	Suc -13	Aut -13	Ord -13	Agg -13
Aba -14	Aut -14	Het -14	Agg -14	Aba -14	Aut -14
Suc -15	Suc -15	Aut -15	Suc -15	Suc -15	Suc -15
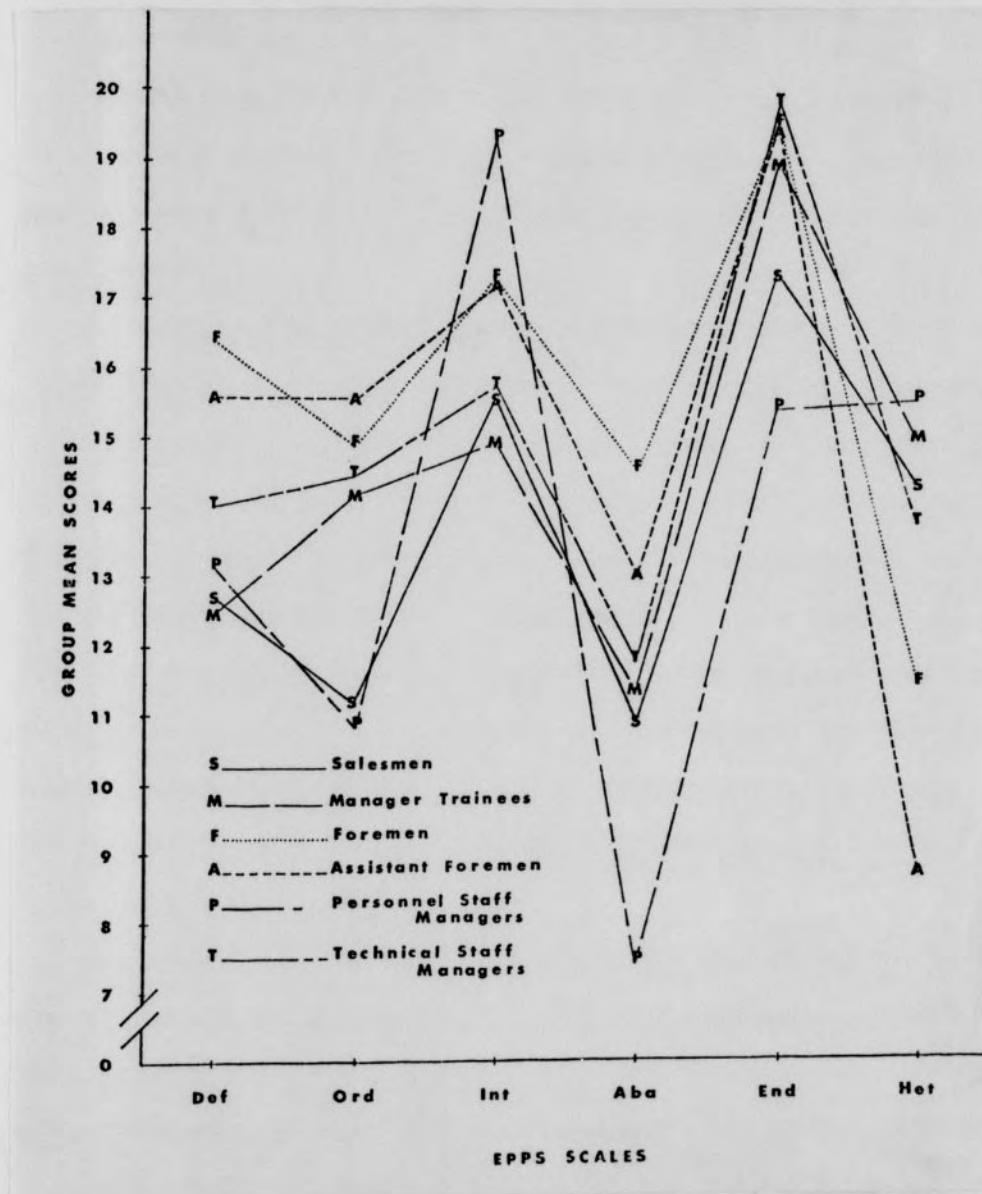
FIGURE 1

GRAPHICAL PROFILES OF THE GROUPS
ON THE DIFFERENTIATING TRAITS

Because of the ipsative nature of the EPPS, it cannot be said that any group actually possesses "more" of a trait than does any other group (Hicks, 1970). It may very well be that personnel staff managers actually have less endurance than do the other five groups, but this is not tested in the EPPS. The EPPS does not test for absolute levels of need; only relative levels of need. The results indicate only that personnel staff managers rated their need for endurance significantly lower than did the other groups.

By counting the differences between groups in Tables 3-8, it is possible to get an idea of which groups are most similar. However, this takes into account only the levels of all traits. The distances function is a much more accurate method of determining profile similarity. The distance function reduces the score levels, the dispersion of the scores, and the shape of the profiles to one numerical figure which is known as 'D'. The smaller the D, the more similar are the compared profiles. The information in Table 9 indicates that manager trainees and technical staff managers are the most similar groups in profile shape, dispersion, and level. The two groups which were the least similar to each other were foremen and personnel staff managers.

The present paper did not investigate the reasons for the similiarities or differences between groups. The only conclusions which may be drawn from the information in Table 9 is that the groups do vary with manager trainees and technical staff managers being most similar and foremen and personnel staff managers being the least similar groups.

The other groups fall between these two extremes. No tests are available to test the statistical significance of the distance function.

Typical Profile

A typical profile, as defined in the present paper, includes not only how a particular profile differs from other profiles, but also the ordering of the traits within the particular profile. The Ordering of the traits includes the rank orders of the means of the traits and the significant differences between these means. How the individual profiles differed from each other is described in Tables 3-8. The ordering of the traits within each profile is in Table 26. The statistical differences between the means within a profile are illustrated in Tables 11-25. Comparisons of the profiles of the six groups studied and the normal adult population are in Figures 2-7.

By considering the ordered means, statistical differences between means, and how a group differed from the adult norm the typical profiles of the groups may be described as follows:

Salesmen. Salesmen were extremely dominant. They were also high in achievement, endurance, change and exhibition. They were moderate on the traits of intraception, affiliation, and heterosexuality. Low traits included deference, nurturance, aggression, order and autonomy. Salesmen were extremely low on abasement and succorance.

Manager Trainees. Manager trainees also were high on dominance. Other high traits included endurance and achievement. They were moderate on change, heterosexuality, and intraception. Low scores for manager trainees consisted of aggression, nurturance, autonomy, and succorance.

Note: See Appendix F for definitions of extremely high, high, moderate, low and extremely low as these terms are used in the present paper.

	Percentile	Raw Score
ach	81	18.16
def	42	12.72
ord	26	11.19
exh	82	15.63
aut	29	11.02
aff	58	15.23
int	69	15.56
suc	26	6.60
dom	93	21.60
aba	27	10.88
mur	26	11.98
chg	76	16.53
end	52	17.35
het	66	14.28
agg	37	11.21

PERCENTILE

PERCENTILE
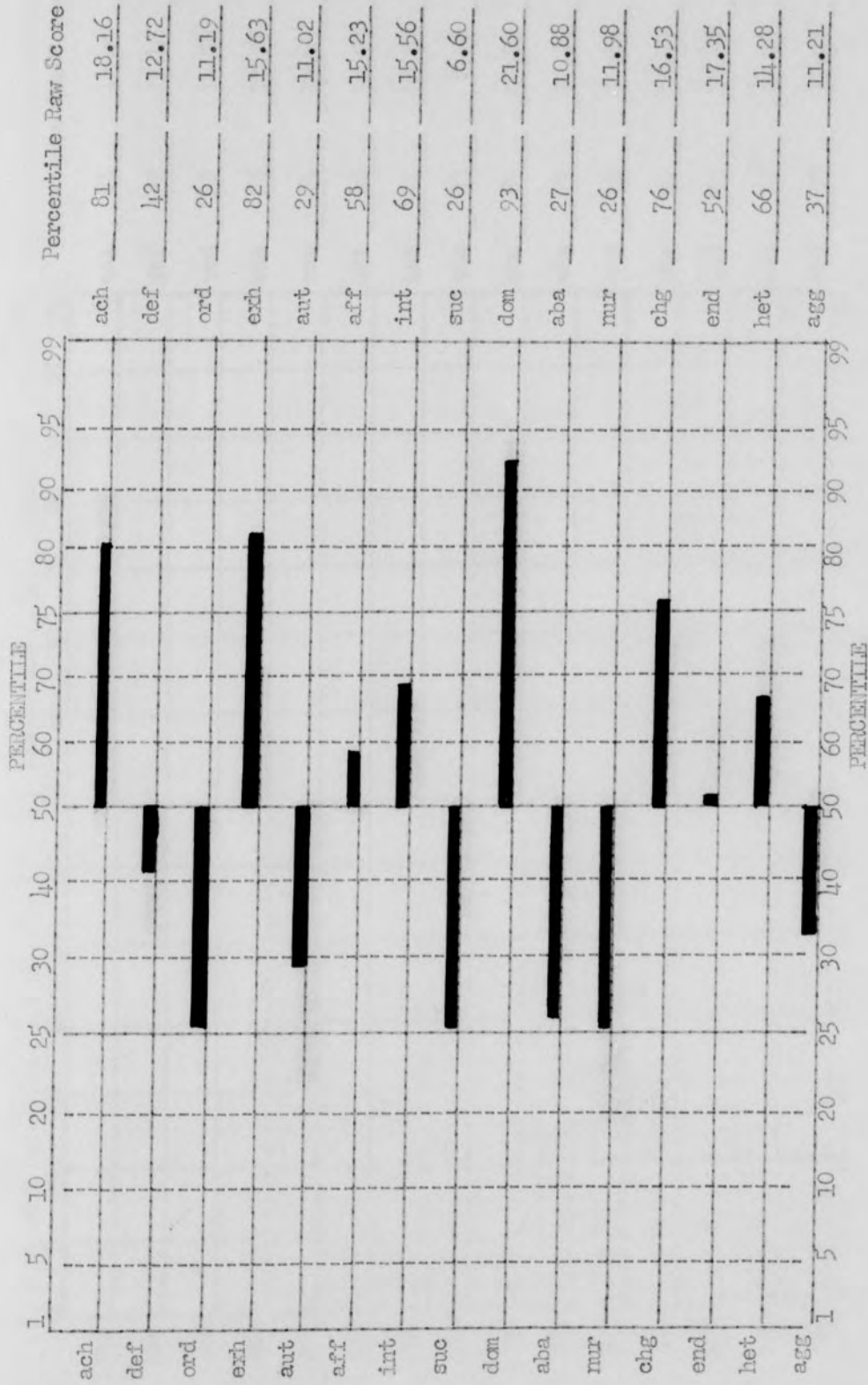
FIGURE 2 MEAN PROFILE OF SALESMEN IN CONTRAST TO ADULT NORMS
(Form From Edwards, 1959)

	Percentile	Raw Score
ach	81	18.46
def	32	12.46
ord	47	14.14
exh	66	13.93
aut	21	10.43
aff	48	14.07
int	61	14.93
suc	33	7.96
dom	89	20.89
aba	27	11.36
nur	15	10.89
chg	69	15.39
end	59	18.93
het	69	14.93
agg	37	11.07
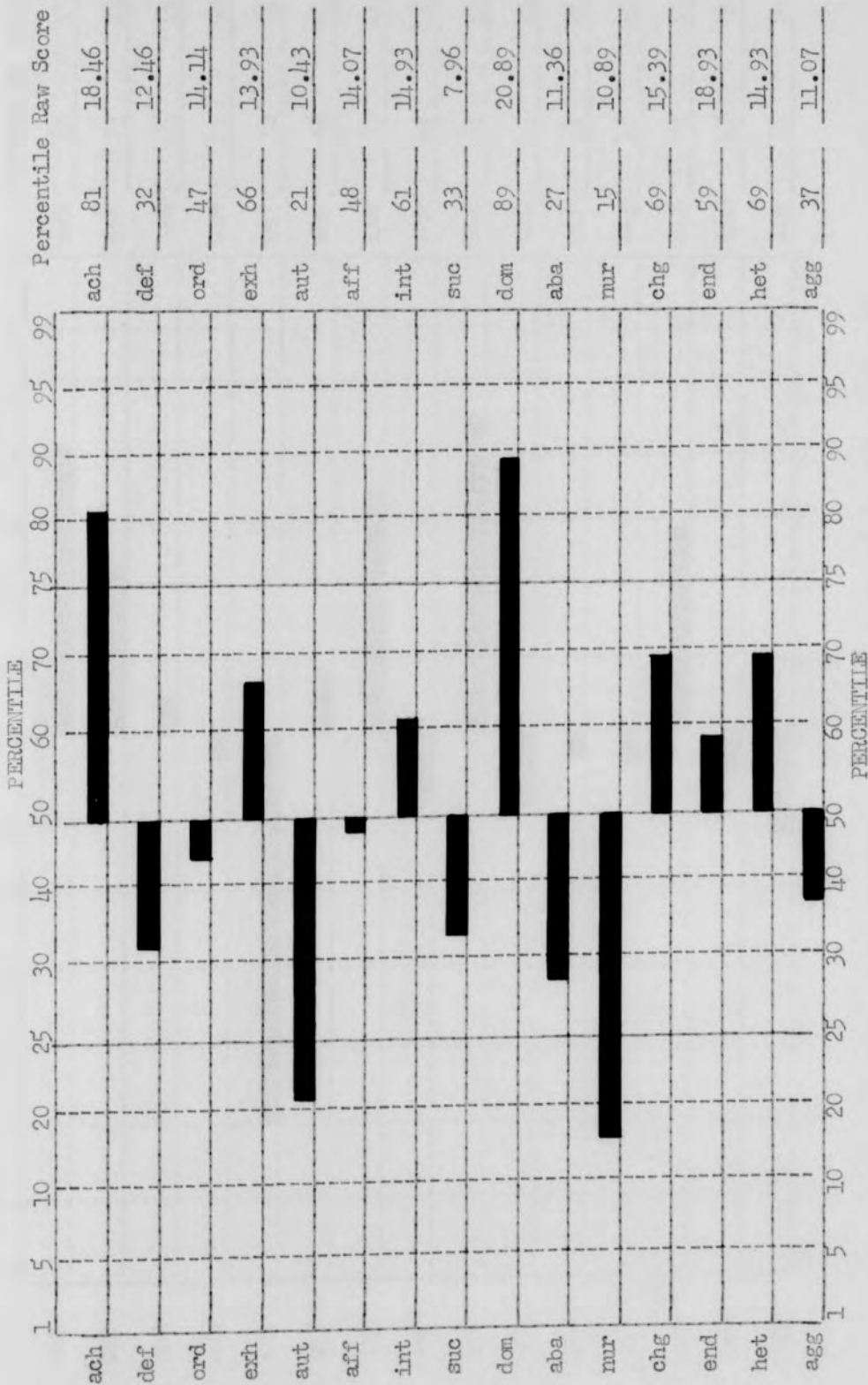
FIGURE 3   MEAN PROFILE OF MANAGER TRAINEES IN CONTRAST TO ADULT NORMS
(Form From Edwards, 1959)

	Percentile	Raw Score
ach	81	17.84
def	71	16.37
ord	55	14.89
exh	47	12.26
aut	10	8.16
aff	58	14.74
int	77	17.16
suc	42	8.95
dom	85	19.90
aba	41	13.00
mur	47	14.53
chg	46	13.21
end	74	19.53
het	45	8.63
agg	37	10.68
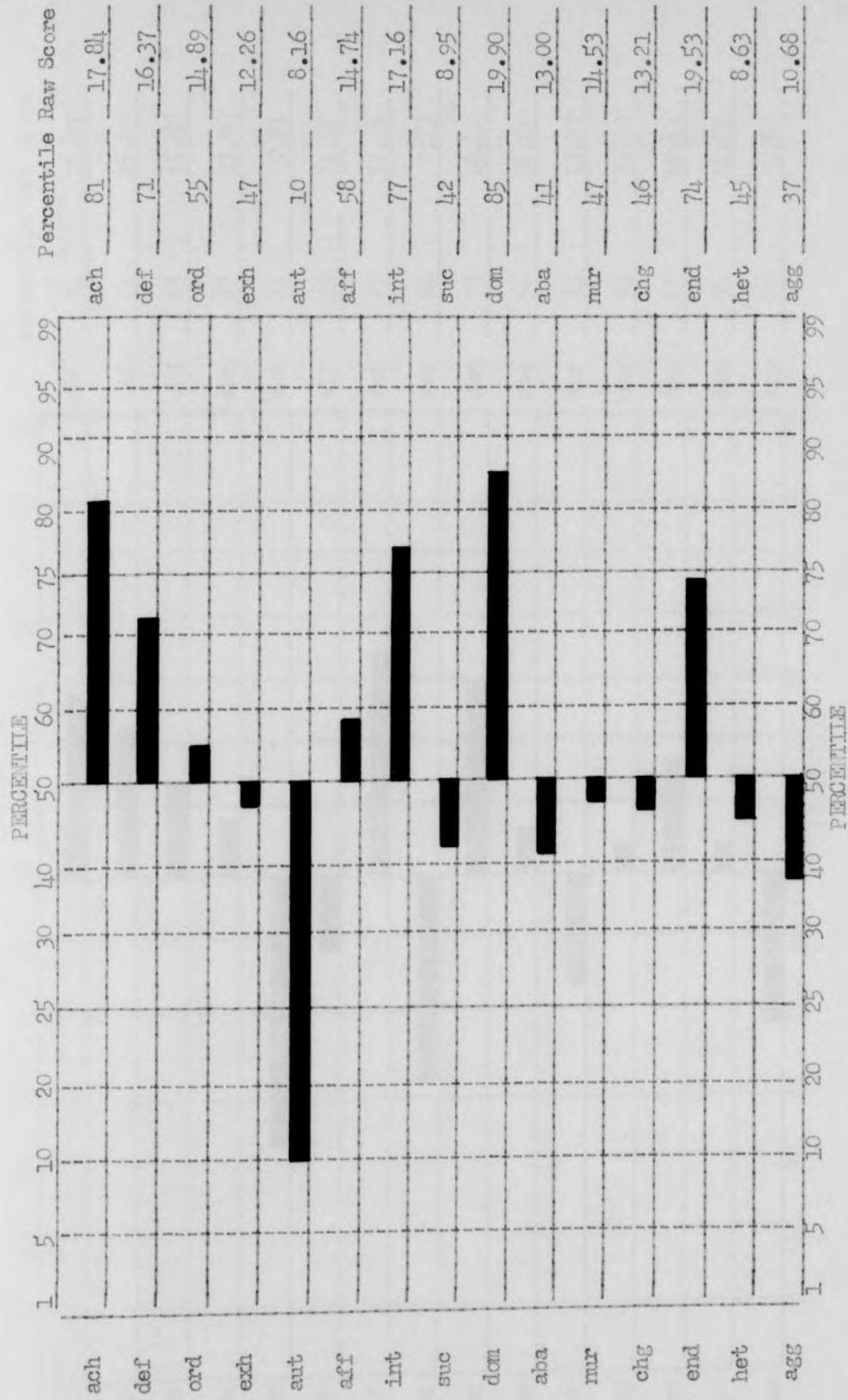
FIGURE 4 MEAN PROFILE OF FOREMEN IN CONTRAST TO ADULT NORMS
(Form From Edwards, 1959)

	Percentile	Raw Score
ach	74	17.47
def	71	15.65
ord	63	15.60
exh	57	13.00
aut	21	9.81
aff	39	12.58
int	77	17.24
suc	26	7.73
dom	75	18.44
aba	56	14.52
nur	33	13.27
chg	54	14.00
end	67	19.47
het	54	11.37
agg	29	9.60
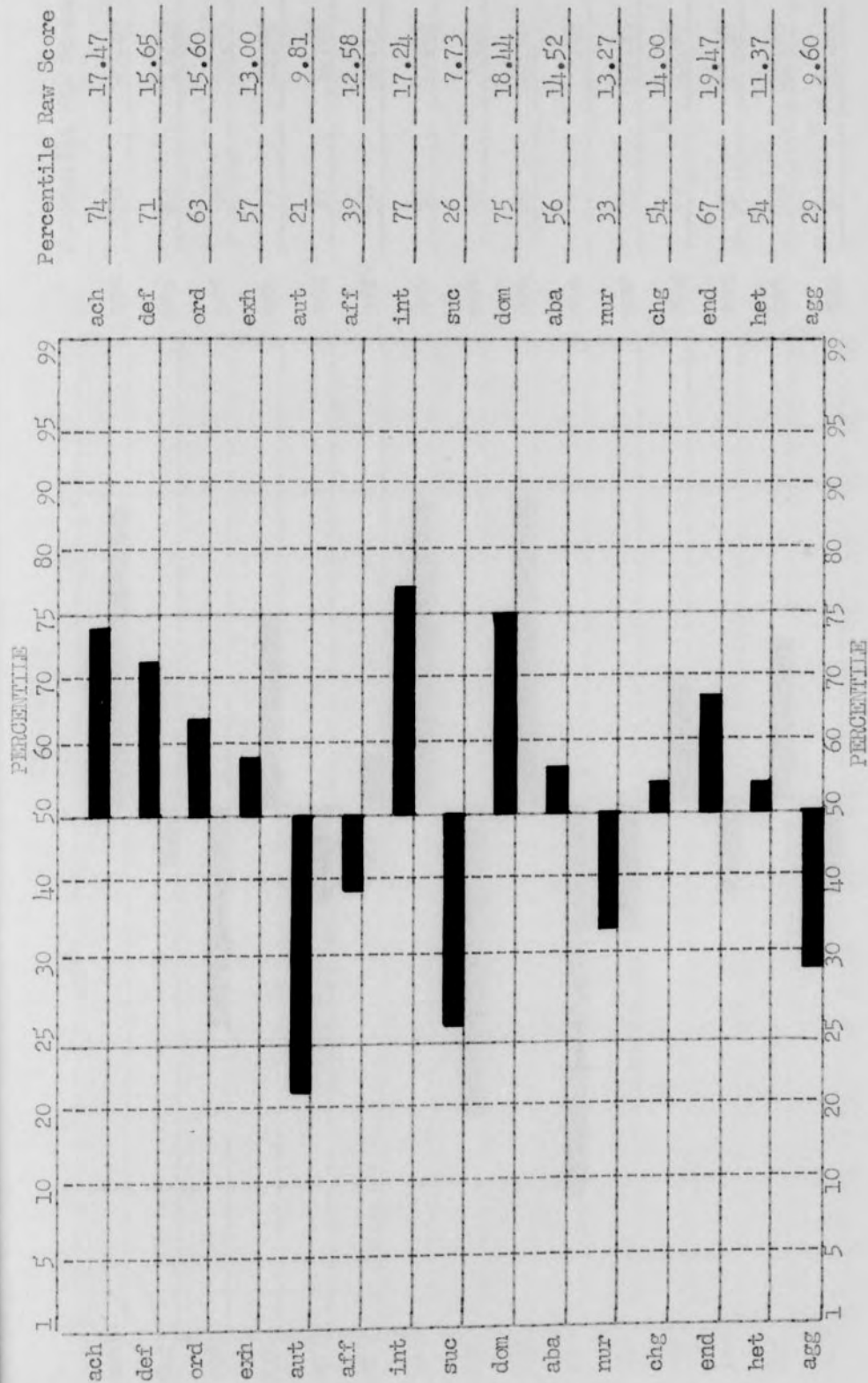
FIGURE 5 MEAN PROFILE OF ASSISTANT FOREMEN IN CONTRAST TO ADULT NORMS
(Form From Edwards, 1959)

	Percentile	Raw Score
ach	86	19.19
def	42	13.13
ord	26	10.81
exh	75	14.56
aut	37	12.25
aff	58	15.19
int	87	19.25
suc	19	6.31
dom	89	21.12
aba	9	7.38
nur	33	12.63
chg	70	15.56
end	37	15.38
het	73	15.56
agg	37	11.44
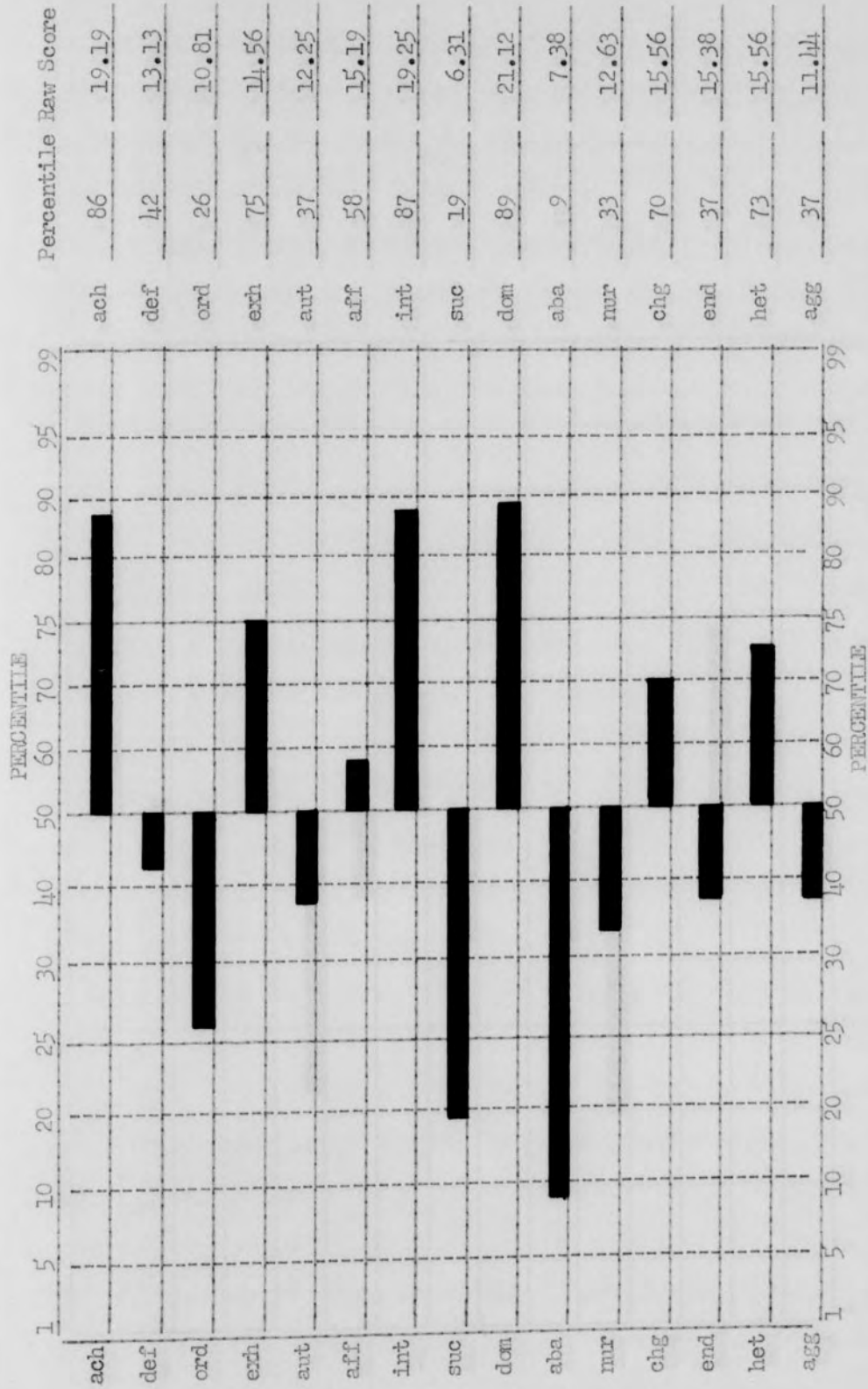
FIGURE 6   MEAN PROFILE OF PERSONNEL STAFF MANAGERS IN CONTRAST TO ADULT NORMS
(Form From Edwards, 1959)

	Percentile	Raw Score
ach	86	18.61
def	52	14.00
ord	47	14.32
exh	57	13.48
aut	21	10.43
aff	39	13.23
int	69	15.73
suc	33	7.79
dom	85	19.73
aba	33	11.73
mur	20	11.30
chg	62	14.95
end	74	19.73
het	66	13.71
agg	37	11.00
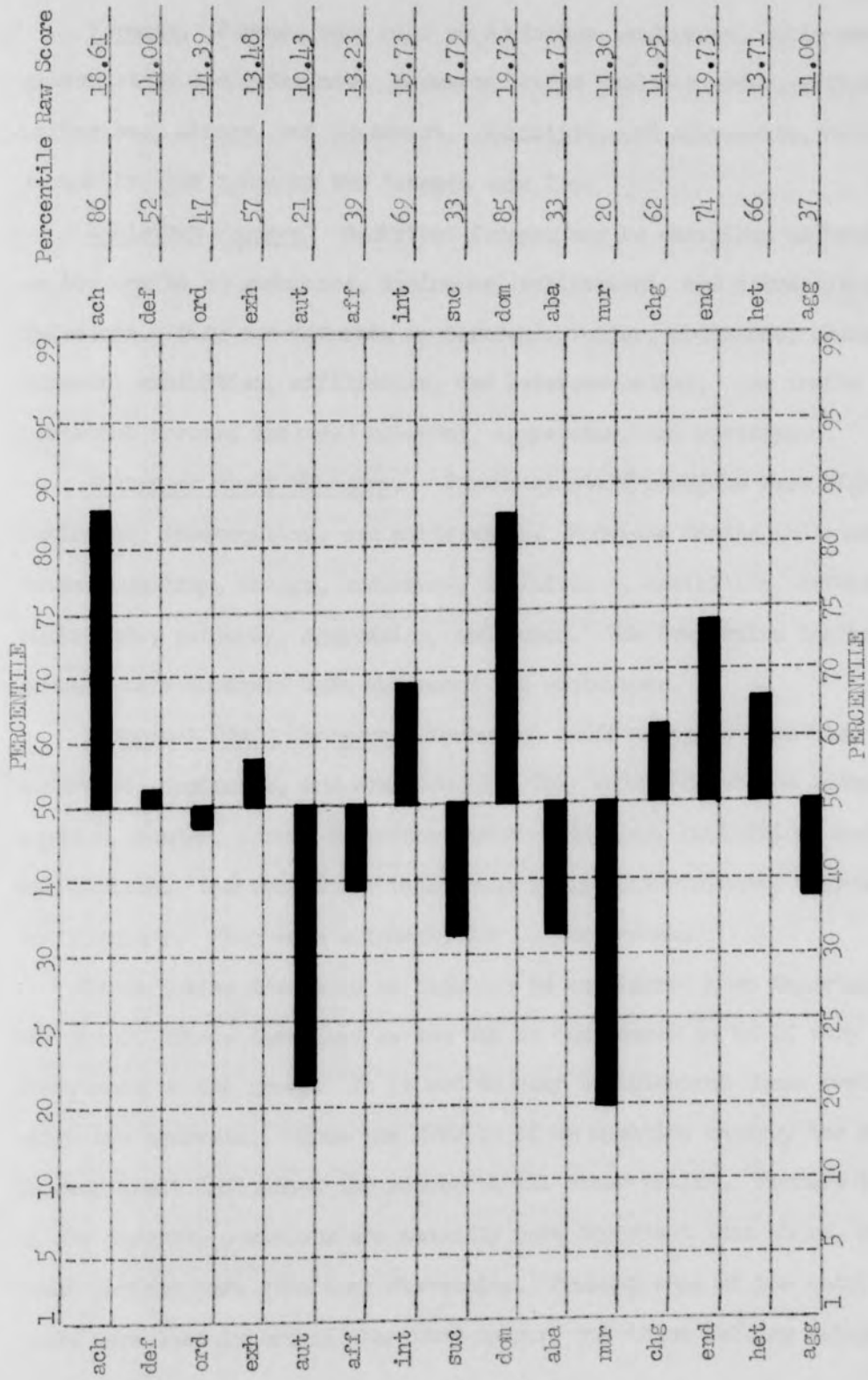
FIGURE 7 MEAN PROFILE OF TECHNICAL STAFF MANAGERS IN CONTRAST TO ADULT NORMS
(Form From Edwards, 1959)

Foremen. Foremen were high on dominance, endurance, achievement, intraception and deference. Moderate traits included order, affiliation, nurturance, change, and abasement. Exhibition and aggression, heterosexuality, and autonomy for foremen were low.

Assistant Foremen. Assistant foremen may be described as being high on the traits of endurance, dominance, achievement, and intraception and deference. They are moderate on deference, order, abasement, change, nurturance, exhibition, affiliation, and heterosexuality. Low traits of assistant foremen included autonomy, aggression, and succorance.

Personnel Staff Managers. Personnel staff managers were high on dominance, intraception, and achievement. Moderate traits included heterosexuality, change, endurance, affiliation, exhibition, deference, nurturance, autonomy, aggression, and order. The low traits for personnel staff managers were abasement and succorance.

Technical Staff Managers. Technical staff managers were high on endurance, dominance, and achievement. They were moderate on intraception, change, order, deference, heterosexuality, exhibition, and affiliation. Low traits for this group included nurturance, aggression, and autonomy. They were extremely low on succorance.

Those traits described as high can be considered most important to the group. Those described as low can be considered to be of very little importance to the group. It is not as easy to interpret those traits which are moderate. Since the EPPS is of an ipsative nature, the score on each trait influenced the scores on all other traits. Perhaps those in the moderate positions are actually more important than shown, but the other choices were even more attractive. Perhaps some of the moderate needs were less important than they appear, but those falling below them

in rank were of so little importance that those are moderate simply because they are the better of two evils. Only a comparison of the EPPS to a free choice method could answer this question.

The present paper did not attempt to answer why the groups ranked their traits as they did. What factor caused personnel staff managers to score high in intraception? Was it a factor in the work role which is satisfying to, and thus attracts a particular type of person?

Implications

The above information indicates that persons in different occupations do have different personality patterns as revealed by the EPPS. However, the above information does not constitute acceptable evidence that the EPPS can be used successfully as a tool for employee selection and placement.

If the EPPS is to be a helpful tool for employee selection and placement, it must be validated against performance. Do persons who are successful in an occupation have EPPS profile shapes which are different from the profiles of unsuccessful persons in that occupation? Do the profiles of successful persons in one occupation differ from the profiles of persons who are successful in other occupations? If the EPPS cannot be used as a predictor of performance it should not be considered a helpful tool in employee selection and placement.

The EPPS also needs to be validated within the setting of the company in which it is to be used. The profiles of any of the six groups included in the present study may vary from industry to industry or from company to company within the same industry.

Although the information in the present paper indicates that the EPPS might be a useful tool of employee selection, the EPPS scores should not be the sole criterion for a personnel decision. The EPPS tells only that the person has personality characteristics similar to other persons in the job classification. It does not measure the aptitude, intelligence, or skills of an employee. The EPPS should be used as only one measure in the selection of employees even though its predictive validity were established.

CONCLUSIONS

The present study found that the six classifications of workers have differently shaped EPPS Profiles. It was also found that the traits of deference, order, intraception, abasement, endurance, and heterosexuality were mainly responsible for these differences.

The groups were compared on the above traits and found to differ from each other to varing degrees. Of the groups studied, technical staff managers were most similar in profile shape. They did not differ from each other in level on any of the EPPS scales. Foremen and personnel staff managers had profiles which differed from each other the most. They differed from each other on five of the six traits.

Each group was described by a typical profile by considering ordered means of each group's traits, the significant trait diff-erences within groups, and trait differences between groups.

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APPENDIX A

DEFINITIONS OF THE EPPS TRAITS

DEFINATIONS OF THE EPPS TRAITS

(Edwards, 1959, P.11)

1. ach Achievement: To do one's best, to be successful, to accomplish tasks requiring skill and effort, to be a recognized authority, to accomplish something of great significance, to do a difficult job well, to solve difficult problems and puzzles, to be able to do things better than others, to write a great novel or play.

2. def Deference: To get suggestions from others, to find out what others think, to follow instructions and do what is expected, to praise others, to tell others that they have done a good job, to accept the leadership of others, to read about great men, to conform to custom and avoid the unconventional, to let others make decisions.

3. ord Order: To have written work neat and organized, to make plans before starting on a difficult task, to have things organized, to keep things neat and orderly, to make advance plans when taking a trip, to organize details of work, to keep letters and files according to some system, to have meals organized and a definite time for eating, to have things arranged so that they run smoothly without change.

4. exh Exhibition: To say witty and clever things, to tell amusing jokes and stories, to talk about personal adventures and experiences, to have others notice and comment upon one's appearance, to say things just to see what effect it will have on others, to talk about personal achievements, to be the center of attention, to use words that others do not know the meaning of, to ask questions others cannot answer.

5. aut Autonomy: To be able to come and go as desired, to say what one thinks about things, to be independent of others in making decisions, to feel free to do what one wants, to do things that are unconventional, to avoid situations where one is expected to conform, to do things without regard to what others may think, to criticize those in positions of authority, to avoid responsibilities and obligations.

6. aff Affiliation: To be loyal to friends, to participate in friendly groups, to do things for friends, to form new friendships, to make as many friends as possible, to share things with friends, to do things with friends rather than alone, to form strong attachments, to write letters to friends.

7. int Intraception: To analyze one's motives and feelings, to observe others, to understand how others feel about problems, to put one's self in another's place, to judge people by why they do things rather than by what they do, to analyze the behavior of others, to analyze the motives of others, to predict how others will act.

8.   suc Succorance: To have others provide help when in trouble, to seek encouragement from others, to have others be kindly, to have others be sympathetic and understanding about personal problems, to receive a great deal of affection from others, to have others do favors cheerfully, to be helped by others when depressed, to have others feel sorry when one is sick, to have a fuss made over one when hurt.

9.   dom Dominance: To argue for one's point of view, to be a leader in groups to which one belongs, to be regarded by others as a leader, to be elected or appointed chairman of committees, to make group decisions, to settle arguments and disputes between others, to persuade and influence others to do what one wants, to supervise and direct the actions of others, to tell others how to do their jobs.

10.   aba Abasement: To feel guilty when one does something wrong, to accept blame when things do not go right, to feel that personal pain and misery suffered does more good than harm, to feel the need for punishment for wrong doing, to feel better when giving in and avoiding a fight than when having one's own way, to feel the need for confession of errors, to feel timid in the presence of superiors, to feel inferior to others in most respects.

11.   nur Nurturance: To help friends when they are in trouble, to assist others less fortunate, to treat others with kindness and sympathy, to forgive others, to do small favors for others, to be generous with others, to sympathize with others who are hurt or sick, to show a great deal of affection toward others, to have others confide in one about personal problems.

12.   chg Change: To do new and different things, to travel, to meet new people, to experience novelty and change in daily routine, to experiment and try new things, to eat in new and different places, to try new and different jobs, to move about the country and live in different places, to participate in new fads and fashions.

13.   end Endurance: To keep at a job until it is finished, to complete any job undertaken, to work hard at a task, to keep at a puzzle or problem until it is solved, to work at a single job before taking on others, to stay up late working in order to get a job done, to put in long hours of work without distraction, to stick at a problem even though it may seem as if no progress is being made, to avoid being interrupted while at work.

14.   het Heterosexuality: To go out with members of the opposite sex, to engage in social activities with the opposite sex, to be in love with someone of the opposite sex, to kiss those of the opposite sex, to be regarded as physically attractive by those of the opposite sex, to participate in discussions about sex, to read books and plays involving sex, to listen to or to tell jokes involving sex, to become sexually excited.

15.   agg Aggression: To attack contrary points of view, to tell others what one thinks about them, to criticize others publicly, to make fun of others, to tell others off when disagreeing with them, to get revenge for insults, to become angry, to blame others when things go wrong, to read newspaper accounts of violence.

APPENDIX B

MEANS AND STANDARD DEVIATIONS OF TRAITS,

EDUCATION, AND AGE

BY GROUPS

TABLE 27

MEANS AND STANDARD DEVIATIONS OF TRAITS, EDUCATION, AND AGE

by GROUPS

		Ach.	Def.	Ord.	Exh.	Aut.	Aff.	Int.	Suc.	Dom.	Aba.	Nur.	Chg.	End.	Het.	Agg.	Educ.	Age
Salesmen	M	18.16	12.72	11.19	15.63	11.02	15.23	15.56	6.60	21.60	10.88	11.98	16.53	17.35	14.28	11.21	15.35	27.77
	SD	3.61	3.30	4.14	3.75	3.79	3.27	3.87	3.57	3.32	4.11	3.75	3.75	4.00	4.70	4.45	1.18	5.93
Manager Trainee	M	18.46	12.46	14.14	13.93	10.43	14.07	14.93	7.96	20.89	11.36	10.89	15.39	18.93	14.93	11.07	16.18	24.36
	SD	3.80	3.15	4.38	3.69	4.15	3.13	5.32	3.76	2.87	4.96	2.89	3.62	3.92	5.56	4.35	.94	3.43
Foremen	M	17.84	16.37	14.89	12.26	8.16	14.74	17.16	8.95	19.90	13.00	14.53	13.21	19.53	8.63	10.68	13.00	39.11
	SD	3.36	3.48	3.53	2.40	3.37	3.74	4.09	3.28	3.63	3.64	5.88	3.82	3.56	5.75	4.68	2.15	8.80
Assist. Foremen	M	17.47	15.65	15.60	13.06	9.81	12.58	17.24	7.73	18.44	14.52	13.27	14.00	19.47	11.37	9.60	11.90	30.16
	SD	3.71	3.44	4.68	2.98	3.73	4.38	4.28	3.31	5.18	3.76	4.96	3.85	4.08	5.68	3.78	1.59	8.41
Personnel Staff Managers	M	19.19	13.13	10.81	14.56	12.25	15.19	19.25	6.31	21.12	7.38	12.63	15.56	15.38	15.56	11.44	16.50	30.31
	SD	3.42	1.93	4.14	3.99	3.13	3.55	4.32	3.24	3.67	4.22	3.85	4.91	5.00	3.85	4.74	1.46	5.20
Technical Staff Managers	M	18.61	14.00	14.39	13.48	10.43	13.23	15.73	7.79	19.73	11.73	11.30	14.95	19.73	13.71	11.00	16.00	29.69
	SD	3.97	3.59	4.74	3.12	4.31	4.01	4.75	3.57	3.97	5.02	4.52	4.05	3.95	6.36	5.02	1.27	5.98

FORMULA FOR STANDARD DEVIATIONS

(Lordhal, 1967)

$$S = \sqrt{\frac{\Sigma X_i^2}{N} - (\overline{X})^2}$$

Notations

1. Standard Deviations of trait scores for each group

   X_i = Trait scores for subject

   $\overline{X}$ = Mean trait scores

   N = Number subjects

2. Standard Deviations of age for each group

   X_i = Years of age for subject

   $\overline{X}$ = Mean years of age

   N = Number subjects

3. Standard Deviations of education for each group

   X_i = Years of education for subject

   $\overline{X}$ = Mean years of education

   N = Number subjects

APPENDIX C

RAW DATA AND STATISTICS

FOR AGE AND EDUCATION

TABLE 28

YEARS OF AGE

Groups: Salesmen	Manager Trainees	Foremen	Assistant Foremen	Personnel Staff Managers	Technical Staff Managers
26	21	43	25	24	25
22	27	45	31	30	27
29	22	53	22	32	38
33	22	30	29	26	27
26	25	36	25	23	24
22	24	48	52	30	23
26	23	42	51	38	28
28	22	28	29	40	22
45	22	48	25	23	33
29	23	50	32	34	31
27	23	49	44	32	33
22	25	28	25	31	25
29	25	39	44	28	32
30	22	48	28	36	25
24	24	34	24	24	23
25	23	30	27	24	44
25	25	25	48		41
23	26	28	24		33
26	25	39	23		26
23	25		25		25
29	22		24		26
29	28		27		27
26	25		24		30
23	22		22		31
30	40		18		28
30	23		47		26
22	23		24		28
27	25		22		28
40			41		26
27			31		29
26			33		23
31			24		26
25			34		25
27			35		32
25			24		34
32			37		22
23			29		24
23			26		28
30			40		25
22			21		30
26			23		42
53			28		30
28			35		29

TABLE 28 CONTINUED

YEARS OF AGE

Salesmen	Manager Trainees	Foremen	Assistant Foremen	Personnel Staff Managers	Technical Staff Managers
			31		27
			27		27
			35		26
			26		27
			47		46
			34		38
			20		34
			33		27
			21		45
			24		40
			29		27
			18		37
			41		45
			32		
			44		
			27		
			23		
			23		
			23		

TABLE 29

ANALYSIS OF VARIANCE OF AGE

Source of Variation	S S	df	MS	F
Groups	2658.41	5	531.68	11.46**
Error	10126.57	218	46.45	
Total	12784.98	223		

** P <.01

TABLE 30

YEARS OF EDUCATION

Groups: Salesmen	Manager Trainee	Foremen	Assistant Foremen	Personnel Staff Managers	Technical Staff Managers
16	16	14	12	16	16
16	18	12	12	16	16
14	18	14	12	16	16
16	16	16	12	18	12
14	16	12	12	18	16
12	16	12	12	17	16
14	16	12	11	12	16
16	15	11	12	16	18
14	16	11	14	16	16
16	16	12	07	17	16
16	19	08	10	16	16
16	16	12	12	16	18
16	16	16	08	18	16
16	16	16	12	18	16
16	14	12	13	18	16
16	18	16	11	16	16
16	15	16	12		20
16	16	12	12		16
16	16	13	13		16
12	16		12		16
13	16		11		18
16	16		13		16
16	16		12		16
16	16		12		16
14	16		12		16
16	16		11		16
16	16		12		16
16			12		16
14			11		16
16			16		16
16			16		16
16			13		17
16			10		16
16			13		16
12			12		14
16			12		16
16			12		16
16			12		18
14			10		16
16			15		15
16			12		18
16			12		16
			09		16
			16		16
					16

TABLE 30 CONTINUED

YEARS OF EDUCATION

Salesmen	Manager Trainee	Foremen	Assistant Foremen	Personnel Staff Managers	Technical Staff Managers
			12		16
			12		16
			08		16
			11		16
			12		16
			12		16
			12		12
			12		12
			13		16
			12		16
			12		
			12		
			11		
			12		
			12		
			12		

TABLE 31

ANALYSIS OF VARIANCE OF EDUCATION

Source of Variation	S S	df	MS	F
Groups	758.67	S	151.73	72.70**
Error	454.97	218	2.09	
Total	1213.64	223		

** P<.01

TABLE 32

PRODUCT MOMENT CORRELATIONS

Correlations of Scores and Age

Name of Trait	r	Name of Trait	r	Name of Trait	r
Achievement	-.003	Affiliation	.006	Nurturance	.027
Deference	.013	Intraception	.006	Change	-.010
Order	.005	Succorance	.016	Endurance	-.005
Exhibition	-.012	Dominance	-.003	Heterosexuality	.013
Autonomy	-.016	Abasement	.010	Aggression	.009

Correlations of Scores and Education

for Foremen and Assistant Foremen

Achievement	.007	Affiliation	.002	Nurturance	-.009
Deference	-.007	Intraception	.003	Change	.000
Order	.001	Succorance	-.005	Endurance	-.000
Exhibition	-.002	Dominance	.012	Heterosexuality	.015
Autonomy	.004	Abasement	-.018	Aggression	.003

Correlations of Scores and Education

for Salesmen, Manager Trainees, Personnel Staff Managers,

and Technical Staff Managers

Achievement	.001	Affiliation	.003	Nurturance	.003
Deference	.002	Intraception	-.000	Change	.002
Order	-.000	Succorance	.002	Endurance	-.000
Exhibition	-.000	Dominance	.000	Heterosexuality	-.000
Autonomy	.001	Abasement	-.006	Aggression	-.000

No correlations are significant.

FORMULA FOR PRODUCT MOMENT CORRELATIONS
(Lordhal, 1967)

$$r = \frac{N\Sigma XY - X\Sigma Y}{\sqrt{\Sigma X^2 - (X)^2}\sqrt{\Sigma Y^2 (Y)^2}}$$

Notations

1. Product Moment Correlations of scores and age

    X = Subject's score

    Y = Subject's age in years

    N = 224

2. Product Moment Correlations of traits and education for foremen and assistant foremen.

    X = Subject's score

    Y = Subject's education level

    N = 81

3. Product Moment Correlations of traits and education for salesmen, manager trainees, personnel staff managers and technical staff managers.

    X = Subject's scores

    Y = Subject's education level

    N = 143

APPENDIX D

RAW SCORES AND STATISTICS FOR THE EPPS

TABLE 33

RAW SCORES OF SALESMEN

Subject #	Ach	Def	Ord	Exh	Aut	Aff	Int	Suc	Dom	Aba	Nur	Chg	End	Het	Agg
1-1	22	14	16	17	05	14	18	08	16	14	10	21	09	22	03
1-2	24	12	11	10	06	16	19	06	21	12	15	13	19	15	11
1-3	13	12	14	12	12	20	13	08	23	07	11	19	19	15	11
1-4	23	14	09	12	04	14	17	06	19	18	12	22	17	13	10
1-5	19	19	10	20	11	18	17	01	21	08	14	14	16	18	08
1-6	17	16	13	13	07	16	11	15	22	10	09	15	20	14	12
1-7	16	13	08	14	08	19	18	04	14	15	11	16	19	16	19
1-8	23	13	18	14	09	15	14	05	22	10	10	18	24	07	08
1-9	19	15	15	14	07	13	18	05	26	13	11	12	20	12	10
1-10	15	10	09	19	09	18	14	08	23	08	11	10	16	24	16
1-11	10	08	12	21	15	19	19	03	21	08	09	18	19	15	13
1-12	15	09	08	16	13	18	02	13	25	14	09	21	11	17	19
1-13	11	12	21	08	08	17	09	12	22	11	17	10	23	17	12
1-14	21	08	04	20	11	16	20	08	20	05	12	22	15	21	07
1-15	19	14	14	14	09	13	24	04	26	07	10	12	19	22	03
1-16	17	15	15	18	05	17	15	06	22	16	08	17	21	10	08
1-17	23	15	07	11	13	18	18	03	17	11	10	20	21	14	09
1-18	11	18	16	18	15	15	12	04	22	12	12	17	17	12	09
1-19	17	07	05	23	08	21	15	14	19	06	19	14	13	18	11
1-20	20	08	09	17	13	08	08	12	25	07	09	19	15	17	23
1-21	23	17	12	15	05	13	14	07	22	10	13	18	16	13	12
1-22	18	10	06	16	13	16	14	04	17	13	21	20	16	15	11
1-23	15	08	08	13	15	16	17	05	18	10	22	15	18	17	13
1-24	20	10	11	17	14	10	16	06	22	12	10	19	21	13	09
1-25	25	12	08	16	10	15	14	03	23	04	12	23	24	11	10
1-26	18	08	08	20	22	16	07	03	26	11	11	17	12	11	20
1-27	16	11	08	17	10	17	15	05	19	22	19	14	25	07	05
1-28	20	14	11	13	08	12	20	10	23	11	16	12	19	12	09
1-29	17	19	19	06	11	18	16	13	21	07	16	13	17	10	07
1-30	17	14	09	13	09	19	21	11	22	14	13	15	13	08	12

TABLE 33 CONTINUED

RAW SCORES OF SALESMEN

Subject #	Traits Ach	Def	Ord	Exh	Aut	Aff	Int	Suc	Dom	Aba	Nur	Chg	End	Het	Agg
1-31	25	18	18	12	09	10	21	07	25	06	09	13	20	05	12
1-32	18	16	14	17	17	10	15	08	24	07	05	20	15	08	16
1-33	17	09	11	15	16	17	12	09	21	17	12	14	12	08	20
1-34	14	10	10	21	11	19	14	03	21	15	09	22	17	13	11
1-35	21	13	11	16	10	17	17	07	23	10	09	17	18	08	12
1-36	18	17	07	15	16	07	23	01	24	10	06	22	13	20	11
1-37	16	19	10	16	12	12	20	04	20	21	11	07	19	11	12
1-38	17	11	16	13	11	12	17	04	25	07	15	20	19	13	10
1-39	18	16	08	18	12	18	18	08	10	15	16	15	22	11	05
1-40	20	10	02	17	18	15	13	09	25	06	15	18	05	23	14
1-41	14	09	17	25	14	13	18	01	23	11	08	18	16	19	04
1-42	19	14	12	18	11	11	15	08	24	07	09	15	19	17	11
1-43	20	14	11	12	12	17	11	03	25	10	09	14	17	20	15

TABLE 34

RAW SCORES OF MANAGER TRAINEES

Subject #	Ach	Def	Ord	Exh	Aut	Aff	Int	Suc	Dom	Aba	Nur	Chg	End	Het	Agg
2-1	26	13	10	13	09	13	11	10	20	05	09	21	17	18	15
2-2	20	14	12	18	12	18	12	09	16	17	13	10	17	18	15
2-3	16	10	18	08	19	17	09	09	20	14	14	12	17	19	03
2-4	12	11	19	10	14	13	16	07	25	19	12	12	25	14	05
2-5	21	16	11	14	08	17	14	05	21	10	15	16	19	08	13
2-6	18	13	12	12	06	15	21	11	20	04	15	16	22	12	08
2-7	20	09	14	13	06	20	09	07	20	17	10	20	17	19	12
2-8	20	15	17	10	16	10	08	06	26	08	09	10	18	10	13
2-9	21	10	11	18	21	15	09	09	22	05	10	14	17	19	19
2-10	14	15	14	19	03	12	19	07	18	17	15	14	19	10	16
2-11	16	14	17	14	09	11	23	05	26	12	06	18	22	12	09
2-12	14	14	13	15	09	14	21	05	22	15	12	16	17	15	07
2-13	19	06	19	18	15	14	09	15	15	06	10	15	23	11	05
2-14	19	08	04	16	14	14	11	05	20	14	08	22	18	20	17
2-15	25	19	20	14	10	10	17	03	22	09	13	13	25	03	07
2-16	14	10	20	17	09	18	06	10	22	11	12	16	19	16	08
2-17	16	10	24	07	10	08	11	08	23	05	12	13	23	28	12
2-18	21	08	13	17	14	15	13	12	23	07	13	14	14	16	10
2-19	12	13	20	08	03	18	23	05	18	20	10	19	18	18	05
2-20	22	17	15	09	08	11	20	03	22	16	09	16	18	15	08
2-21	15	10	15	18	09	17	10	14	20	05	10	19	07	24	17
2-22	21	09	09	19	12	08	23	05	17	06	10	20	18	16	17
2-23	18	15	11	12	09	17	22	07	26	14	16	07	13	12	11
2-24	13	16	12	14	07	17	16	09	22	08	09	16	18	19	14
2-25	17	17	11	10	08	14	15	10	18	14	06	11	25	20	14
2-26	23	12	13	15	12	11	23	03	23	18	04	14	22	04	13
2-27	21	13	07	12	12	15	15	19	17	07	13	17	24	10	05
2-28	23	12	15	20	08	12	12	05	19	15	10	15	19	10	14

TABLE 35

RAW SCORES OF FOREMEN

Subject #	Ach	Def	Ord	Exh	Aut	Aff	Int	Suc	Dom	Aba	Nur	Chg	End	Het	Agg
3-1	19	16	16	11	07	15	22	08	23	10	16	16	18	05	08
3-2	23	18	19	11	08	09	24	04	22	10	05	16	14	13	14
3-3	18	13	17	09	06	22	13	19	14	08	26	10	15	06	14
3-4	18	20	15	11	08	16	07	07	23	14	06	17	23	18	07
3-5	13	19	10	12	04	13	21	07	22	13	12	14	13	18	19
3-6	16	09	04	14	10	17	15	11	20	14	23	14	17	09	15
3-7	18	16	16	11	05	14	21	09	21	15	16	19	20	02	07
3-8	17	13	13	17	05	19	10	11	17	17	20	15	20	09	05
3-9	14	16	16	11	11	11	21	08	26	19	13	07	22	01	14
3-10	14	18	15	08	06	21	17	11	14	18	22	12	25	05	04
3-11	12	14	19	17	06	19	17	09	15	15	17	18	14	10	08
3-12	21	22	11	15	16	13	20	08	15	12	08	09	20	03	17
3-13	19	13	14	14	13	09	18	06	21	14	07	14	23	06	19
3-14	23	21	18	14	10	15	14	06	25	06	13	13	20	03	09
3-15	21	20	14	11	05	14	18	10	24	13	11	11	18	13	07
3-16	21	19	16	19	13	09	19	06	22	10	09	10	25	05	12
3-17	22	12	15	11	10	12	15	11	18	08	14	20	20	13	09
3-18	14	13	16	11	03	17	17	13	17	12	20	07	18	21	11
3-19	16	19	19	11	09	15	17	06	19	19	18	09	24	04	04

TABLE 36

RAW SCORES OF ASSISTANT FOREMEN

Subject #	Traits														
	Ach	Def	Ord	Exh	Aut	Aff	Int	Suc	Dom	Aba	Nur	Chg	End	Het	Agg
4-1	23	11	23	15	14	13	20	04	24	15	07	17	18	12	05
4-2	16	13	09	12	11	15	24	04	21	15	19	13	23	06	09
4-3	17	19	22	19	08	10	18	09	22	09	07	11	20	13	06
4-4	14	15	23	11	08	20	18	07	16	20	11	18	15	05	09
4-5	20	15	22	13	05	15	18	09	11	18	16	12	16	11	07
4-6	12	12	17	10	16	09	20	04	21	16	11	12	20	11	19
4-7	17	17	10	13	13	10	19	03	23	13	22	19	08	07	16
4-8	18	17	20	15	08	11	24	07	20	11	03	11	22	11	12
4-9	14	12	12	16	10	11	18	10	16	16	10	16	21	12	14
4-10	19	17	12	12	02	18	18	10	13	19	14	16	23	10	05
4-11	16	21	26	16	03	08	14	12	07	16	15	03	19	22	12
4-12	18	12	05	17	15	09	13	03	16	17	13	22	15	26	09
4-13	16	21	18	12	10	11	16	10	07	21	20	16	22	03	07
4-14	26	13	15	14	10	06	16	11	22	10	06	21	11	18	11
4-15	16	19	14	12	07	11	15	07	27	12	07	16	16	14	16
4-16	15	21	19	08	07	18	17	08	08	20	22	13	18	12	04
4-17	22	13	11	15	17	10	18	05	24	08	10	15	23	08	11
4-18	16	14	09	12	11	11	20	03	19	21	11	08	23	20	12
4-19	21	19	18	13	09	12	22	12	19	14	11	09	21	05	05
4-20	15	12	16	13	06	17	13	06	20	14	14	21	13	15	15
4-21	18	15	12	18	09	06	17	12	19	14	07	13	26	11	13
4-22	19	05	20	11	11	09	07	07	23	12	13	16	23	23	11
4-23	20	18	13	15	09	10	21	06	17	14	14	14	22	10	07
4-24	21	15	13	17	13	24	11	05	07	16	15	16	20	14	03
4-25	24	18	15	15	13	08	21	05	24	03	05	18	18	12	11
4-26	17	16	23	09	06	16	16	07	21	19	15	12	26	02	05
4-27	19	17	16	13	12	07	25	02	18	16	16	13	21	07	08

TABLE 36 CONTINUED

RAW SCORES OF ASSISTANT FOREMEN

Subject #	Ach	Def	Ord	Exh	Aut	Aff	Int	Suc	Dom	Aba	Nur	Chg	End	Het	Agg
4-28	21	12	09	17	08	14	10	13	17	11	18	13	21	15	11
4-29	24	13	16	12	04	16	22	09	14	13	19	21	14	06	07
4-30	24	14	21	08	02	15	15	08	18	07	13	12	21	20	11
4-31	21	15	14	12	11	10	18	06	25	05	07	19	21	13	13
4-32	20	14	10	15	09	09	23	02	28	13	13	13	18	09	14
4-33	22	16	19	08	10	08	14	09	21	13	10	14	21	08	17
4-34	18	13	20	14	10	17	09	08	13	13	19	10	22	12	12
4-35	18	15	10	16	11	09	11	15	14	15	16	19	18	13	09
4-36	13	19	09	15	06	22	16	14	11	18	26	12	16	13	00
4-37	20	15	13	18	10	08	19	09	22	16	07	10	25	07	11
4-38	15	10	20	12	04	14	21	06	26	14	14	10	25	09	10
4-39	13	21	17	11	13	07	13	10	24	21	14	13	18	05	10
4-40	13	20	23	09	10	15	15	04	12	14	18	16	20	15	06
4-41	22	16	12	16	14	14	14	12	17	12	11	19	15	10	06
4-42	11	18	16	12	07	17	18	04	17	16	18	16	27	08	05
4-43	18	13	21	12	12	08	20	04	27	10	08	12	22	14	07
4-44	22	19	11	09	07	13	22	09	22	14	11	10	17	10	14
4-45	19	09	22	10	09	20	18	03	20	15	15	09	22	11	08
4-46	13	17	09	13	12	13	20	09	18	18	13	20	15	10	10
4-47	17	17	11	11	14	07	16	06	14	17	17	10	20	21	12
4-48	19	21	17	12	03	14	14	13	16	16	15	11	24	04	11
4-49	19	14	13	15	11	18	08	07	16	15	15	15	20	12	12
4-50	19	16	14	17	17	13	11	09	18	10	21	15	12	06	12
4-51	19	10	14	11	20	05	21	09	17	17	04	10	27	11	15
4-52	15	13	11	10	10	14	17	10	23	16	13	18	18	17	05
4-53	14	22	20	15	12	14	10	04	16	16	15	18	17	10	07
4-54	19	16	21	15	09	08	23	09	26	09	04	15	23	07	06
4-55	15	18	14	09	07	16	26	12	16	17	15	08	12	14	11
4-56	13	16	12	18	12	17	22	05	20	16	16	09	18	05	11
4-57	14	18	15	12	06	22	17	16	08	21	23	12	16	00	10
4-58	15	19	24	09	06	14	14	08	19	19	15	18	22	05	03
4-59	18	17	18	09	14	09	19	04	26	12	10	15	23	06	08
4-60	14	10	16	10	13	07	14	10	21	15	08	13	21	25	13
4-61	07	16	12	20	10	16	20	06	20	13	13	11	12	24	10
4-62	10	21	21	12	12	12	20	09	16	14	15	11	24	04	11

TABLE 37

RAW SCORES OF PERSONNEL STAFF MANAGERS

Subject #	Ach	Def	Ord	Exh	Aut	Aff	Int	Suc	Dom	Aba	Nur	Chg	End	Het	Agg
5-1	14	11	07	20	11	18	17	03	17	10	10	22	20	15	15
5-2	20	12	10	15	12	11	22	04	26	08	07	14	17	17	15
5-3	18	14	11	08	10	14	19	08	24	07	13	21	15	16	12
5-4	21	15	12	18	14	13	15	04	20	01	11	20	21	21	04
5-5	19	14	08	18	11	17	27	01	23	03	10	11	11	22	15
5-6	23	14	11	09	15	15	14	06	25	02	14	15	17	15	15
5-7	14	08	10	17	13	07	17	07	24	17	12	18	14	18	14
5-8	25	14	03	16	15	20	19	09	24	09	14	10	09	10	12
5-9	18	15	19	11	18	15	27	08	17	06	08	17	13	16	02
5-10	13	14	16	13	07	21	15	10	24	03	13	22	23	11	05
5-11	21	12	12	16	06	19	23	08	16	10	21	15	12	10	07
5-12	20	15	15	08	13	12	19	01	14	13	20	13	18	09	19
5-13	17	13	03	22	17	15	24	06	17	12	12	18	08	18	08
5-14	22	14	12	14	13	16	21	14	23	04	17	04	07	14	15
5-15	24	15	07	15	11	12	17	06	21	07	12	19	17	17	10
5-16	18	10	17	13	10	18	12	06	23	06	08	10	24	20	15

TABLE 38

RAW SCORES OF TECHNICAL STAFF MANAGERS

Subject #	Ach	Def	Ord	Exh	Aut	Aff	Int	Suc	Dom	Aba	Nur	Chg	End	Het	Agg
6-1	18	11	16	13	07	16	18	03	20	12	15	16	23	18	04
6-2	12	15	14	14	06	15	24	06	10	16	10	14	22	27	05
6-3	22	11	10	16	07	13	23	08	25	08	11	19	17	12	07
6-4	24	21	12	13	08	11	12	09	21	12	14	11	21	12	09
6-5	15	13	11	10	09	16	19	08	25	16	10	22	16	12	07
6-6	17	13	18	13	11	16	12	12	15	05	11	17	23	13	14
6-7	17	19	27	09	05	13	22	10	19	06	16	12	25	07	03
6-8	21	08	10	17	19	11	16	03	14	09	05	18	17	24	18
6-9	17	12	13	15	13	12	04	12	19	22	06	18	11	17	19
6-10	18	11	08	18	18	19	19	09	17	04	09	22	12	13	13
6-11	20	13	09	13	09	21	18	07	19	09	12	21	18	10	10
6-12	17	05	14	14	20	13	07	02	24	06	09	14	20	23	22
6-13	19	17	08	14	13	10	22	06	15	20	09	11	19	22	05
6-14	19	16	22	12	07	13	16	11	21	06	12	17	20	06	12
6-15	18	14	11	20	07	16	11	18	14	05	12	14	13	26	11
6-16	22	10	11	14	10	12	19	07	21	08	12	15	16	19	14
6-17	24	18	13	16	01	13	14	08	24	09	15	20	17	11	07
6-18	18	17	13	17	13	06	17	08	24	06	06	15	18	21	11
6-19	15	16	07	12	08	16	12	12	13	17	11	08	22	24	16
6-20	27	15	15	11	21	10	13	04	23	05	11	17	22	08	08
6-21	19	14	10	17	06	19	06	10	20	07	19	14	23	09	17
6-22	22	16	22	10	08	14	14	11	20	15	10	19	21	05	03
6-23	19	14	16	16	16	12	11	13	18	09	12	09	24	09	12
6-24	21	13	22	13	12	08	20	04	22	10	02	13	26	09	15
6-25	16	15	18	12	06	16	19	03	23	13	14	13	27	07	08
6-26	23	15	12	17	16	05	16	05	22	09	02	23	20	11	13
6-27	09	15	10	11	11	15	21	08	21	09	12	20	19	14	15
6-28	20	16	23	16	11	14	13	09	15	20	10	10	26	01	05

TABLE 38 CONTINUED

RAW SCORES OF TECHNICAL STAFF MANAGERS

Subject #	Ach	Def	Ord	Exh	Aut	Aff	Int	Suc	Dom	Aba	Nur	Chg	End	Het	Agg
6-29	18	17	21	15	15	09	15	06	22	08	05	12	25	03	19
6-30	21	19	22	08	13	11	11	09	20	06	03	11	23	17	16
6-31	18	12	12	16	07	12	15	11	21	16	19	14	21	08	08
6-32	23	04	10	10	14	08	23	07	16	12	12	16	21	16	18
6-33	19	19	21	09	10	10	15	04	27	17	11	05	23	08	12
6-34	18	13	14	17	09	12	02	10	25	18	11	15	19	17	10
6-35	16	14	09	12	10	21	17	06	19	19	20	17	10	15	05
6-36	06	08	13	09	11	19	19	03	15	21	24	14	21	23	02
6-37	25	17	19	12	04	12	12	13	19	08	07	18	21	20	03
6-38	26	06	10	10	16	11	19	03	22	12	09	20	21	09	16
6-39	21	14	13	11	09	15	20	05	25	12	12	08	21	07	17
6-40	16	11	09	12	15	18	22	02	18	14	14	15	21	20	03
6-41	15	16	14	10	08	21	14	10	21	05	19	17	14	10	15
6-42	22	11	09	17	12	17	12	10	15	19	17	14	16	07	12
6-43	14	14	13	16	12	11	17	06	20	10	14	20	18	16	09
6-44	14	21	18	08	05	16	11	09	20	15	12	14	26	13	08
6-45	24	08	14	15	13	06	14	06	22	13	10	12	22	13	18
6-46	18	19	11	16	06	11	22	09	17	11	11	19	19	12	07
6-47	17	14	14	18	10	09	18	04	20	12	09	15	15	19	15
6-48	15	16	13	08	12	09	17	14	15	17	14	19	24	06	11
6-49	19	17	20	18	02	14	11	10	20	07	15	15	17	12	12
6-50	18	15	08	14	06	18	15	15	26	15	20	09	13	05	13
6-51	11	17	16	09	09	17	14	12	19	22	10	10	19	17	08
6-52	19	13	19	17	16	09	16	03	21	17	05	12	22	08	12
6-53	24	10	12	17	15	09	17	06	07	05	08	16	18	27	19
6-54	21	16	23	09	09	06	20	06	24	14	07	06	24	19	06
6-55	17	16	16	15	07	18	22	03	20	11	08	18	19	14	06
6-56	18	13	18	14	11	17	13	08	23	08	10	14	14	16	13

NOTATIONS FOR FORMULAS USED IN APPENDIX D

$\bar{n}_n$ = Harmonic $N = \dfrac{p}{\frac{1}{n}}$

p	=	Number of groups
q	=	Number of traits
Pm	=	Total score for each subject
G	=	Grand Total
G'	=	Grand Mean

A_i	=	Group Score
A_i'	=	Group Mean
B_j	=	Trait Score
B_j'	=	Trait Mean
AB_{ij}	=	Cell Total
AB_{ij}'	=	Cell Mean
n_i	=	Number of Subjects in each group.
N	=	Total Number of Subjects.

FORMULAS FOR SUMS OF SQUARES AND DEGREES OF FREEDOM

Analysis of Variance of Traits and Groups
Fixed Model, Repeated Measures, Unequal N's
(Adapted From Winer, 1967)

Source of Variation	Sums of Squares	Degrees of Freedom	Mean Square	F
Between Subjects	$\dfrac{(\Sigma P_m^2)}{q} - \dfrac{G^2}{pq}$	$N-1$		
Groups (A)	$\bar{n}_n \dfrac{(\Sigma A_i'^2)}{q} - \dfrac{G'^2}{pq}$	$p-1$	$\dfrac{SS\ A}{df}$	$\dfrac{MS\ A}{MS\ s/g}$
Subjects within groups (s/g)	$\dfrac{(\Sigma P_m^2)}{q} - \Sigma\left(\dfrac{A_i^2}{n_i q}\right)$	$N-p$	$\dfrac{SS\ s/g}{df}$	
Within Subjects	$(\Sigma X^2) - \dfrac{(\Sigma P_m^2)}{q}$	$N(q-1)$		
Traits (B)	$\bar{n}_n \left[\dfrac{(\Sigma B_j'^2)}{p} - \dfrac{G'^2}{pq}\right]$	$q-1$	$\dfrac{SS\ B}{df}$	$\dfrac{MS\ B}{MS\ B \times s/g}$
Traits x Groups (AB)	$\bar{n}_n \left[\dfrac{\Sigma(AB_{ij}')^2}{q} - \dfrac{(\Sigma A_i'^2)}{q} - \dfrac{(\Sigma B_j'^2)}{p} + \dfrac{G'^2}{pq}\right]$	$(p-1)(q-1)$	$\dfrac{SS\ AB}{df}$	$\dfrac{MS\ AB}{MS\ B \times s/g}$
Traits x Subjects within groups (B x s/g)	$(\Sigma X^2) - \dfrac{(AB_{ij})^2}{n_i} - \dfrac{(\Sigma P_m^2)}{q} + \Sigma\left[\dfrac{A_i^2}{n_i q}\right]$	$(N-p)(q-1)$	$\dfrac{SS\ B \times s/g}{df}$	
Total	$\Sigma\Sigma X - \dfrac{G^2}{N}$	$(Nq-1)$		

FORMULAS FOR ANALYSIS OF SIMPLE EFFECTS

(Adapted From Winer, 1967)

Source of Variation	Sums of Squares	Degrees of Freedom	Mean Square	F
a (groups) at b (traits)	$\overline{n}_n \left[(\Sigma AB'^2_{ij}) - \dfrac{B_j}{p} \right]$	$p-1$	$\dfrac{SS\ a\ at\ b}{df}$	$\dfrac{MS\ a\ at\ b}{MS\ w.\ cells}$
Within Cells (w. cells)	SS within groups + SS b x s/g	$Q\ (N-p)$	$\dfrac{SS\ w.\ cells}{df}$	
b (traits) at a (groups)	$\overline{n}_n \left[\Sigma(AB_{ij}')^2 - \dfrac{(\Sigma A_i'^2)}{p} \right]$	$q-1$	$\dfrac{SS\ b\ at\ a}{df}$	$\dfrac{MS\ b\ at\ a}{MS\ b\ x\ s/g}$
b x Subjects within groups (b x s/g)	$(\Sigma X^2) - \Sigma \left[\dfrac{(AB_{ij})^2}{n_i} \right] - \dfrac{(\Sigma P^2)}{q} + \Sigma \left[\dfrac{A^2}{n_i q} \right]$	$(N-p)(q-1)$	$\dfrac{SS\ b\ x\ s/g}{df}$	

TABLE 39

POST-HOC ANALYSIS GROUPS WITHIN TRAITS - DEFERENCE

		2	3	4	5	6
s =	.66					
$q_{.99}$ (r,218)		3.67	4.12	4.40	4.60	4.76
$s \, q_{.99}$(r,218)		1.97	2.21	2.36	2.47	2.56

Ordered Means

MT	S	PSM	TSM	AF	F
12.46	12.72	13.13	14.00	15.65	16.37

Differences between means

	MT	S	PSM	TSM	AF	F
MT		.26	.67	1.54	3.19**	3.91**
S			.41	1.28	2.93**	3.65**
PSM				.87	2.52**	3.24**
TSM					1.65	2.37**
AF						.72

** = P<.01

Note
S = Salesmen
MT= Manager Trainees
F = Foremen
AF= Assistant Foremen
PSM= Personnel Staff Managers
TSM= Technical Staff Managers

TABLE 40

POST-HOC ANALYSIS OF GROUPS WITHIN TRAITS - ORDER

s = .66	2	3	4	5	6
q.99 (r,218)	3.67	4.12	4.40	4.60	4.76
s q.99(r,218)	1.97	2.21	2.36	2.47	2.56

Ordered Means

PSM	S	MT	TSM	F	AF
10.81	11.19	14.14	14.39	14.89	15.60

Differences between means

	PSM	S	MT	TSM	F	AF
PSM		.38	3.33**	3.58**	4.08**	4.79**
S			2.95**	3.20**	3.70**	4.41**
MT				.25	.75	1.46
TSM					.50	1.21
F						.71

** = P<.01

TABLE 41

POST-HOC ANALYSIS OF GROUPS WITHIN TRAITS - INTRACEPTION

s = .66	2	3	4	5	6
$q_{.99}$ (r,218)	3.67	4.12	4.40	4.60	4.76
s $q_{.99}$(r,218)	1.97	2.21	2.36	2.47	2.56

Ordered Means

MT	S	TSM	S	AF	PSM
14.93	15.56	15.73	17.16	17.24	19.25

Differences between means

	MT	S	TSM	F	AF	PSM
MT		.63	.80	2.23	2.31	4.32**
S			.17	1.60	1.68	3.69**
TSM				1.43	1.51	3.52**
F					.08	2.09
AF						2.01

** = $P < .01$

TABLE 42

POST-HOC ANALYSIS OF GROUPS WITHIN TRAITS - ABASEMENT

s = .66	2	3	4	5	6
q.99 (r,218)	3.67	4.12	4.40	4.60	4.76
s q.99(r,218)	1.97	2.21	2.36	2.47	2.56

Ordered Means

PSM	S	MT	TSM	F	AF
7.38	10.88	11.36	11.73	13.00	14.52

Differences between means

	PSM	S	MT	TSM	F	AF
PSM		3.50**	3.98**	4.35**	5.62**	7.14**
S			.48	.85	2.12	3.64**
MT				.37	1.64	3.16**
F					1.27	2.79**
AF						1.52

** = P<.01

TABLE 43

POST-HOC ANALYSIS OF GROUPS WITHIN TRAITS - ENDURANCE

		2	3	4	5	6
s	= .66					
$q_{.99}$ (r,218)		3.67	4.12	4.40	4.60	4.76
s $q_{.99}$ (r,218)		1.97	2.21	2.36	2.47	2.56

Ordered Means

PSM	S	MT	AF	F	TSM
15.38	17.35	18.93	19.47	19.53	19.73

Differences between means

	PSM	S	MT	AF	F	TSM
PSM		1.97**	3.55**	4.09**	4.15**	4.35**
S			1.58	2.12	2.18	2.38
MT				.54	.60	.80
AF					.06	.26
F						.20

** = P<.01

TABLE 44

POST-HOC ANALYSIS OF GROUPS WITHIN TRAITS - HETEROSEXUALITY

		2	3	4	5	6
s =	.66					
q.99 (r,218)		3.67	4.12	4.40	4.60	4.76
s q.99 (r,218)		1.97	2.21	2.36	2.47	2.56

Ordered Means

F	AF	TSM	S	MT	PSM
8.63	11.37	13.71	14.28	14.93	15.56

Differences between means

	F	AF	TSM	S	MT	PSM
F		2.74**	5.08**	5.65**	6.30**	6.93**
AF			2.34**	2.91**	3.56**	4.19**
TSM				.57	1.22	1.85
S					.65	1.28
PSM						.63

** = P<.01

TABLE 45

POST-HOC ANALYSIS-TRAITS WITHIN GROUPS - SALESMEN

S = .66		2	3	4	5	6	7	8	9	10	11	12	13	14	15
$q.99(r,3052)$		3.64	4.12	4.40	4.60	4.76	4.88	4.99	5.08	5.16	5.23	5.29	5.35	5.40	5.45
$S\ q.99(r,3205)$		2.40	2.72	2.90	3.04	3.14	3.22	3.29	3.35	3.41	3.45	3.49	3.53	3.57	3.60

Ordered Means

Suc.	Aba.	Aut.	Ord.	Agg.	Nur.	Def.	Het.	Aff.	Int.	Exh.	Chg.	End.	Ach.	Dom.
6.60	10.88	11.02	11.19	11.21	11.98	12.72	14.28	15.23	15.56	15.63	16.53	17.35	18.15	21.60

Differences between means

	Suc.	Aba.	Aut.	Ord.	Agg.	Nur.	Def.	Het.	Aff.	Int.	Exh.	Chg.	End.	Ach.	Dom.
Suc.		4.28**	4.42**	4.59**	4.61**	5.38**	6.12**	7.68**	8.63**	8.96**	9.03**	9.93**	10.75**	11.56**	15.00**
Aba.			.14	.31	.33	1.10	1.84	3.40**	4.35**	4.68**	4.75**	5.65**	6.47**	7.28**	10.72**
Aut.				.17	.19	.96	1.70	3.26**	4.21**	4.54**	4.61**	5.51**	6.33**	7.14**	10.58**
Ord.					.02	.79	1.53	3.09**	4.04**	4.37**	4.44**	5.34**	6.16**	6.79**	10.41**
Agg.						.77	1.51	3.07**	4.02**	4.35**	4.42**	5.32**	6.14**	6.95**	10.39**
Nur.							.74	2.30	3.25**	3.58**	3.65**	4.55**	5.37**	6.18**	9.62**
Def.								1.56	2.51	2.84	2.91	3.81	4.63**	5.44**	8.88**
Het.									.95	1.28	1.35	2.25	3.07	3.88**	7.32**
Aff.										.33	.40	1.30	2.12	2.93	6.37**
Int.											.07	.97	1.79	2.60	6.04**
Exh.												.90	1.72	2.53	5.97**
Chg.													.82	1.63	5.07**
End.														.81	4.25**
Ach.															3.44**

** = $P < .01$

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TABLE 46

POST-HOC ANALYSIS-TRAITS WITHIN GROUPS - MANAGER TRAINEES

S = .66

	2	3	4	5	6	7	8	9	10	11	12	13	14	15
q.99(r,3052)	3.64	4.12	4.40	4.60	4.76	4.88	4.99	5.08	5.16	5.23	5.29	5.35	5.40	5.45
S q.99(r,3205)	2.40	2.72	2.90	3.04	3.14	3.22	3.29	3.35	3.41	3.45	3.49	3.53	3.57	3.60

Ordered Means

Suc.	Aut.	Nur.	Agg.	Aba.	Def.	Exh.	Aff.	Ord.	Int.	Het.	Chg.	Ach.	End.	Dom.
7.96	10.43	10.89	11.07	11.36	12.46	13.93	14.07	14.14	14.93	14.93	15.39	18.46	18.93	20.89

Differences between means

	Suc.	Aut.	Nur.	Agg.	Aba.	Def.	Exh.	Aff.	Ord.	Int.	Het.	Chg.	Ach.	End.	Dom.
Suc.		2.47	2.93	3.11	3.40	4.50**	5.97**	6.11**	6.18**	6.97**	6.97**	7.43**	10.50**	10.97**	12.93**
Aut.			.46	.64	.93	2.03	3.50	3.64	3.71	4.50	4.50**	4.96**	8.03**	8.50**	10.46**
Nur.				.18	.47	1.57	3.04	3.18	3.25	4.04	4.04	4.50**	8.57**	8.04**	10.46**
Agg.					.29	1.39	2.86	3.00	3.07	3.86	3.86	4.32**	7.39**	7.86**	10.00**
Aba.						1.10	2.57	2.71	2.78	3.57	3.57	4.03	7.10**	7.57**	9.82**
Def.							1.47	1.61	1.68	2.47	2.47	2.93	6.00**	6.47**	8.43**
Exh.								.14	.21	1.00	1.00	1.46	4.53**	5.00**	6.96**
Aff.									.07	.86	.86	1.32	4.39**	4.86**	6.96**
Ord.										.79	.79	1.25	4.32**	4.75**	6.75**
Int.											=0=	.46	3.53**	4.00**	5.96**
Het.												.46	3.53**	4.00**	5.96**
Chg.													3.07**	3.54**	5.50**
Ach.														.47	2.43
End.															1.96

** = P<.01

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TABLE 47

POST-HOC ANALYSIS-TRAITS WITHIN GROUPS - FOREMEN

S = .66	2	3	4	5	6	7	8	9	10	11	12	13	14	15
q.99(r,3052)	3.64	4.12	4.40	4.60	4.76	4.88	4.99	5.08	5.16	5.23	5.29	5.35	5.40	5.45
S q.99(r,3205)	2.40	2.72	2.90	3.04	3.14	3.22	3.29	3.35	3.41	3.45	3.49	3.53	3.57	3.60

Ordered Means

Aut.	Het.	Suc.	Agg.	Exh.	Aba.	Chg.	Nur.	Aff.	Ord.	Def.	Int.	Ach.	End.	Dom.
8.16	8.63	8.95	10.68	12.26	13.00	13.21	14.53	14.74	14.89	16.37	17.16	17.84	19.53	19.90

Differences between means

	Aut.	Het.	Suc.	Agg.	Exh.	Aba.	Chg.	Nur.	Aff.	Ord.	Def.	Int.	Ach.	End.	Dom.
Aut.		.47	.79	2.52	4.10	4.84**	5.05**	6.37**	6.58**	6.73**	8.21**	9.00**	9.68**	11.37**	11.74**
Het.			.32	2.05	3.63	4.37	4.58	5.90**	6.11**	6.26**	7.74**	8.53**	9.21**	10.90**	11.27**
Suc.				1.73	3.31	4.05	4.26	5.58**	5.79**	5.94**	7.42**	8.21**	8.89**	10.58**	10.95**
Agg.					1.58	2.23	2.53	3.85	4.06	4.21	5.69**	6.40**	7.16**	8.85**	9.22**
Exh.						.74	.95	2.27	2.48	2.63	4.11	4.90	5.58**	7.27**	7.64**
Aba.							.21	1.53	1.74	1.89	3.37	4.16	4.84	6.53**	6.90**
Chg.								1.32	1.53	1.68	3.16	3.95	4.63	6.32**	6.69**
Nur.									.21	.36	1.84	2.63	3.31	5.00**	5.37**
Aff.										.15	1.63	2.42	3.10	4.79**	5.16**
Ord.											1.48	2.27	2.95	4.64**	5.01**
Def.												.79	1.47	3.16**	3.53**
Int.													.68	2.37**	2.74**
Ach.														1.69**	2.06**
End.															.37

** = $P < .01$

TABLE 48

POST-HOC ANALYSIS-TRAITS WITHIN GROUPS - ASSISTANT FOREMEN

S = .66		2	3	4	5	6	7	8	9	10	11	12	13	14	15
q.99(r,3052)		3.64	4.12	4.40	4.60	4.76	4.88	4.99	5.08	5.16	5.23	5.29	5.35	5.40	5.45
S q.99(r,3205)		2.40	2.72	2.90	3.04	3.14	3.22	3.29	3.35	3.41	3.45	3.49	3.53	3.57	3.60

Ordered Means

Suc.	Agg.	Aut.	Het.	Aff.	Exh.	Nur.	Chg.	Aba.	Ord.	Def.	Int.	Ach.	Dom.	End.
7.73	9.60	9.81	11.37	12.58	13.06	13.27	14.00	14.52	15.60	15.65	17.24	17.47	18.44	19.47

Differences between means

	Suc.	Agg.	Aut.	Het.	Aff.	Exh.	Nur.	Chg.	Aba.	Ord.	Def.	Int.	Ach.	Dom.	End.
Suc.		1.87	2.08	3.64**	4.85**	5.33**	5.54**	6.27**	6.79**	7.87**	7.92**	9.51**	9.74**	10.71**	11.74**
Agg.			.21	1.77	2.98**	3.46**	3.67**	4.40**	4.92**	6.00**	6.05**	7.64**	7.87**	8.84**	9.87**
Aut.				1.56	2.77	3.25**	3.46**	4.19**	4.71**	5.79**	5.84**	7.43**	7.66**	8.63**	9.66**
Het.					1.21	1.69	1.90	2.63**	3.15**	4.23**	4.28**	5.87**	6.10**	7.07**	8.10**
Aff.						.48	.69	1.42	1.94	3.02**	3.07**	4.66**	4.89**	5.86**	6.89**
Exh.							.21	.94	1.46	2.54**	2.59**	4.18**	4.41**	5.38**	6.41**
Nur.								.73	1.25	2.33	2.38	3.97**	4.20**	5.17**	6.20**
Chg.									.52	1.60	1.65	3.24**	3.47**	4.44**	5.47**
Aba.										1.08	1.13	2.72**	2.95**	3.92**	4.95**
Ord.											.05	1.64	1.87	2.84**	3.87**
Def.												1.59	1.82	2.79**	3.82**
Int.													.23	1.20	2.23
Ach.														.97	2.00
Dom.															1.03

** = P<.01

TABLE 49

POST-HOC ANALYSIS-TRAITS WITHIN GROUPS - PERSONNEL STAFF MANAGERS

S = .66	2	3	4	5	6	7	8	9	10	11	12	13	14	15
q.99(r,3052)	3.64	4.12	4.40	4.60	4.76	4.88	4.99	5.08	5.16	5.23	5.29	5.35	5.40	5.45
S q.99(r,3205)	2.40	2.72	2.90	3.04	3.14	3.22	3.29	3.35	3.41	3.45	3.49	3.53	3.57	3.60

Ordered Means

Suc.	Aba.	Ord.	Agg.	Aut.	Nur.	Def.	Exh.	Aff.	End.	Chg.	Het.	Ach.	Int.	Dom.
6.31	7.38	10.81	11.44	12.25	12.63	13.13	14.56	15.19	15.38	15.56	15.56	19.19	19.25	21.12

Differences Between Means

	Suc.	Aba.	Ord.	Agg.	Aut.	Nur.	Def.	Exh.	Aff.	End.	Chg.	Het.	Ach.	Int.	Dom.
Suc.		1.07	4.50**	5.13**	5.94**	6.32**	6.82**	8.25**	8.88**	9.07**	9.25**	9.25**	12.88**	12.94**	14.81**
Aba.			3.43	4.06	4.87**	5.25**	5.75**	7.18**	7.81**	8.00**	8.18**	8.18**	11.81**	11.87**	13.74**
Ord.				.63	1.44	1.82	2.32	3.75	4.38	4.57	4.75	4.75	8.38**	8.44**	10.31**
Agg.					.81	1.19	1.69	3.12	3.75	3.94	4.12	4.12	7.75**	7.81**	9.68**
Aut.						.38	.88	2.31	2.94	3.13	3.31	3.31	6.94**	7.00**	8.87**
Nur.							.50	1.93	2.56	2.75	2.93	2.93	6.56**	6.62**	8.49**
Def.								1.43	2.06	2.25	2.43	2.43	6.06**	6.12**	7.99**
Exh.									.63	.82	1.00	1.00	4.63	4.69	6.56**
Aff.										.19	.37	.37	4.00	4.06	5.93**
End.											.18	.18	3.81	3.87	5.74**
Chg.												=0=	3.63	3.69	5.56**
Het.													3.63	3.69	5.56**
Ach.														.06	1.93
Int.															1.87

** = P<.01

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TABLE 50

POST-HOC ANALYSIS-TRAITS WITHIN GROUPS - TECHNICAL STAFF MANAGERS

S = .66	2	3	4	5	6	7	8	9	10	11	12	13	14	15
q.99(r,3052)	3.64	4.12	4.40	4.60	4.76	4.88	4.99	5.08	5.16	5.23	5.29	5.35	5.40	5.45
S q.99(r,3205)	2.40	2.72	2.90	3.04	3.14	3.22	3.29	3.35	3.41	3.45	3.49	3.53	3.57	3.60

Ordered Means

Suc.	Aut.	Agg.	Nur.	Aba.	Aff.	Exh.	Het.	Def.	Ord.	Chg.	Int.	Ach.	Dom.	End.
7.79	10.43	11.00	11.30	11.73	13.23	13.48	13.71	14.00	14.39	14.95	15.73	18.61	19.73	19.73

Differences between means

	Suc.	Aut.	Agg.	Nur.	Aba.	Aff.	Exh.	Het.	Def.	Ord.	Chg.	Int.	Ach.	Dom.	End.
Suc.		2.64**	3.21**	3.51**	3.94**	5.44**	5.69**	5.92**	6.21**	6.60**	7.16**	7.94**	10.82**	11.94**	11.94**
Aut.			.57	.87	1.30	2.80**	3.05**	3.28**	3.57**	3.96**	4.52**	5.30**	8.18**	9.30**	9.30**
Agg.				.30	.73	2.23	2.48	2.71**	3.00**	3.39**	3.95**	4.73**	7.61**	8.73**	8.73**
Nur.					.43	1.93	2.18	2.41	2.70**	3.09**	3.65**	4.43**	7.31**	8.43**	8.43**
Aba.						1.50	1.75	1.98	2.27	2.66**	2.22**	4.00**	6.88**	8.00**	8.00**
Aff.							.25	.48	.77	1.16	1.72	2.50**	5.38**	6.50**	6.50**
Exh.								.23	.52	.91	1.47	2.25	5.13**	6.25**	6.25**
Het.									.29	.68	1.24	2.02	4.90**	6.02**	6.02**
Def.										.39	.95	1.73	4.61**	5.73**	5.73**
Ord.											.56	1.34	4.22**	5.34**	5.34**
Chg.												.78	3.66**	4.78**	4.78**
Int.													2.88**	4.00**	4.00**
Ach.														1.12	1.12
Dom.															=0=

** = P<.01

APPENDIX E

FORMULA FOR DISTANCE FUNCTION

$$D = \sqrt{(x - y)^2 + \dots}$$

FORMULA FOR DISTANCE FUNCTION
(Nunnally, 1967)

$$D = \sqrt{(a - b)^2} =$$

$$\sqrt{(T_1 G_1 - T_1 G_2)^2 + (T_2 G_1 - T_2 G_2)^2 + (T_3 G_1 - T_3 G_2)^2 + \ldots + (T_i G_1 - T_i G_2)^2}$$

Notations

a = Trait for the First Group   T = Trait

b = Trait for the Second Group   G = Group

i = Number of traits   D = Distance Function

APPENDIX F

DEFINITIONS OF TERMS USED TO DESCRIBE THE PROFILES OF EACH GROUP

DEFINITIONS OF TERMS USED TO DESCRIBE
THE PROFILES OF EACH GROUP

Extremely High. A group is considered to be extremely high on a trait if they rank that trait significantly higher than all other traits and if their score on that trait is as high as the 85th percentile when compared to the general adult norm.

High. A groups is considered to be high on a trait if they scored significantly higher on that trait than on four other traits and if their score on that trait is as high as the 75th percentile when compared to the general adult norm.

Moderate. A group is considered to be moderate on a trait if they do not rank that trait significantly higher than four other traits, and if when compared to the general adult population the trait falls between the 30th and 75th percentile.

Low. A group is considered to be low on a trait if they rank that trait significantly lower than four other traits and if that trait falls below the 30th percentile when compared to the general adult population.

Extremely Low. A group is considered extremely low on a trait if they rank that trait significantly lower than four other traits and if that trait falls below the 30th percentile when compared to the general adult population.

If a group does not have any traits which meet the criterion of significant differences and percentile ranks, the traits which closest meet these criteria are described as high and low.