

UNCLASSIFIED

AD - 4 2 3 9 6 4

DEFENSE DOCUMENTATION CENTER

FOR

SCIENTIFIC AND TECHNICAL INFORMATION

CAMERON STATION, ALEXANDRIA, VIRGINIA



UNCLASSIFIED

NOTICE: When government or other drawings, specifications or other data are used for any purpose other than in connection with a definitely related government procurement operation, the U. S. Government thereby incurs no responsibility, nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use or sell any patented invention that may in any way be related thereto.

CATALOGED BY DDC

AS AD No. 423964

GRADUATE SCHOOL OF BUSINESS

STANFORD UNIVERSITY

PERCEPTION OF LEADERSHIP IN SMALL GROUPS

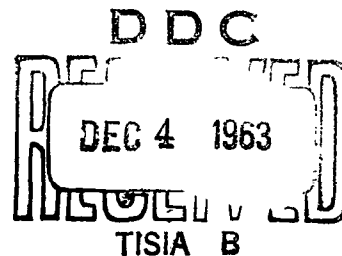
Thomas W. Harrell, Principal Investigator

Technical Report Number 4

Correlations Between Seven Leadership Criteria
and Selected Variables

Lucy E. Burnham and Hans E. Lee

November, 1963



Prepared for:

Group Psychology Branch

Office of Naval Research

Nonr - 225 (62)

Reproduction of this report in whole or in part is permitted for any
purpose of the United States Government

Correlations Between Seven Leadership Criteria
and Selected Variables

Problem

The overall plan for the study of leadership emergence in small groups includes an attempt to predict the seven criteria of leadership from numerous test variables by performing multiple regression analyses. This report, presented as a preliminary study to carrying out these regression analyses, involves a study of the rank order correlations between the seven criteria of leadership and nine variables which were selected from the total test battery. The purpose of this study was to see whether personality test variables could be used to describe members of a small group. The results of previous reports, particularly the finding in Technical Report #3 that the observation data and the sociometric data were highly correlated, influenced the decision to conduct a preliminary study. There was also a concern, as indicated by the results reported in Technical Report #2, that perhaps sociometric choices could not be predicted as well by personality variables as they could be predicted by performance variables such as academic achievement. All of these considerations were taken into account in the present study.

Method

As reported in Technical Report #3, data were collected on 34 four- and five-man groups who performed in task-oriented small discussion groups. Seven criteria of leadership were obtained as listed in Table 1. In

addition, each member of these groups had taken a battery of nine personality tests called the Management Potential Test Battery (MPTB) which includes the grade point average as listed in Table 1. The nine variables used in this study were selected from the total MPTB variables on the following bases. In a review of the literature conducted prior to the initiation of the small group studies, it was found that three scales which were available in the MPTB were significantly correlated with leadership in similar studies (Bass, 1953; Haythorn, 1958; and Mann, 1959). These same three scales, the Ascendance scale (GZ-As) and the Social Interest scale (GZ-SI) both from the Guilford-Zimmerman Temperament Survey, and the Public Opinion Questionnaire (POQ) which is a modification of the California F scale, were selected to be included in this study. Three additional variables were selected because they correlated $\pm .20$ or greater with the number of positive boss ratings received, as reported in Technical Report #2. These scales are the MMPI-Pt scale, the General Activity scale (GZ-GA) from the Guilford-Zimmerman Temperament Survey, and the Consideration scale (LOQ-C) from the Leadership Opinion Questionnaire. The other variables included in this study were the grade point average earned in the first year of a two-year Master of Arts in Business program (GPA-1), and the verbal and quantitative scores from the Admissions Test for the Graduate School of Business given by Educational Testing Service (ETS-V and ETS-Q). These last three variables were used because Technical Report #2 had suggested that they would produce higher correlations than the other MPTB variables with the leadership criteria.

The data used in this study were rank order scores for both the leadership criteria and the selected variables. For each leadership criterion,

such as category A, average scores were obtained for the members of the group and these average scores were reranked within the group. These are the same leadership data as were used for the correlations reported in Technical Report #3. Not all of the seven leadership criteria available for each group were used, only those criteria which showed agreement among the raters significant at the .05 level or greater as reported in Technical Report #1. The rationale for this selection was that the ranked averages for these criteria would be more reliable when there was significant agreement among the raters. The data for the nine MPTB variables were ranked for the four or five men within each group. Using Spearman's rank order correlation method, the rank scores for these nine variables were correlated with the ranks for each leadership criterion within each group which showed significant agreement among the raters. The number of correlations available for any given distribution will vary according to this restriction of significant agreement on the leadership criteria.

Frequency distributions of these results are reported in Table 2 along with the number of cases which were available for analysis. The rank order correlations in each distribution were converted to z scores (McNemar, 1962) with a correlation of 1.00 treated as .99 throughout. Average z scores were then calculated for each distribution and, reconverted to average correlations, are presented in Table 2. All of the correlations reported in this study were performed on the average z scores which allows a nearly normal distribution of correlations. Table 2 is the only table where the actual or average correlations are reported. Although Total Activity is included in Tables 2 and 3, it is not included in the

**THIS
PAGE
IS
MISSING
IN
ORIGINAL
DOCUMENT**

between POQ and Question 2 or guidance. Not only are these two significant results in the opposite directions for the observation and the sociometric data, but all of the average z scores for POQ and the observation data are in the positive direction while all of the average z scores for POQ and the sociometric data are in the negative direction. This seems to be a substantial indication that the observation data are measuring something different from the sociometric data.

Reported in Table 4 are the results of the distribution of the average z scores across the rows. In order to study this effect, the absolute values of the z scores along any particular row were divided into above and below the median z score for that row. Excluding Category C due to the lack of data, this division into above and below the median was done for all of the rows. The purpose was to point out any consistency of particular MPTB variables to produce high correlations across all of the leadership criteria. Considering these calculations across the rows, the results of which may be read at the bottom of each column in Table 4, there seems to be some consistency in the correlations between any one MPTB variable and all of the leadership criteria. Both GPA-1 and POQ show average z scores above the median of the rows for four out of five of the criteria. These results lend themselves to the conclusion that GPA-1 and POQ are measuring something which is common to nearly all of the leadership criteria. The non-uniform distributions of the other variables suggest that these variables are tapping various aspects of the leadership criteria.

Turning to an analogous technique but here applied to the columns, the results of which may be read from the end of each row in Table 5, two

of the leadership criteria show consistently high correlations across the MPTB variables. For both category A and Question 2, seven out of nine of the average z scores are above the median for the columns. Again, this suggests that both Category A and Question 2 have qualities in common with a number of different variables while the other criteria show differential correlations with the variables. It is interesting that, while Category A shows high correlations with most of the MPTB variables, GPA-1 is one out of the two variables with which Category A shows a lack of correlation. This is encouraging in the consideration of previous results which had indicated that the grade point average would non-discriminately correlate with all of the criteria.

Of the seven leadership criteria, Category A and Question 2 are the most correlated with the selected variables. Considering the MPTB variables, GPA-1 and POQ show the highest correlations with the seven leadership criteria. In the light of these results, attention should be called to the intersections between the rows and the columns for Category A, POQ, Question 2, and GPA-1, as have been indicated in Table 6. Of these four average z scores, all are significantly correlated beyond the .05 level except Category A and GPA-1 which shows an average z score of .14. It should also be noted that the correlation between POQ and Question 2 is negative. This particular pattern seems to indicate further support of the hypothesis that the observation data and the sociometric choices are measuring different qualities.

Discussion

The observation data show two positive significant correlations with the MPTB variables, LOQ-C and POQ. The observation data did not show high correlations with the GPA-1. This supports the hypotheses of this study; one, that test variables and not only the GPA would be significantly correlated with the leadership criteria, and the other, that the two instruments for measuring leadership, the observation codings and the sociometric choices, would give different information.

The significant results for the sociometric data are in the negative direction with the exception of the GPA-1 results. As far as the variables MMPI-Pt, GZ-DI, and POQ are concerned, it would seem that sociometric choices are based on the absence of certain characteristics rather than the presence of them. That the GPA-1 showed high positive correlation with sociometric choice is interesting in the light of a bias which may have influenced previous results concerning the grade point average. In Technical Report #2, where the total GPA was the best predictor of the sociometric choices for boss, this GPA may have been known among the students who were doing the rating and, therefore, may have biased the results. For the present study, the GPA itself could not have been known as the small group studies were conducted during the first few weeks of the first year when even grades for class work had not yet been given. Sociometric choices for leadership in small groups appears based on the same type of class performance which is rewarded by the grade point average.

The pattern of correlations between Category A, Question 2, POQ, and GPA-1, shown schematically in Table 6, has theoretical importance as well

as supporting the rationale for this study. Category A is a measure of observed behavior where the observers are asked to code strictly goal-oriented acts in this category. It seems that this behavior is characterized by high authoritarianism (POQ) but does not depend on qualities associated with a high grade point average. The sociometric questionnaire represents choices among the members of the group where Question 2 reflects a social facilitation phenomenon. This behavior is characterized by the reverse of the task-oriented behavior, that is, qualities which are associated with a high grade point average and a low authoritarianism. These results have support in other leadership studies (Bales, 1950) which have found that groups are characterized by two types of leaders, the task leader and the socio-emotional leader.

A hypothesis for further research is suggested by the sociometric data. Considering that GPA is highly correlated with both peer ratings for desirability as boss and Question 2 for the guidance of the group, it is hypothesized that boss ratings will also be correlated with guidance. If this hypothesis is confirmed, another significant step will be made toward understanding the qualities which represent desirability as boss and toward specifying the characteristics of the leader in small groups.

Summary

The purpose of this study was to indicate whether personality test variables would be useful in predicting criteria of leadership. A corollary purpose was to study the relationship between the two instruments for measuring leadership, observation codings and sociometric choices, in the way they correlated with selected Management Potential Test Battery variables.

While the GPA-1 showed significant correlations with the sociometric data, average correlation is $+0.57$ with guidance of the group, GPA-1 was not highly correlated with any of the observation data. In addition, the POQ proved to be significantly correlated with both the observation data, average correlation with task-oriented acts is $+0.50$, and the sociometric data, average correlation with guidance is -0.37 . These results, particularly where the POQ correlated in the opposite directions with the observation data and the sociometric data, indicate that the sociometric choices by members of the group are based on different qualities of leadership than are observers' ratings of the same group behavior. Thus it may be possible to obtain other personality correlates which will discriminate between different types of leadership activity in the small group.

Of theoretical importance is the finding that observation codings and the sociometric choices seem to be measuring two different types of leadership behavior, task-oriented behavior and socio-emotional behavior. The task leader is characterized by high authoritarianism while the socio-emotional leader is characterized by high academic achievement and low authoritarianism.

Future analyses of these small group data plan to include using all of the MPTB variables to predict each of the seven leadership criteria in order to further understand the personality correlates of small group leadership behavior.

References

- Bales, Robert F. Interaction Process Analysis: A method for the study of small groups. Cambridge: Addison-Wesley Press, 1950.
- Bass, B. M., Wurster, C. R., Doll, and Clair, D. J. "Situational factors in leadership among sorority women." Psych. Monographs, 1953, 67, 16.
- Harrell, T. W. "Perception of leadership in small groups." ONR Technical Report #1, Graduate School of Business, Stanford University, February 1963.
- Harrell, T. W. "Correlation between peer ratings and behavior patterns." ONR Technical Report #2, Contract Nonr 225(62), Graduate School of Business, Stanford University, May 1963.
- Harrell, T. W. "A comparison of the results obtained from various measures of leadership behavior." ONR Technical Report #3, Contract Nonr 225(62), Graduate School of Business, Stanford University, July 1963.
- Haythorn, W. "The effects of varying combinations of authoritarian and equalitarian leaders and followers." In Maccoby, E. et. al., (eds) Readings in Social Psychology. New York: Henry Holt and Co., 1958.
- Mann, R. D. "A review of the relationship between personality and performance in small groups." Psych. Bull., 1959, 56, 241-270.
- McNemar, Q. Psychological Statistics. New York: John Wiley and Sons, Inc., 1962.

Table 1

Available Data for Small Group Studies

Leadership Criteria

Observation data:

Category A - Task-oriented acts

Category B - Group solidarity acts

Category C - Individual prominence acts

Total Activity - Summation of Categories A, B, and C

Sociometric data:

Question 1 - Who contributed the best ideas during the discussion? (best ideas)

Question 2 - Who did the most to guide the discussion and keep it moving effectively? (guidance)

Question 3 - Which member of the group stood out most definitely as the leader in the discussion? (leader)

Management Potential Test Battery (MPTB) Variables

Strong Vocational Interest Blank:

Engineer

Production Manager

Personnel Director

Accountant

Sales Manager

President of Manufacturing Concern

Masculinity-Femininity

(Table continued on next page)

Minnesota Multiphasic Personality Inventory:

K, Hs, D, Hy, Pd, Mf, Pa, Pt, Sc, Ma, Si,

Ego Strength

Dominance

Bulford-Zimmerman Temperament Survey:

General Activity

Restraint

Ascendance

Social Interest

Emotional Stability

Objectivity

Friendliness

Thoughtfulness

Personal Relations

Masculinity

Leadership Opinion Questionnaire:

Consideration

Initiating Structure

Ghiselli Self-Description Inventory:

Supervisory Qualities

Initiative

Self-Assurance

Decision-Making

Test of Imagination:

n Achievement

n Affiliation

n Power

(Table continued on next page)

Personnel Problems

Public Opinion Questionnaire

Graduate School of Business - Grade Point Average

Table 2

Distributions of Spearman's Rank Order Correlations Between
Seven Leadership Criteria and Nine MPTB Variables¹

Category A Group Task-Oriented Acts:

X_{15}	X_{22}	X_{24}	X_{26}	X_{27}	X_{34}	X_{41}	X_{46}	X_{47}
40	80	90	80	80	100	100	80	100
40	80	82	60	68	90	90	48	20
18	62	80	42	65	88	70	-02	-40
05	30	80	40	50	40	68	-18	-52
-10	07	40	40	40	35	30	-22	-58
-12	-25	10	20	38	20	22	-30	-62
-25	-42	08	18	30	-28	20	-65	-70
-38	-80	-02	12	20	-32	10	-90	-90
-62		-30	-10	-38	-32	-18		
-70		-32	-18	-50	-40	-20		
-80		-70	-32	-55	-60	-40		
-90		-92	-38	-100		-40		

N = 12 8 12 12 12 11 12 8 8

Avg. r_s = -32 14 10 15 01 45 50 -21 -40

Category B Group Solidarity Acts:

X_{15}	X_{22}	X_{24}	X_{26}	X_{27}	X_{34}	X_{41}	X_{46}	X_{47}
80	50	70	70	88	82	40	100	80
65	48	20	58	22	42	30	68	60
42	20	-10	20	10	08	30	48	15
32	-28	-70	08	-02	08	-20	20	-08
-30	-30	-72	-25	-52	-28	-30	-02	-10
-78	-32	-82	-40	-85	-40	-50	-10	-50
-90	-90	-90	-70	-85	-40	-65	-92	-82

N = 7 7 7 7 7 6 7 7 7

Ave. r_s = -09 -19 -49 07 -13 20 15 36 06

(Table continued on next page)

Category C Individual Prominence Acts:

	X_{51}	X_{22}	X_{24}	X_{26}	X_{27}	X_{34}	X_{41}	X_{46}	X_{47}
	08	82	35	20	18	70	50	60	90
	-02	32	-58	20	00	-10	10	42	-10
	-38	30	-70	-30	-58	-12	12	38	-32
	-40	12	-82	-82	-70	-68	-60	32	-58
N =	4	4	4	4	4	4	4	4	4
Ave. r_s =	-02	42	-52	26	32	20	03	45	12

Total Activity

	X_{15}	X_{22}	X_{24}	X_{26}	X_{27}	X_{34}	X_{41}	X_{46}	X_{47}
	70	80	80	95	100	100	80	80	100
	55	80	80	80	80	90	80	48	50
	40	62	62	70	70	80	30	30	20
	40	50	60	60	70	80	22	25	00
	40	40	50	60	58	60	20	05	-32
	-02	20	40	40	50	40	10	-02	-32
	-12	18	32	40	42	35	00	-18	-40
	-20	00	28	40	40	-02	-10	-20	-60
	-25	-10	10	22	25	-20	-28	-32	-62
	-38	-25	-12	22	20	-32	-30	-40	-80
	-42	-42	-30	-10	15	-32	-40	-65	-90
	-55		-40	-10	-55	-32	-40		
	-62		-50	-32	-62	-60	-80		
	-80		-92	-62	-100		-90		
N =	14	11	14	14	14	13	14	11	11
Ave. r_s =	-05	36	13	38	30	47	07	05	-24

Question 1 Best ideas

X ₁₅	X ₂₂	X ₂₄	X ₂₆	X ₂₇	X ₃₄	X ₄₁	X ₄₆	X ₄₇
80	98	95	90	60	82	90	82	90
48	98	82	70	55	58	58	80	40
38	90	80	60	48	50	30	77	38
38	62	77	50	30	40	30	48	30
12	50	20	30	-10	18	10	10	22
00	40	10	-02	-18	08	-10	00	20
-08	22	00	-05	-18	-10	-15	-18	20
-08	10	00	-10	-25	-30	-30	-30	10
-25	-38	-10	-18	-52	-32	-40	-32	-12
-30	-40	-18	-18	-60	-32	-50	-38	-30
-50	-40	-70	-20	-80	-38	-52	-42	-42
-62	-50	-80	-58	-82	-38	-60	-60	-70
-78	-52	-90	-85	-90	-40	-80	-90	-78
-90		-92	-90	-100		-100		

N =	14	13	14	14	14	13	14	13	13
Ave.									
r _s =	-13	38	-04	-04	-42	02	-24	01	03

Question 2 Guidance of the group

X ₁₅	X ₂₂	X ₂₄	X ₂₆	X ₂₇	X ₃₄	X ₄₁	X ₄₆	X ₄₇
75	100	100	80	75	80	70	100	80
60	82	98	80	70	80	58	68	50
40	82	90	75	68	75	38	58	40
20	68	70	70	60	60	30	48	38
12	62	58	70	60	50	10	18	30
00	50	48	70	35	12	-05	05	20
-02	20	40	60	25	00	-10	-30	-18
-22	20	38	40	20	-05	-60	-38	-32
-32	08	-05	38	-10	-12	-62	-40	-52
-55	-10	-10	12	-25	-18	-80	-40	-78
-62	-10	-20	08	-40	-32	-80	-42	-80
-62	-42	-40	-10	-42	-32	-80	-52	-80
-65		-58	-18	-50	-40	-80		
-90		-80	-20	-78	-40	-80		
-90		-92	-92	-100		-90		

N =	15	12	15	15	15	14	15	12	12
Ave.									
r _s =	-26	57	29	27	-09	15	-37	19	-12

Question 3 Leader

	X ₁₅	X ₂₂	X ₂₄	X ₂₆	X ₂₇	X ₃₄	X ₄₁	X ₄₆	X ₄₇
	70	95	95	95	70	95	60	95	95
	65	95	95	70	68	90	60	82	70
	65	82	80	70	65	75	50	68	70
	35	68	70	68	60	70	42	60	55
	10	62	58	65	58	60	40	50	38
	02	30	35	65	50	38	30	48	20
	-02	20	32	40	40	35	20	35	20
	-12	20	12	40	35	35	10	22	-20
	-12	12	-02	22	35	10	00	-18	-30
	-18	-02	-10	10	18	00	-30	-18	-32
	-35	-10	-15	-02	15	-12	-30	-20	-38
	-62	-10	-18	-02	10	-20	-40	-25	-40
	-62	-25	-25	-10	00	-25	-55	-50	-60
	-70	-40	-30	-18	-10	-30	-65	-60	-68
	-80	-70	-50	-25	-30	-32	-65	-65	-85
	-80		-62	-30	-32	-62	-85		
	-80		-70	-50	-35	-70	-90		
	-100		-92	-90	-100		-90		
N =	18	15	18	18	18	17	18	15	15
Ave.									
r =	-37	28	06	16	10	19	-20	18	-04

¹Key to variables:

X₁₅ = MMPI-Pt

X₂₂ = First year grade point average (GPA-1)

X₂₄ = GZ - General Activity

X₂₆ = GZ - Ascendance

X₂₇ = GZ - Social Interest

X₃₄ = LOQ - Consideration

X₄₁ = POQ - F Scale

X₄₆ = ETS - Verbal score

X₄₇ = ETS - Quantitative score

Table 3
Average z correlations for
nine MPTB variables and seven leadership criteria

Criteria	MPTB Variables								
	MMP-Pt	GPA-1	GZ-GA	GZ-As	GZ-SI	LOQ-C	POQ	ETS-V	ETS-Q
Cat. A - Task oriented	-33	14	10	15	01	49*	55*	-22	-43
Cat. B - Gp. solidarity	-09	-19	-53	07	-13	20	15	38	06
Cat. C - Ind. prominence	-02	45	-58	26	34	20	03	47	12
Total Activity	-05	37	13	40	31	51	07	05	-25
Question 1 - best ideas	-13	40*	-04	-04	-45*	01	-25	00	03
Question 2 - guidance	-27	65**	30	28	-09	15	-39*	19	-12
Question 3 - leader	-39*	29	06	16	10	19	-20	18	-04

* significant beyond the .05 level

** significant beyond the .01 level

Table 4

Distribution of absolute z scores about the median
for each of the rows

Criteria	MPTB Variables								
	MMP-Pt	GPA-1	GZ-GA	GZ-As	GZ-SI	LOQ-C	POQ	ETS-V	ETS-Q
Cat. A - Task oriented	+	-	-	-	-	+	+	+	+
Cat. B - Gp. solidarity	-	+	+	-	-	+	-	+	-
Question 1 - best ideas	+	+	-	-	+	-	+	-	-
Question 2 - guidance	-	+	+	+	-	-	+	-	-
Question 3 - leader	+	+	-	-	-	+	+	-	-
No. scores above median	3	4	2	1	1	3	4	2	1
No. scores below median	2	1	3	4	4	2	1	3	4

Table 5

Distribution of absolute z scores about the median
for each of the columns

Criteria	MPTB Variables										No. Scores below med.
	MMP-Pt	GPA-1	GZ-GA	GZ-As	GZ-SI	LOQ-C	POQ	ETS-V	ETS-Q	No. scores above med.	
Cat. A - Task oriented	+	-	+	+	-	+	+	+	+	7	2
Cat. B - Group solidarity	-	-	+	-	+	+	-	+	+	5	4
Question 1 - best ideas	-	+	-	-	+	-	+	-	-	3	6
Question 2 - guidance	+	+	+	+	-	-	+	+	+	7	2
Question 3 - leader	+	+	-	+	+	+	-	-	-	5	4
											20

Table 6
Matrix of average z scores for
four selected variables¹

	MPTB Variables	
	GPA-1	POQ
Cat. A - Task oriented	14	55*
Question 2 - guidance	65**	-39*

¹These four variables were selected from the larger matrix shown in Table 3.

*Significant beyond the .05 level

**Significant beyond the .01 level