A CRITICAL STUDY OF GRAPHIC RATING SCALES

BY

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A THESIS

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION AND STATEMENT OF THE PROBLEM

The value of the rating scale technique as applied to personality traits has been criticized by many psychologists. Some of the early studies in this field, which found rating scales unreliable, caused their value to be questioned. However, several more recent studies have done much to influence favorably the standing of rating scales. Despite the severe criticism, the rating scale has increased both in favor and in usage. Guilford[1] has stated that "without any doubt, rating-scale methods have made their place secure in industrial practice and in the educational world." Starr and Greenly[2] conducted a survey in 1939 which covered sixty-four companies employing from 500 to more than 100,000 employees. Approximately one-third of the companies used merit ratings. Mahler[3] in a recent survey of the rating practices of 125 companies found that the majority used rating scales, with twelve using check lists and seven ranking or grading. Nevertheless, the rating scale requires continuous study and rater training if it is to become a reliable evaluation instrument.

Many studies have been made of rating scales, but a review of the literature failed to reveal any that had reported findings based

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[1] J. P. Guilford, Psychometric Methods. New York: McGraw-Hill Book Company, Inc. 1936. p. 265.

[2] R. B. Starr and R. J. Greenly, "Merit rating survey findings," Personnel Journal, 17: 378-384, April, 1939.

[3] W. R. Mahler, "Some common errors in employee rating practices," Personnel Journal, 26: 68-74, June, 1947.

upon the analysis of variance. However, a number of articles have suggested many applications of analysis of variance techniques to areas of psychological and educational research.[4] A simple experimental design can be set up in which a number of independent ratings, based upon observance of performance, are given to an individual. Using the same scale, other independent ratings are given to other individuals assigned to the same role when the several individuals are each members of different but essentially similar groups attempting to solve the same problem. If the levels of rating for each trait to be rated are given numerical values, for example from 1 to 9, a mean rating can be obtained for each application of the rating blank. Thus, the problem is to determine if differences in the means of the rated performances of the several individuals who were assigned the same roles are real differences or if these differences can be attributed to fluctuations in ratings resulting from chance alone.

Analysis of variance and its test of significance, F, enables us to test the significance of these differences in mean ratings.

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[4] H. E. Garrett and J. Zubin, "The analysis of variance in psychological research," Psychological Bulletin, 40: 233-267, April, 1943.

D. A. Grant, "The analysis of variance in psychological research," Psychological Bulletin, 41: 158-166, March, 1944.

C. C. Peters, "Interaction in analysis of variance interpreted as intercorrelation," Psychological Bulletin, 41: 287-299, May, 1944.

H. W. Alexander, "A general test for trend," Psychological Bulletin, 43: 533-557, November, 1946.

L. S. Kogan, "Analysis of variance - repeated measurements," Psychological Bulletin, 45: 131-143, March, 1948.

The rationale of analysis of variance is that the total sum of squares of the numerical values of a set of ratings made by several groups of individuals can be analyzed or broken down into parts, each identifiable with a different source of variation. In the simplest case, the total sum of squares is broken down into two parts, a sum of squares based upon variation within the ratings given by the several groups and a sum of squares based upon variation between the mean ratings given by the several groups. On the assumption that the groups of ratings making up the total series of ratings are random samples from a homogeneous population, the "within" and the "between" variances of ratings may be expected to differ only within the limits of chance fluctuations. This is the null hypothesis which is tested by dividing the variance of the mean ratings given by the several groups by the variance of ratings within the several groups. If this variance ratio, F, exceeds the value at the level of significance agreed upon (generally either the 5 percent or the 1 percent level), then the null hypothesis is considered false. If the null hypothesis is rejected, mean ratings given by the several groups to individuals serving in the same roles will differ and the differences are indicative of real differences. The F-test allows one to infer that there are significant differences between mean ratings but does not specify that each mean rating differs significantly from each of the others. If the null hypothesis is accepted, differences in the mean ratings given by the several groups can be attributed to chance alone. One purpose of this study is to give the facts a chance to prove or disprove this null

hypothesis for ratings given independently by two groups of air force officers, students and their instructors.

A second purpose of this study is to analyze a more complex experimental design in which the variance of ratings given to individuals serving in different staff positions, the variance between raters (students and instructors) and the interaction will be studied. Thus, we will ascertain for each scale (1) if individuals serving in staff positions of importance are given ratings which differ significantly from those given to other individuals serving in subordinate positions (2) if mean ratings given by students to the performance of their fellow students serving in different staff positions differ significantly from the mean ratings given by instructors who give full time to observation and rating (3) if the interaction between ratings given by instructors and students to students serving in staff positions of varying degrees of importance is statistically significant.

A third purpose of this study is to determine the reliabilities of students' and instructors' ratings. Symonds[5] has emphasized the need for adequate sampling in evaluation: "A single observation is unreliable, a single rating is unreliable, a single test is unreliable, a single measurement is unreliable, a single answer to a question is unreliable. Reliability is achieved by heaping up observations, ratings, tests, questions, measures . . . . . An adequate rating requires the judgment of several raters in several situations at several different times. Reliable evidence must be multiplied evidence."

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[5] Percival M. Symonds, Diagnosing Personality and Conduct. New York: D. Appleton-Century Company. 1931. p. 5.

Extreme variations in performance were found by observers of airplane landings during World War II.[6] Observers rated each landing made by pilots on place of landing, attitude of airplane and dropping or bouncing. Different observers agreed well in making the required records, but retests showed almost no consistency of performance, and this consistency dropped even lower when tests were made on different days. Part of the inconsistency can be attributed to variations in wind, turbulence, and other uncontrolled conditions. Nevertheless, a single measure of landing behavior, no matter how reliably judged, gives little or no information of real value as to the pilot's competence in landing the aircraft.

Realizing all the foregoing, it was decided to use both students and instructors in evaluating students' performance when they worked as a group or a staff in solving tactical and strategic air force problems at the Air Command and Staff School. Thus in each staff of sixteen officers, students rated their fellow officers with whom they had worked as follows: The student Commanding General and the student Chief of Staff rated all student staff members. The student officers in charge of the several activities rated each other as well as the students acting as Commanding General, Chief of Staff, and members of their respective staff sections. Subordinate officers in each staff section rated their section chief and all other members of the

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[6] Staff, Psychological Research Project (Pilot), "Psychological research on pilot training in the AAF," American Psychologist, 1: 7-16, January, 1946.

same staff section. Students rated each other only once for each problem. An instructor evaluator assigned to each staff rated daily each student staff officer on his performance during each problem.

Ratings were rendered on six counts: knowledge applied to the solution of the problem, thinking, initiative, cooperation in group work, organizing ability, and expression. They were based upon a nine-point scale with nine as the maximum rating. Criteria for specified ratings were given on graphic, unidimensional scales[7] which were constructed by a committee of instructors, Warren G. Findley and the writer.

A fourth purpose of this study is to ascertain if certain staff positions afford a better opportunity for observers to rate the performance of officers serving in those positions than do other staff positions. In investigating this point the Chi-square technique will be applied to the number of ratings rendered by both students and instructors on the performance of students serving in the different staff positions.

A final purpose of this study is to determine the relationships between the ratings rendered on the six scales and the composite rating for each position rated by students and instructors in order to investigate the possibility of evaluating performance in certain staff positions by using fewer scales. Correlation analysis will be used in this phase of the study.

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[7] See appendix.

CHAPTER II

REVIEW OF THE LITERATURE

HISTORY OF RATING SCALES

The effort to judge and describe individual characteristics or trait differences is no doubt as old as social life itself. Galton was probably the first to use a rating scale in a psychological problem. He used it in the evaluation of the vividness of images.[8] Galton was impressed with the application of the normal distribution curve to human traits and assumed that it operated in the inheritance of eminence.[9] Galton no doubt received some help from the astronomers who first discovered that individual errors in time observations of astronomical phenomena were grouped in a rather definite way. This grouping had been studied statistically and was developed into the normal probability curve. Shortly thereafter biologists discovered the normal probability law operating in biological data. Bradshaw[10] credited Galton with two fundamental assumptions of ratings:

> 1) Personal qualities are distributed in the population according to the frequencies of the normal distribution curve, and equal intervals on the scale should represent equal steps in frequency on a normal curve.

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[8] F. Galton, Inquiries into Human Faculty and Its Development. London: Macmillan and Company, Ltd. 1883.

[9] F. Galton, Hereditary Genius. London: Macmillan and Company, Ltd. 1914.

[10] F. F. Bradshaw, "The American Council on Education rating scale: its reliability, validity and use," Archives of Psychology, No. 119, October, 1930. p. 7.

2) If standard descriptions of personal qualities are arranged in linear order, a rater can give an accurate judgment, which will be comparable with another rater's judgment, by matching his own experience against that term which appears most similar to it.

Probably the first to secure ratings of human ability was Pearson,[11] a pupil of Galton, who in 1906 devised a seven-point scale for estimating intelligence. Another important development in the history of rating scales was a procedure developed by Miner.[12] His sample rating blank is shown below:

Sample Rating Blank

Will you please rate the student named below for the traits indicated? Place a dot along the line after each trait, grading the student as finely as you care to. Please give the rating independently without consulting others. The record sheet is to be returned to the Secretary's office within three days.

Jones, John Instructor - D

Among the members of the average senior class in this student's course and school the student would rank in the

	Lowest 5th	Fourth 5th	Middle 5th Average	Second 5th	Highest 5th
Common Sense					
Energy					
Initiative					
Leadership					
Reliability					
General Ability					

[11] K. Pearson, "On the relationship of intelligence to size and shape of head and to other physical and mental characteristics," Biometrika, 5: 105-146, 1907.

[12] J. B. Miner, "The evaluation of a method for finely graduated estimates of ability," Journal of Applied Psychology, 1: 123-133, June, 1917.

This procedure represented the results of work which had been done on rating up to that point. The person was rated relative to members of a defined group which was known to the raters and used as a standard. All qualitative terms which are generally used to describe traits were avoided since it was impossible to define them so that they had the same meaning for the different raters. The procedure allowed raters to make fine discriminations which could be transmuted into equivalent units of the standard deviation on the basis of the distribution of the ratings. However, standards varied from rater to rater.

During World War I psychologists were called upon to devise methods of rating the efficiency of officers. Hollingsworth[13] credits Scott with introducing the "Officers Rating Scale," a man-to-man scale, which attempted to make ratings more concrete. Figure 1[14] gives Army Rating Scale Instructions.[15] Figure 2[16] shows the Army Rating Scale.[17] Difficulties encountered with the rating scale were[18] (1) raters were often unwilling to undergo the labor of making out the master rating scale. They sometimes postponed the task or made out a scale in a

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[13] H. L. Hollingsworth, Judging Human Character. New York: D. Appleton and Company. 1922. pp. 103-104.

[14] See appendix.

[15] W. D. Scott, R. C. Clothier, S. B. Mathewson and W. R. Spriegel, Personnel Management. New York: McGraw-Hill Book Company, Inc. 1941. p. 217.

[16] See appendix.

[17] W. D. Scott, R. C. Clothier, S. B. Mathewson and W. R. Spriegel, op. cit, p. 218.

[18] Ibid., p. 219.

careless manner. (2) some of the raters found difficulty in comparing a subordinate with the five men listed on the master scale and in stating which of the five he resembled in the quality or trait under consideration. Thus it appears that the stability of a known group against which the rater was to compare ratees varied from rater to rater. Rugg[19] who obtained data from Army records and from a similar scale used in the public schools found that the "man-to-man" criterion was rarely alike for two raters. He found that the rating scale developed by Scott lacked reliability. Rating officers often transferred their opinions of an officer's personal qualities to other ratings on intelligence, leadership, and physical qualities.

Perhaps as a result of Rugg's critical study, interest in rating scales began to deteriorate. However, late in 1922 Paterson[20] published an elaborate description of the Scott Company graphic rating scale which was modified from the original man-to-man scale. The same scale was also discussed by Freyd[21] in 1923. He concluded that the graphic type of rating scale was the most popular and, on the whole, the most satisfactory. Figures 3 and 4[22] show a graphic rating scale used by the Scott Company for workers in nonexecutive positions.[23]

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[19] H. O. Rugg, "Is the rating of human character practicable?" Journal of Educational Psychology, 12: 425-438, November, 1921; 485-501, December, 1921. 13: 30-42, January, 1922; 81-93, February, 1922.

[20] D. G. Paterson, "The Scott Company graphic rating scale," Journal of Personnel Research, 1: 361-370, December, 1922.

[21] Max Freyd, "The graphic rating scale," Journal of Educational Psychology, 14: 83-102, February, 1923.

[22] See appendix.

[23] W. D. Scott, R. C. Clothier, S. B. Mathewson and W. R. Spriegel, op. cit., pp. 222-223.

The experience gained with graphic rating scales and the critical studies made of them in the past thirty years have done much to demonstrate their strengths and limitations. In the pages that follow, these studies will be reviewed. For convenience in comparison, these studies will be reviewed in groups designated as follows: validity, reliability, kinds of traits most easily rated, intercorrelations of trait ratings and abbreviated scales, and types of errors.

VALIDITY

The validity of a graphic rating scale is generally though mistakenly taken for granted if observations by impartial raters can be made with a high degree of reliability. Observations are often used as the criterion and very few studies have been made of the validity of ratings based upon observations.

Marsh and Perrin[24] studied ratings made by sixteen graduate and undergraduate students, with at least two years work in psychology, on the performance of 84 college students. These ratings were correlated with more objective criteria, such as intelligence, aiming and card-sorting test scores and head size. Raters observed the ratees while they performed the tasks, then made their ratings without knowing the test scores or head sizes. Ratings on intelligence correlated .78 with intelligence test scores. Ratings on card-sorting correlated .68 with card-sorting test scores, while those on aiming correlated only .36

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[24] S. E. Marsh and F. A. C. Perrin, "An experimental study of the rating scale technique," Journal of Abnormal and Social Psychology, 19: 383-399, January-March, 1925.

with actual scores. Ratings of head size had a correlation of .76 with actual head size. Such a study can be made only when there is some objective outside criterion of the same trait available.

The best type of outside criterion would appear to be some measure of actual behavior, such as sales or production records. In most rating studies, it is impossible to obtain such a criterion. The present study is no exception, for the simulated staff planning exercises on tactical and strategic air force problems will never again be repeated in exactly the same manner in wartime.

Kelly[25] has treated validity thus: "If competent judges appraise Individual A as being as much better than Individual B as Individual B is better than Individual C, then it is so, and there is no higher authority to appeal to." Remmers,[26] in a study of students' ratings of their teachers, states that student judgments constitute the criterion; hence validity and reliability are in this case synonymous. In the present study students' ratings of the performance of their fellow staff members and instructors' ratings of their performance will be used as the criterion. Hence the validity of these ratings can be determined in the present study only by inference from the reliability of the ratings.

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[25] T. L. Kelley, The Influence of Nurture upon Individual Difference. New York: The Macmillan Company. 1926, p. 9.

[26] H. H. Remmers, "Reliability and halo effect of high school and college students' judgments of their teachers," Journal of Applied Psychology, 18: 619-630, October, 1934.

RELIABILITY

It is generally agreed that the reliability of pooled ratings increases with the number of raters. Rugg[27] recommends the use of pooled or averaged ratings of not less than three independent raters. Symonds[28] recommends at least eight raters and Bradshaw,[29] from five to 106 depending upon the degree of reliability sought. In each instance it is assumed that the several raters are all competent to rate and that the reliability of pooled ratings tends to increase according to the Spearman-Brown Formula.[30]

In 1926 Kornhauser[31] published a study dealing with reliability. Two groups of college students, one made up of eighteen seniors and the other consisting of fifty students from all classes, were rated by varying numbers of instructors. A graphic scale with five intervals, each interval being separated by a vertical line, was used. Students were rated on seven traits which were described briefly. The Graphic Rating Card which was used is shown in Figure 5.[32]

Where several instructors had observed the same students, the average of three sets of instructors' ratings were correlated with the

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[27] H. O. Rugg, op. cit.

[28] P. M. Symonds, op. cit., p. 96.

[29] F. F. Bradshaw, op. cit.

[30] J. P. Guilford, op. cit., p. 421.

[31] A. W. Kornhauser, "Reliability of average ratings," Journal of Personnel Research, 5: 309-317, December, 1926.

[32] See appendix.

average of three other sets of instructor ratings, each selected at random. The average correlation for ratings given to the eighteen seniors was .67. Initiative had the lowest r (.34) and industry had the highest r (.78). The range of correlations for ratings given to the fifty students of all classes was much smaller, the average r being in the forties.[33] Correlations of ratings made by pairs of instructors show considerable divergence in instructors' ratings, the average r being .41 for the senior group and .38 for students from all classes.[34] Correlations obtained by having the same instructor rate at different times averaged .60. Thus the reliability of ratings obtained by having the same instructor rate at different times was considerably higher than the reliability obtained by correlating pairs of instructors' ratings based upon the same observations. Intercorrelations of ratings were high, being in the neighborhood of .45 to .84.[35]

Remmers,[36] using the Purdue Rating Scale for Instructors, reported the reliability of high school and college students' ratings of their instructors on such traits as Interest in Subject, Presentation of Subject Matter, and Stimulating Intellectual Curiosity. When two independent raters were used reliabilities varied from .16 to .43. Thus a considerable number of students were needed if reliabilities were to approach .90. Remmers concluded that reliable judgments of

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[33] A. W. Kornhauser, op. cit.

[34] A. W. Kornhauser, "A comparison of raters," Journal of Personnel Research, 6: 338-344, January 1927.

[35] A. W. Kornhauser, "A comparison of ratings on different traits," Journal of Personnel Research, 6: 440-446, March, 1927.

[36] H. H. Remmers, op. cit.

classroom traits of instructors can be obtained from both high school and college students.

In another study at Purdue University, instructors were asked to rate their students on six traits at the end of a term's work. Carter[37] reported reliabilities of .30 and .40 for two raters in this study and estimated reliabilities of .80 to .90 for sixteen raters. He concluded that ratings of students by instructors are sufficiently reliable for practical purposes.

Richards and Ellington[38] reported reliabilities ranging from -.24 to .84 for pairs of teacher raters who were asked to judge their students on twelve traits.

The foregoing studies seem to show that much depends upon the particular trait rated, the training of the raters, and the manner of securing the ratings. Reported results are conflicting and indicate that reliabilities should be calculated for each set of conditions so that the kinds of raters and the number required can be determined for the desired degree of reliability. In general, reported reliabilities for two independent raters are low, much lower than reported reliabilities of group intelligence tests or of standardized achievement tests.

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[37] G. C. Carter, "Student personalities as instructors see them," Studies in Higher Education. Lafayette: Purdue University. 1945.

[38] T. W. Richards and Willis Ellington, "Objectivity in the evaluation of personality," Journal of Experimental Education, 10: 228-237, June, 1942.

TRAITS AMENABLE TO RATING

A trait is considered amenable to rating when competent raters tend to agree. Hollingsworth[39] found close agreement among raters upon such traits as efficiency, originality, perserverance, quickness, judgment, clearness, energy and will. He found fair agreement on mental balance, breadth, leadership, intensity, reasonableness, independence, health, etc., and poor agreement on such traits as courage, unselfishness, integrity, cooperativeness, cheerfulness and kindliness.

Shen[40] found best agreement among raters on scholarship, leadership, and intelligence and the poorest agreement on judicial sense, punctuality, and tact. In another study, Shen[41] found a systematic tendency of individuals to overrate or underrate themselves in all traits according to the kind of delusion they had about themselves. Thus the constant tendency seemed dependent upon the individual and not upon the trait. Miner[42] found good agreement for such traits as leadership, general ability, reliability and energy. Guilford[43] has summarized a number of rules which students of rating have gained from experience:

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[39] J. P. Guilford, op. cit., p. 278.

[40] Eugene Shen, "The reliability coefficient of personal ratings," Journal of Educational Psychology, 16: 232-237, April, 1925.

[41] Eugene Shen, "The validity of self-estimate," Journal of Educational Psychology, 16: 104-107, February, 1925.

[42] J. B. Miner, op. cit., p. 127.

[43] J. P. Guilford, loc. cit.

1) Traits should be described univocally, objectively, and specifically.

2) A trait which is to be rated should not be a composite of a number of traits that vary independently.

3) Each trait should refer to a single type of activity or to the results of a single type of activity.

4) Traits should be grouped according to the accuracy with which they can be rated.

5) In describing traits, avoid the use of general terms such as very, extreme, average, or excellent.

6) Traits should be judged on the basis of past or present accomplishments rather than upon what raters regard as future promise.

7) In self-ratings there is no trait in which all individuals overestimate or all underestimate themselves.

8) Do not use scales for traits on which reliable or more objective data can be obtained.

INTERCORRELATIONS IN TRAIT RATINGS AND ABBREVIATED SCALES

Rating scales used by different industries vary considerably in the number of traits rated. In an analysis of 132 rating scales, Mahler[44] found that the number of traits varied from one to thirty-three, the average being 9.3. Apparently these traits are all important from the companies' points of view and measure different aspects of the ratee's performance. However, Mahler found little or no agreement on what characteristics should be rated. Driver[45] reported a study of a ten-trait merit-rating scale at the Atlantic Refining Company in

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[44] W. R. Mahler, op. cit.

[45] R. S. Driver, "A case history in merit rating," Personnel Journal, 16: 137-162, May, 1940.

which intercorrelations varied from .11 to .79 with a mean of .46. In an earlier study, Kornhauser[46] reported intercorrelations of instructors' ratings of students on intelligence, industry, moral trustworthiness, and leadership which varied from .45 to .83 with a median of .69. Ewart, Seashore and Tiffin,[47] in a study of merit-ratings of 1,120 men on a twelve-trait scale, found intercorrelations from .25 to .88 with a median of .75. A factor analysis showed that a general factor, ability to do the present job, accounted for most of the total variance in the ratings.

Bolanovich[48] made a factor analysis of ratings on 143 field engineers who were rated on fourteen traits: personality, personal appearance, punctuality, thoroughness, efficiency, resourcefulness, dependability, cooperation, job attitude, technical ability, sales ability, organizing ability, judgment, and desire for self-improvement. Intercorrelations ranged from .05 to .73 with a median of .49. The factor analysis revealed that six common factors, attendance to detail, ability to do present job, sales ability, conscientiousness, organizing or systematic tendency and social intelligence, account for most of the total variance in ratings. The multiple correlation for over-all job success was .81 and included seven of the fourteen traits. They were: personality, efficiency, resourcefulness, cooperation, job attitude,

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[46] A. W. Kornhauser, "A comparison of ratings on different traits," op. cit.

[47] E. Ewart, S. E. Seashore and J. Tiffin, "A factor analysis of an industrial merit rating scale," Journal of Applied Psychology, 25: 481-486, October, 1941.

[48] D. J. Bolanovich, "Statistical analysis of an industrial rating chart," Journal of Applied Psychology, 30: 23-31, February, 1946.

sales ability, and organizing ability.

In a recent study, Jurgensen[49] reported intercorrelations from .60 to .88 with a median of .76 for ratings on work habits, attitudes, acceptance by others, self-control, mental ability, and physical ability.

The above intercorrelations appear to be typical of those usually reported for rating scales consisting of relatively narrow and specifically defined traits. Jurgensen[50] converted raw score ratings into standard scores and found that the intercorrelations all dropped in size and ranged from .33 to .84 with a median of .60. Each of the reliabilities also dropped in size when ratings were expressed as standard scores. Jurgensen[51] concluded that it is simpler, more direct, and equally effective to obtain an over-all rating instead of a composite based on highly correlated trait ratings. This does not deny all value to trait ratings. Over-all ratings may be more valid and/or reliable if made after consideration has been given to traits, even though trait intercorrelations are high.

Lawshe[52] and his associates in job evaluation studies have shown that jobs can be evaluated just as efficiently by using fewer scales.

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[49] C. E. Jurgensen, "Intercorrelations in merit rating traits," Journal of Applied Psychology, 34: 240-243, August, 1950.

[50] Ibid.

[51] Ibid.

[52] C. H. Lawshe, Jr., and G. A. Satter, "Studies in job evaluation: 1. Factor analyses of point ratings for hourly-paid jobs in three industrial plants." Journal of Applied Psychology, 28: 189-198,

They have also attempted to identify the primary factors operating in salary rating plans in various industrial plants and to determine the significance of each factor in the total point rating. They found different combinations of factors operating in the several plants studied. They also found that abbreviated scales were just as efficient in job evaluation as were the longer scales. Correlation techniques were used in these studies in which ratings on the selected scales produced multiple correlations which approached 1.00 with the criterion, total point rating.

As a rule, in applying correlation techniques, the research worker hopes to use independent measures which have low or zero intercorrelations and which have high correlations with the criterion. In the studies which have been reviewed the latter condition has existed, but the intercorrelations have generally been high. Hence it can be concluded that the traits which have been rated are not discrete, but

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June, 1944. C. H. Lawshe, Jr., "Studies in job evaluation: 2. The adequacy of abbreviated point ratings for hourly-paid jobs in three industrial plants." Journal of Applied Psychology, 29: 177-184, June, 1945. C. H. Lawshe, Jr., and A. A. Maleski, "Studies in job evaluation: 3. An analysis of point ratings for salary-paid jobs in an industrial plant," Journal of Applied Psychology, 30: 117-128, April, 1946. C. H. Lawshe, Jr., and S. L. Alessi, "Studies in job evaluation: 4. Analysis of another point rating scale for hourly-paid jobs and the adequacy of an abbreviated scale," Journal of Applied Psychology, 30: 310-319, August, 1946. C. H. Lawshe, Jr., and R. F. Wilson, "Studies in job evaluation: 5. An analysis of the factor comparison system as it functions in a paper mill," Journal of Applied Psychology, 30: 426-434, October, 1946. C. H. Lawshe, Jr., and R. F. Wilson, "Studies in job evaluation: 6. The reliability of two point rating systems," Journal of Applied Psychology, 31: 355-365, August, 1947. C. H. Lawshe, Jr., E. E. Dudek and R. F. Wilson, "Studies in job evaluation: 7. A factor analysis of two point rating methods of job evaluation," Journal of Applied Psychology, 32: 118-129, April, 1948.

tend to overlap one another. Smalzried and Remmers[53] found overlapping relationships among traits when they analyzed student ratings of faculty members by the Purdue Rating Scale. Some traits had a high saturation of either Professional Maturity or Empathy, the two factors measured by the scale. However, many other traits had nearly equal saturation of both factors and little of either one.

The multiple correlation technique can be used to discover traits that overlap. Refined rating procedures can then be set up where ratings are based upon observable actions only, rather than upon the type of traits which may overlap.

TYPES OF RATING ERRORS

The overlapping relationships among traits on the rating scale mentioned in the preceding section may be interpreted as either the cause or the consequence of halo effect.[54] The halo effect was first mentioned by Wells,[55] given its name by Thorndike,[56] and described by Rugg,[57] who remarked that we judge our fellows in terms of a general

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[53] N. T. Smalzried and H. H. Remmers, "A factor analysis of the Purdue Rating Scale for Instructors," Journal of Educational Psychology, 34: 363-367, September, 1943.

[54] W. S. Monroe, Encyclopedia of Educational Research, Revised Edition, New York: The Macmillan Company. 1950. p. 964.

[55] F. L. Wells, "A statistical study of literary merit," Archives of Psychology, No. 7, August, 1907.

[56] E. L. Thorndike, "A constant error in psychological rating," Journal of Applied Psychology, 4: 25-29, March, 1920.

[57] H. O. Rugg, op. cit.

mental attitude toward them which leads us to attribute the general attitude or impression to particular qualities. However, Bingham[58] stated that all halo effect, as indicated by close correlations between ratings on specific traits and an over-all estimate of personal fitness, need not be considered invalid. An over-all judgment is more likely to be correct if made after the rater's attention has been focussed on specific traits. Symonds[59] proposed that all persons, in a group being rated, be judged on one trait at a time to reduce this error. Stevens and Wonderlic[60] have shown that halo effect is demonstrably reduced by judging all persons in a given group on one trait at a time, thus confirming Symonds' original prediction. Gilinsky[61] has also verified the above results. Halo effect is more likely to influence the rating of traits not easily observable or not clearly defined.

Another type of error is the one of lenience or severity, referred to by Guilford[62] as the systematic error. This is the tendency in a rater systematically to overrate or to underrate individuals in traits as compared with the average rating of all judges.

A third type of error is the one of central tendency. When raters do not know individuals very well, they hesitate to give extreme

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[58] W. V. Bingham, "Halo, invalid and valid," Journal of Applied Psychology, 23: 221-228, April, 1939.

[59] P. M. Symonds, op. cit., pp. 80-81.

[60] S. N. Stevens and E. F. Wonderlic, "An effective revision of a rating technique," Personnel Journal, 13: 125-134, October, 1934.

[61] A. S. Gilinsky, "The influence of a procedure of judging on the halo effect," American Psychologist, 2: 309-310, August, 1947.

[62] J. P. Guilford, op. cit., p. 273.

ratings; hence their ratings tend to cluster closely about the mean and do not differentiate significantly between different performances.

A fourth type of error is the logical error. Newcomb,[63] in a rating experiment in a boy's summer camp, found that judges are likely to give similar ratings in traits that seem logically related in the minds of the raters. Several raters estimated the proneness of boys to certain types of behavior, the average intercorrelation being .493. When objective records were kept by these same raters, based upon observed behavior, the intercorrelations averaged only .141. Like the halo effect, this error increases the intercorrelations of traits, but for a different reason.

These four errors can be reduced by calling for judgments of objectively observed behavior rather than abstract, overlapping traits.[64] They can also be reduced if the raters help to construct the scale, discuss the distribution of abilities and meet together frequently to compare their ratings with those of others. As has already been said, errors due to halo can be reduced by rating all individuals on a given trait before rating them on another.

Errors can also be reduced by rater training. Driver,[65] in discussing means of improving employee performance rating, lists seven methods of rater training:

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[63] T. Newcomb, "An experiment designed to test the validity of a rating technique," Journal of Educational Psychology, 22: 279-289, April, 1931.

[64] W. S. Monroe, loc. cit.

[65] R. S. Driver, "Training as a means of improving employee performance rating," Personnel, 18: 364-370, May, 1942.

1) Individual instruction

2) Group instruction

3) Ratings completed under the immediate supervision of the rating instructor

4) Discussion after the rating has been completed

5) Rating manual

6) Cover letter

7) Brief introductory speech

Driver[66] concludes that personal contact training methods are more successful than less direct procedures such as rating manuals or cover letters. He recommends that actual cases familiar to all interested individuals be used as practice material for rating and that subsequent to the completion of the ratings, the results be discussed and errors or apparent discrepancies be pointed out to the raters. He also suggests as being helpful, a discussion of (1) the uses to which ratings will be put, (2) individual differences based on the theories concerning the normal distribution curve, (3) procedures to be followed in using rating scales, and (4) the meaning of the various descriptive terms used on the rating scale.

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66 Ibid.

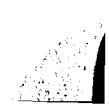
CHAPTER III

THE SITUATION AND DESIGN OF THE STUDY

THE SITUATION

The data for this study were collected at the Air Command and Staff School of the Air University, located at Maxwell Air Force Base, Montgomery, Alabama. The Air Command and Staff School is designed to afford professional education for responsibilities at the wing level to experienced Air Force Officers with ranks of Captain, Major, Lieutenant Colonel, and Colonel.

After receiving instruction primarily by the lecture method in staff and command duties, members of each class are divided into small groups of approximately sixteen students each. Each group then works as a staff or unit on two practical problems, one in a tactical operation, and one in a strategic operation. The group works on a stimulated staff problem with each student assigned to a specific staff position. For the tactical problem, the position designations are as follows: Chief of Staff, Officer in Charge of Personnel, Officer in Charge of Intelligence, Officer in Charge of Operations, Officer in Charge of Supply, and several assistants for each officer except the Chief of Staff. Designations for the strategic problem are the same, with the addition of the position of Commanding General. Each group attacks the same problem with each student performing the tasks delegated to the position to which he has been assigned. Student assignments are changed for each problem, so that most students serve in a more responsible position once and in a subordinate position once.



Each problem is introduced by a control staff of instructors who serve as a higher headquarters staff and answer questions from the subordinate headquarters. Students are briefed on rating procedures by a Senior Officer in Charge of Evaluation at the beginning of each problem. Students have had several hours of instruction and experience in oral expression, its evaluation and staff procedures prior to beginning the first problem.

Each staff is led by a student (Chief of Staff or Commanding General), with a member of the Instructional Staff observing and evaluating. The function of the student leader is to work with his staff in the solution of the assigned problem. He is evaluated on his performance of this function by the instructor, who also rates the performance of each student staff officer on a graphic rating scale. Each instructor rates students approximately four times, once each of the last four days of the problem.

At the completion of a problem, each student rates his fellow students as follows: The student Commanding General and the Chief of Staff rate all student staff members. The student officers in charge of the several activities rate each other as well as the students acting as Commanding General, Chief of Staff, and members of their respective staff sections. Subordinate officers in each staff section rate their section chief and all other members of the same staff section. Students rate each other only once for each problem, but are encouraged to maintain a work sheet[67] during the problem so that they will be able to record any evaluation of students' work throughout the problem.

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[67] See appendix.

Ratings are made on six traits: knowledge applied to the solution of the problem, thinking, initiative, cooperation in group work, organizing ability and expression. They are based upon a nine-point scale with nine as the maximum rating. Criteria for specified ratings are given on graphic, unidimensional scales.[68] If any of the raters feel that they have been unable to observe any staff member on a particular trait, they can check "not observed" on the graphic scale.

DESIGN OF THE STUDY

From the data on students' and instructors' ratings given during the tactical problem, ratings of and by twenty staffs were studied. Ratings made on thirty of the thirty-two staffs in the strategic problem were also studied. Both samples were chosen at random and represent over 78 per cent of the total number of ratings.

The ratings rendered both by instructors and by students were recorded by positions rated. For the tactical problem, ratings on the six traits were listed for the Chief of Staff (C/S), Officer in Charge of Personnel (A-1), Officer in Charge of Intelligence (A-2), Officer in Charge of Operations (A-3), Officer in Charge of Supply (A-4) and one assistant in each section (A/A-1, A/A-2, A/A-3, A/A-4) and the Communications Officer who is really an Assistant A-3 also. For the strategic problem, ratings were recorded for all of the above positions and for the position of Commanding General.

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[68] Ibid.

Assignments of students to the different staffs and to staff positions were made at random. Members of the school faculty who served as observers were assigned to staffs in the same manner.

HYPOTHESES AND METHODS OF TESTING THEM

Each of the several traits inferred from, or observed in, the behavior of a particular staff officer[69] are to be considered one by one. In general, fellow staff officers (usually coordinate with, or subordinate to him) rate the staff officer in question, by means of a graphic rating scale, on each of six traits. Moreover, the situation within which these ratings are made occurs repeatedly in the sense that successive groups or staffs of (ordinarily) different officers interact (within their group) in contending with the same (or an essentially similar) strategic or tactical air force problem. Within each situation, the officer assigned to any particular role (such as that of Commanding General) is rated on each of the several traits by other individual members of his student group and by an instructor.

Within this setting, our first hypothesis is: With reference to the ratings made by students with respect to any one trait, there are no real differences between the mean rated performance of one officer (assigned to a particular staff role) and that of another officer (assigned to the same role) when each of the several officers is a

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[69] (Note: The term "officer" or "staff officer" will be used to refer to student officers only. Instructors, who are officers, will be referred to as "instructors".)

member of (different but essentially similar) successive groups contending with the same (or essentially similar) strategic or tactical air force problem.

This hypothesis will be tested by performing a simple analysis of variance in which ratings made by a given staff of officers of the performance of one of their group serving in a particular position will be compared with ratings of the performances of other officers serving in the same position in other groups by their fellow staff officers. Separate F ratios (between variance divided by within variance) will be calculated for performance ratings of officers serving in each of the ten staff positions in the tactical problem and in each of the eleven staff positions in the strategic problem on each of the six traits. Thus there will be 21 x 6 analyses or F ratios.

Within the same setting, our second hypothesis is: With reference to the ratings made by instructors rather than by students with respect to any one trait, there are no real differences between the mean rated performance of one officer (assigned to a particular staff role) and that of another officer (assigned to the same role) when each of the several officers is a member of (different but essentially similar) successive groups contending with the same (or essentially similar) strategic or tactical air force problem.

This hypothesis will be tested in the same manner used for testing the first hypothesis since instructors' ratings were turned in each day and were made without consulting or having access to previous ratings. F ratios will be calculated for performance ratings received by officers serving in each of the ten staff positions in the tactical

problem and in each of the eleven staff positions in the strategic problem on each of the six traits. Again there will be a total of 21 x 6 analyses or F ratios.

Within the same setting, our third hypothesis is: With reference to the ratings made by instructors and by students with respect to any one trait, there are no real differences between the mean rated performance of officers assigned to a particular staff role and that of other officers assigned to different staff roles when each of the several officers (assigned to a particular staff role) is a member of (different but essentially similar) successive groups contending with the same (or essentially similar) strategic or tactical air force problem.

This hypothesis will be tested by making a two-way classification for each of the six traits on which officers were rated in each of the two problems. Positions of officers rated will be classified on one axis and raters, instructor and student, will be classified on the other axis. An analysis of variance applying the method of unweighted averages[70] based upon disproportionate sub-class numbers will be used. There will be 6 x 2 analyses.

Within the same setting, our fourth hypothesis is: With reference to the ratings made by instructors and students with respect to any one trait, neither instructors nor student staffs will exhibit a high degree or reliability in their ability to rate the performance of

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[70] G. W. Snedecor, Statistical Methods. Ames: The Iowa State College Press, 1946, pp. 293-294.

officers (assigned to different roles) when each officer is a member of (different but essentially similar) successive groups contending with the same (or essentially similar) strategic or tactical air force problem.

This hypothesis will be tested by selecting five staffs at random from the tactical problem and five staffs at random from the strategic problem. Students' ratings on each officer in each staff will be divided at random into two groups for each trait, and Pearson Product-Moment Correlation Coefficients will be calculated on the mean ratings given each officer in each staff and stepped up by the Spearman-Brown Formula. The Pearson Product-Moment Correlation Method will be used on instructors' ratings given each officer in each staff for the second and third days to calculate the reliability of instructors' ratings. Reliabilities will be reported for each of the six trait ratings made by both students and instructors in each problem. Hence, a total of twenty-four reliabilities will be reported. Within the same setting, reliabilities of ratings based upon a composite of two or three traits will also be reported.

Within the same setting, our fifth hypothesis is: Ratings on certain traits of officers serving in certain staff positions are easier to make than are ratings on other traits of officers serving in different staff positions.

This hypothesis will be tested by setting up a two-way classification with the number of ratings given to officers serving in different staff positions on one axis and the number of ratings given to officers

on each trait on the other axis. A two-way classification will be used for the number of instructors' ratings and for the number of students' ratings in each of the two problems. In each of the above-mentioned cases, Chi-square tests will be made to compare the number of different trait ratings actually given to officers serving in each type of staff position and the number of ratings expected for each trait or staff position.

Our sixth and final hypothesis is: Ratings made by both students and instructors on fewer than six traits will correlate highly with composite ratings of which they are a part.

This hypothesis will be tested by using multiple correlation techniques to see if ratings on two or three scales only will yield high correlations with composite ratings on which they are a part. Composite ratings or the sum of the ratings on the six traits were used to determine students' final ratings. Although there is some spuriously high effect, correlations of ratings on each of the six traits with composite ratings will be made for each staff officer rated by both students and instructors. Thus, in the tactical problem, there will be ten intercorrelation tables (7 x 7) for ratings by students and ten intercorrelation tables (7 x 7) for ratings by instructors. In the strategic problem, there will be twenty-two intercorrelation tables, eleven for ratings by students and eleven for ratings by instructors, each 7 x 7.

CHAPTER IV

ANALYSIS AND INTERPRETATION OF DATA

To test Hypothesis 1--"With reference to the ratings made by students with respect to any one trait, there are no real differences between the mean rated performance of one officer (assigned to a particular staff role) and that of another officer (assigned to the same role) when each of the several officers is a member of (different but essentially similar) successive groups contending with the same (or essentially similar) strategic or tactical air force problem."--an analysis of variance was used. This statistical technique is based upon the assumption that the total sum of squares of numerical ratings made by several groups of raters can be separated into two or more specific portions, each aligned with a specific source of variation. In this particular design, ratings given each staff member in the tactical and in the strategic problem for each of the six traits were classified and tabulated as shown in the illustrative example (Table I).

By using this method, it was possible to discover the variance of means ratings given the students of the several staffs and to compare it with the variance of the individual ratings.

Using the data in the illustrative example (Table I), the calculations which were necessary for the 126 analyses of variance are given below and summarized in Table II:

$$\text{Total Sum of Squares} = \Sigma X^2 - \frac{(\Sigma X)^2}{N} \quad \text{or} \quad C - \frac{B^2}{A} \quad \text{(See Table I)}$$

TABLE I

RATINGS GIVEN BY STUDENTS IN TWENTY DIFFERENT STAFFS TO THEIR RESPECTIVE CHIEFS OF STAFFS ON ORGANIZING ABILITY IN THE TACTICAL PROBLEM

Staff / Ratings	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Sub-Totals	
9	1	2			1		3			1				1	2	1		1	2		15	
8	4	4		1	5	1	5	3	4	4	1	6	1	4	9	2	1	4	1	4	64	
7	4	4		4	5	4	1	3	3	2	4		4	4	2	3	1	3		3	54	
6	2	3	5	1	1	4	2	6	2	1	3	2	2	3	1	4	2	5	1	3	53	
5	1		4	3			2	1	1	1	3	1	3			1				2	23	
4				1		1					1		1			1		1			6	
3			1								1		1								3	
2																					0	
1																					0	
N	12	13	10	10	12	10	13	13	10	9	13	9	12	12	14	12	4	14	4	12	218	A
ΣX	86	96	53	61	90	64	96	86	70	66	76	65	70	87	110	79	27	96	32	81	1491	B
ΣX^2	630	722	289	387	682	420	734	580	500	496	468	481	432	641	872	541	185	680	262	561	10563	C
$\frac{(\Sigma X)^2}{N}$	616.33	708.92	280.90	372.10	676.00	409.60	708.92	568.92	490.00	484.00	444.31	464.44	408.33	630.75	864.29	520.08	182.25	658.29	256.00	540.75	10295.18	D

Total Sum of Squares = $10563 - \frac{(1491)^2}{218}$ = 10563 - 10197.62

Total Sum of Squares = 365.38

Sum of Squares between Staff Officer Means = $\sum \frac{(\Sigma Xi)^2}{Ni} - \frac{(\Sigma X)^2}{N}$ or $D - \frac{B^2}{A}$ (See Table I) where ΣXi = the sum of ratings given in each staff and i = 1 to 20

Ni = the number of ratings given in each staff and i = 1 to 20

Sum of Squares between Staff Officer Means = 10295.18 - 10197.62 = 97.56

Sum of Squares within Staff Officer ratings = C - D (See Table I)

Sum of Squares within Staff Officer ratings = 10563 - 10295.18 = 267.82

TABLE II

ANALYSIS OF VARIANCE OF STUDENTS' RATINGS OF THEIR RESPECTIVE CHIEFS OF STAFF ON ORGANIZING ABILITY IN THE TACTICAL PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Total	217	365.38		
Between Staff Officer Means	19	97.56	5.13	3.80**
Within Staff Officer Ratings	198	267.82	1.35	

** Significant at the 1% level.

The mean square in each of the above cases was calculated by dividing the sum of squares by the number of degrees of freedom. The mean square of Within Staff Officer Ratings was used as the error term, hence F = $\frac{5.13}{1.35}$ or 3.80.

This same procedure was used to analyze ratings on all six traits given to 1) Student officers serving in all ten staff positions of the tactical problem. 2) Student officers serving in all eleven staff positions of the strategic problem. The 6 x 10 or 60 F ratios for the tactical problem are shown in Table III. The 6 x 11 or 66 F ratios for the strategic problem are shown in Table IV. Out of the 126 analyses of variance which were used to test Hypothesis 1, only 16 had F ratios which were not significant at the 5 per cent level. Twenty-four were significant at the 5 per cent level and the remainder, 86, were significant at the 1 per cent level. Hence Hypothesis 1 is false.

The majority of the F ratios which were not significant at the 5 per cent level were on Cooperation and Thinking which were difficult to rate. Likewise, the majority of the F ratios which were not significant at the 5 per cent level were on ratings given officers serving in minor positions as assistants whose performances were somewhat more difficult to rate than were the performances of officers in charge of sections.

To test Hypothesis 2--"With reference to the ratings made by instructors rather than by students with respect to any one trait, there are no real differences between the mean rated performance of one officer (assigned to a particular staff role) and that of another officer (assigned to the same role) when each of the several officers is a member of (different but essentially similar) successive groups contending with the same (or essentially similar) strategic or tactical air force problem."—an analysis of variance similar to the one previously described was used. Ratings given each staff member in the tactical and in the strategic problem for each of the six traits were classified and tabulated as illustrated in Table V.

TABLE III

F RATIOS

STUDENTS' RATINGS ON TACTICAL PROBLEM

Position Rated / Trait	Chief of Staff	Officer in Charge of Personnel	Officer in Charge of Intelligence	Officer in Charge of Operations	Officer in Charge of Supply	Asst. Personnel Officer	Asst. Intelligence Officer	Asst. Operations Officer	Asst. Supply Officer	Communications Officer
Knowledge	* 1.98	* 2.00	** 2.13	* 1.80	** 3.78	** 3.42	1.74	** 2.58	* 1.94	** 5.00
Degrees of Freedom	19-198	19-150	19-153	19-209	19-173	19-84	15-67	19-137	19-115	19-157
Thinking, Reaching Sound Conclusions	* 1.95	1.37	* 1.67	* 1.74	** 4.10	** 2.77	1.67	** 2.57	** 2.83	** 4.57
Degrees of Freedom	19-203	19-150	19-156	19-209	19-174	19-82	15-64	19-137	19-111	19-152
Initiative	** 3.79	** 2.85	* 1.70	1.58	** 4.88	** 4.23	** 2.40	** 2.63	** 2.51	** 3.74
Degrees of Freedom	19-201	19-151	19-159	19-211	19-175	19-93	15-68	19-134	19-112	19-154
Cooperation in Group Work	1.38	1.31	0.84	** 2.03	** 2.94	* 2.02	1.19	1.28	1.63	** 2.75
Degrees of Freedom	19-200	19-170	19-169	19-218	19-185	19-118	15-83	19-152	19-135	19-169
Organizing Ability	** 3.80	** 2.34	** 2.05	1.46	** 3.77	** 2.45	* 2.10	* 1.72	** 2.48	** 3.98
Degrees of Freedom	19-198	19-144	19-146	19-210	19-166	19-77	14-58	19-116	19-92	19-139
Expression	** 3.48	** 2.18	** 2.03	** 2.20	** 5.12	** 2.74	** 2.70	** 2.62	* 1.66	** 3.96
Degrees of Freedom	19-201	19-170	19-171	19-219	19-183	19-106	15-80	19-150	19-123	19-165

* Significant at the 5% level. **Significant at the 1% level. (Only 17 out of 20 staffs had an Assistant Intelligence Officer)

TABLE IV

F RATIOS

STUDENTS' RATINGS ON STRATEGIC PROBLEM

Position Rated / Trait	Commanding General	Chief of Staff	Officer in Charge of Personnel	Officer in Charge of Intelligence	Officer in Charge of Operations	Officer in Charge of Supply	Asst. Personnel Officer	Asst. Intelligence Officer	Asst. Operations Officer	Asst. Supply Officer	Communications Officer
Knowledge	2.79**	2.19*	4.44**	4.30**	3.23**	1.61*	1.46	1.74*	2.02**	1.85**	2.00**
Degrees of Freedom	29-347	12-138	29-238	29-256	29-350	29-253	29-156	29-169	29-251	29-149	29-256
Thinking, Reaching Sound Conclusions	1.75*	2.24*	3.09**	4.51**	2.39**	1.49	0.98	2.34**	1.81**	1.77*	2.11**
Degrees of Freedom	29-352	12-142	29-244	29-269	29-355	29-262	29-165	29-176	29-260	29-160	29-266
Initiative	2.63**	2.03*	2.98**	4.14**	4.04**	2.74**	2.32**	1.88**	1.72*	1.47*	2.27**
Degrees of Freedom	29-354	12-147	29-247	29-270	29-353	29-268	29-157	29-182	29-259	29-163	29-266
Cooperation in Group Work	2.54**	3.50**	1.85**	2.92**	2.50**	2.38**	1.64*	2.30**	1.90**	1.85**	2.02**
Degrees of Freedom	29-350	12-148	29-268	29-287	29-360	29-282	29-183	29-205	29-272	29-183	29-280
Organizing Ability	2.66**	2.29*	3.22**	4.17**	2.31**	2.62**	1.92**	3.06**	1.48	2.24**	2.66**
Degrees of Freedom	29-354	12-134	29-233	29-250	29-348	29-249	29-139	29-154	29-224	29-140	29-231
Expression	2.47**	3.42**	2.64**	5.97**	2.56**	3.05**	1.79*	2.95**	1.44	1.86**	1.96**
Degrees of Freedom	29-353	12-146	29-262	29-287	29-361	29-275	29-166	29-199	29-270	29-172	29-279

* Significant at the 5% level. **Significant at the 1% level. (Only 13 of 30 staffs had a Chief of Staff position)

TABLE V

RATINGS GIVEN BY INSTRUCTORS IN TWENTY DIFFERENT STAFFS TO THEIR RESPECTIVE CHIEFS OF STAFF ON ORGANIZING ABILITY IN THE TACTICAL PROBLEM

Staff / Ratings	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Sub-Totals	
9							1		3									1	4		9	
8		3	1		3		1	1	1						3			1			14	
7		1			1	1	1	1		4					1			1		2	13	
6	1		2	1		2		2				2		4				1		2	17	
5	1										1					3	1				6	
4	1		1	2		1					2	2	2			1	2				14	
3			1								1		2				1				5	
2																					0	
1																					0	
N	3	4	5	3	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	78	A
ΣX	15	31	27	14	31	23	24	27	35	28	16	20	14	24	31	19	16	30	36	26	487	B
ΣX^2	77	241	161	68	241	137	194	185	307	196	66	104	50	144	241	91	66	230	324	170	3293	C
$\frac{(\Sigma X)^2}{N}$	75.00	240.25	146.80	65.33	240.25	132.25	192.00	182.25	306.25	196.00	64.00	100.00	49.00	144.00	240.25	90.25	64.00	225.00	324.00	169.00	3244.89	D

The analysis of variance data in Table VI were calculated by using the same procedure as illustrated for the data in Tables I and II.

TABLE VI

ANALYSIS OF VARIANCE OF INSTRUCTORS' RATINGS OF THEIR RESPECTIVE CHIEFS OF STAFF ON ORGANIZING ABILITY IN THE TACTICAL PROBLEM

Source of Variation	Degrees of Freedom	Sums of Squares	Mean Square	F Ratio
Total	77	252.37		
Between Staff Officer Means	19	204.25	10.75	12.95**
Within Staff Officer Ratings	58	48.12	0.83	

** Significant at the 1% level.

The above procedure was used to analyze ratings on all six traits given to:

1) Student officers serving in all ten staff positions of the tactical problem.

2) Student officers serving in all eleven staff positions of the strategic problem.

The 6 x 10 or 60 F ratios for the tactical problem are shown in Table VII. The 6 x 11 or 66 ratios for the strategic problem are shown in Table VIII.

TABLE VII

F RATIOS

INSTRUCTORS' RATINGS ON TACTICAL PROBLEM

Position Rated / Trait	Chief of Staff	Officer in Charge of Personnel	Officer in Charge of Intelligence	Officer in Charge of Operations	Officer in Charge of Supply	Asst. Personnel Officer	Asst. Intelligence Officer	Asst. Operations Officer	Asst. Supply Officer	Communications Officer
Knowledge	7.23**	4.48**	9.60**	7.88**	2.92**	6.22**	4.91**	7.67**	7.11**	7.04**
Degrees of Freedom	19-58	19-54	19-57	19-56	19-57	19-49	14-38	19-49	19-53	19-50
Thinking, Reaching Sound Conclusions	7.82**	4.75**	7.49**	5.43**	4.70**	6.65**	5.24**	6.03**	3.97**	5.31**
Degrees of Freedom	19-59	19-55	19-57	19-57	19-58	19-47	15-39	19-50	19-50	19-47
Initiative	8.38**	5.94**	9.03**	6.72**	4.41**	5.65**	4.58**	7.51**	4.67**	5.54**
Degrees of Freedom	19-58	19-58	19-58	19-57	19-58	19-55	16-40	19-52	19-55	19-55
Cooperation in Group Work	9.52**	6.39**	4.47**	10.25**	11.03**	7.54**	4.07**	9.02**	5.17**	3.43**
Degrees of Freedom	19-59	19-59	19-58	19-59	19-59	19-55	15-41	19-55	19-55	19-54
Organizing Ability	12.95**	4.69**	10.33**	11.47**	4.20**	3.25**	4.65**	6.54**	5.00**	2.85**
Degrees of Freedom	19-58	19-59	19-54	19-57	19-56	19-47	15-35	17-41	19-45	19-41
Expression	15.69**	6.15**	9.62**	9.97**	5.80**	5.08**	5.62**	6.96**	12.43**	5.62**
Degrees of Freedom	19-59	19-59	19-59	19-57	19-59	19-52	15-39	19-56	19-52	19-53

** Significant at the 1% level. (Only 17 of 20 staffs had an Assistant Intelligence Officer)

TABLE VIII

F RATIOS

INSTRUCTORS' RATINGS ON STRATEGIC PROBLEM

Position Rated / Trait	Commanding General	Chief of Staff	Officer in Charge of Personnel	Officer in Charge of Intelligence	Officer in Charge of Operations	Officer in Charge of Supply	Asst. Personnel Officer	Asst. Intelligence Officer	Asst. Operations Officer	Asst. Supply Officer	Communications Officer
Knowledge	8.12**	3.28**	4.49**	5.63**	2.60**	10.78**	5.78**	3.40**	7.00**	2.67**	3.71**
Degrees of Freedom	29-93	12-43	29-89	29-93	29-93	29-89	29-82	29-86	29-87	29-76	29-82
Thinking, Reaching Sound Conclusions	7.75**	4.89**	3.02**	3.76**	5.82**	8.09**	5.35**	4.24**	4.85**	4.55**	9.06**
Degrees of Freedom	29-94	12-43	29-89	29-93	29-96	29-87	29-84	29-85	29-83	29-77	29-84
Initiative	5.94**	7.60**	3.66**	5.29**	6.89**	9.97**	7.54**	5.12**	6.16**	6.62**	3.59**
Degrees of Freedom	29-96	12-42	29-94	29-94	29-97	29-91	29-97	29-90	29-88	29-80	29-85
Cooperation in Group Work	5.59**	6.43**	4.64**	4.33**	2.13**	6.46**	8.50**	5.58**	6.59**	2.67**	5.58**
Degrees of Freedom	29-94	12-43	29-95	29-94	29-95	29-90	29-86	29-89	29-87	29-80	29-85
Organizing Ability	6.75**	3.18**	3.66**	4.21**	7.90**	7.15**	3.29**	6.00**	4.08**	2.78**	4.49**
Degrees of Freedom	29-96	12-41	29-91	29-91	29-93	29-89	28-70	29-76	29-80	28-67	28-76
Expression	12.91**	10.38**	4.79**	5.00**	9.93**	6.71**	5.76**	6.95**	7.18**	4.06**	4.32**
Degrees of Freedom	29-96	12-43	29-94	29-95	29-96	29-92	28-81	29-90	29-87	29-81	29-82

** Significant at the 1% level. (Only 13 of the 30 staffs had a Chief of Staff position)

Out of 126 analyses of variance which were used to test Hypothesis 2, all F ratios were significant at the 1 per cent level. Hence, Hypothesis 2 is false.

To test Hypothesis 3 - "With reference to the ratings made by instructors and by students with respect to any one trait, there are no real differences between the mean rated performance of officers assigned to a particular staff role and that of other officers assigned to different staff roles when each of the several officers (assigned to a particular staff role) is a member of (different but essentially similar) successive groups contending with the same (or essentially similar) strategic or tactical air force problem." - an analysis of variance of a two-way classification was used. Positions of officers who were rated in each problem were classified on one axis and raters (instructor and student) were classified on the other axis. Ratings on each of the six traits were examined for both problems. The method of unweighted averages[71] using disproportionate sub-class numbers was used. The data in Table IX illustrate the use of this method.

In Table IX the average ratings given by both students and instructors are shown for each staff position along with the number of ratings.

$$\text{Total Sum of Squares} = 6.9^2 + 6.9^2 + \ldots + 6.8^2 - \frac{(130.0)^2}{20} = 3.24$$

$$\text{Sum of Squares Between Position Means} = \frac{13.5^2 + 13.3^2 + \ldots + 14.0^2}{2} - \frac{(130.0)^2}{20} = 1.63$$

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[71] G. W. Snedecor, loc. cit.

TABLE IX

A SUMMARY OF RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN TWENTY DIFFERENT STAFFS ON KNOWLEDGE APPLIED TO THE SOLUTION OF THE TACTICAL PROBLEM

Positions Rated / Raters	C/S	A-1	A-2	A-3	A-4	A/A-1	A/A-2	A/A-3	A/A-4	Comm. Off.	Totals
No. of Ratings Students	218	170	173	229	193	104	83	157	135	177	
Average Rating	6.9	6.9	6.7	6.9	6.9	6.4	6.5	6.5	6.8	7.2	67.7
No. of Ratings Instructors	78	74	77	76	77	69	53	69	73	70	
Average Rating	6.6	6.4	5.8	6.5	6.5	5.9	5.9	5.8	6.1	6.8	62.3
Totals	13.5	13.3	12.5	13.4	13.4	12.3	12.4	12.3	12.9	14.0	130.0

Key: C/S - Chief of Staff
A-1 - Officer in Charge of Personnel
A-2 - Officer in Charge of Intelligence
A-3 - Officer in Charge of Operations
A-4 - Officer in Charge of Supply
A/A-1 - Asst. Personnel Officer
A/A-2 - Asst. Intelligence Officer
A/A-3 - Asst. Operations Officer
A/A-4 - Asst. Supply Officer
Comm. Off. - Communications Officer

$$\text{Sum of Squares Between Rater Means} = \frac{67.7^2 + 62.3^2}{10} - \frac{(130.0)^2}{20}$$

$$= 1.46$$

$$\text{Interaction Sum of Squares} = 3.24 - 1.63 - 1.46 = 0.15$$

$$\text{Error Mean Square} = \frac{1}{20}\left(\frac{1}{218} + \frac{1}{170} + \frac{1}{173} + \ldots + \frac{1}{70}\right) \text{(Error Mean Square of the Original Data)}$$

$$\text{Error Mean Square} = \frac{1}{20}(0.21)(0.65) = .007 \text{ or } .01$$

The Error Mean Square of the Original Data is calculated in Table X.

TABLE X

AN ANALYSIS OF VARIANCE OF ORIGINAL RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN TWENTY DIFFERENT STAFFS ON KNOWLEDGE APPLIED TO THE SOLUTION OF THE TACTICAL PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square
Total	2354		
Between Officer Means	19		
Within Officer Ratings by the Same Group	2335	1526.74	0.65

The complete analysis is shown in Table XI.

TABLE XI

AN ANALYSIS OF VARIANCE OF RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN TWENTY DIFFERENT STAFFS ON KNOWLEDGE APPLIED TO THE SOLUTION OF THE TACTICAL PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Total	19	3.24		
Positions	9	1.63	0.18	18.00**
Raters	1	1.46	1.46	146.00**
Interaction (Positions x Raters)	9	0.15	0.02	2.00*
Error	2335		0.01	

* Significant at the 5% level. ** Significant at the 1% level.

The data in Tables XVIII and XIX[72] were treated in the same manner as the preceding ratings on Knowledge to obtain an analysis of variance of ratings on Thinking (see Table XX).[73] Similarly the data in Tables XXI through L[74] were used to obtain analyses of variance of ratings on the other traits for the tactical and strategic problems.

Out of the twelve analyses of variance (Tables XI, XX, XXIII, XXVI, XXIX, XXXII, XXXV, XXXVIII, XLI, XLIV, XLVII and L)[75] which were used to test Hypothesis 3, all twelve F ratios which were made on rater means were significant at the 1 per cent level. This evidence combined with that which is obtained by inspecting the twelve summaries of

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[72] See appendix.

[73] Ibid.

[74] Ibid.

[75] Ibid.

ratings made by students and instructors (Tables IX, XVIII, XXI, XXIV, XXVII, XXX, XXXIII, XXXVI, XXXIX, XLII, XLV and XLVIII)[76] shows that for each trait rated students tended to be more lenient than instructors in their ratings. Similarly, all twelve F ratios which were made on position means were significant at the 1 per cent level (Tables XI, XX, XXIII, XXVI, XXIX, XXXII, XXXV, XXXVIII, XLI, XLIV, XLVII and L).[77] This evidence along with that which is obtained by inspecting the twelve summaries of ratings made by students and instructors (Tables IX, XVIII, XXI, XXIV, XXVII, XXX, XXXIII, XXXVI, XXXIX, XLII, XLV, and XLVIII)[78] shows that both students and instructors alike had a tendency to give significantly higher ratings to officers serving in positions of importance than to those serving in minor positions as assistants. This was apparent for ratings by both instructors and students in the tactical problem but only for ratings by instructors in the strategic problem. Students tended to give officers serving as assistants higher ratings in the strategic problem. It is also interesting to note that in the tactical problem, interaction was significant at the 5 per cent level only on Knowledge, Initiative, Cooperation and Organizing Ability (Tables XI, XXIII, XXVI, and XXIX).[79] However, in the strategic problem, interaction was significant at the 1 per cent level on all traits rated except Expression (Tables XXXV, XXXVIII, XLI, XLIV, and XLVII).[80]

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[76] Ibid.

[77] Ibid.

[78] Ibid.

[79] Ibid.

[80] Ibid.

Thus it appears that as both instructors and students gained experience in these staff problems, they tended to value things differently. In giving ratings on Expression, there was no interaction in either problem. The above data show that Hypothesis 3 is false.

To test Hypothesis 4 - "With reference to the ratings made by instructors and students with respect to any one trait, neither instructors nor student staffs will exhibit a high degree of reliability in their ability to rate the performance of officers (assigned to different roles) when each officer is a member of (different but essentially similar) successive groups contending with the same (or essentially similar) strategic or tactical air force problem." - five staffs were selected at random from the tactical problem and five staffs at random from the strategic problem. Students' ratings on each officer were divided at random into two groups for each trait and the average ratings of each group were correlated using the Pearson Product-Moment Correlation Coefficient. The results were stepped up by the Spearman-Brown Formula to obtain the reliability of ratings of the entire group of students. Since only one instructor rated each staff or group of students, it was impossible to obtain the reliability of instructors' ratings by using different instructors observing the same group. However, instructors' ratings on two successive days, the second and the third, were used to obtain a measure of their reliability in rating. Table XII shows the reliability of instructors' and students' ratings on each item of the rating scale for both the tactical and the strategic problems.

TABLE XII

RELIABILITY OF INSTRUCTORS' AND STUDENTS' RATINGS OF STAFF MEMBERS' PERFORMANCE ON THE TACTICAL AND STRATEGIC PROBLEMS

Trait Rated / Problem	Knowledge		Thinking		Initiative		Cooperation		Organizing Ability		Expression	
	Ratings		Ratings		Ratings		Ratings		Ratings		Ratings	
	Instr	Stud	Instr	Stud	Instr	Stud	Instr	Stud	Instr	Stud	Instr	Stud
Tactical	.55	.64	.52	.32	.68	.25	.77	.36	.59	.56	.77	.62
Strategic	.62	.48	.53	.27	.53	.49	.53	.25	.59	.12	.84	.59

Reliabilities of instructors' ratings on each trait varied from .52 to .84, the average being .63. Reliabilities of student staffs' ratings varied from .12 to .64, the average being .41. Both instructors' and student staffs' reliabilities were highest on rating Expression and lowest on rating Thinking. It would appear from the data that a single instructor rated more reliably than a group of students. However, it should be pointed out that instructors' ratings on the second and third days were used and although the ratings were theoretically independent they undoubtedly were influenced by systematic error which would tend to raise the reliability. If a high degree of reliability is defined to be .85 or better, then Hypothesis 4 is true.

To test Hypothesis 5 - "Ratings on certain traits of officers serving in certain staff positions are easier to make than are ratings on other traits of officers serving in different staff positions." - Chi-square tests were made on the number of ratings given by both students and instructors and the number expected by each. The expected number of ratings given on each trait in the tactical problem was 80 because there were 20 staffs which were rated by their instructors on

four different days. The actual number of ratings given are shown in each cell of Tables LI and LII.[81] These numbers were each multiplied by a factor to bring the actual total, row or column, to the expected total, 800 or 480.

Chi-square tests on the number of ratings given by instructors to students in the tactical problem follow:

Using the data in Table LI[82]

Chi-square (Knowledge) =

$$\frac{(87-80)^2+(83-80)^2+(86-80)^2+(85-80)^2+(86-80)^2+(77-80)^2+(59-80)^2+(77-80)^2+(82-80)^2+(78-80)^2}{80}$$

Chi-square (Knowledge) = $\frac{622}{80} = 7.78$

Similarly Chi-square (Thinking) = 7.08

Chi-square (Initiative) = 5.58

Chi-square (Cooperation) = 5.53

Chi-square (Organizing Ability) = 13.25

Chi-square (Expression) = 6.53

For 9 degrees of freedom, a value of 16.92 is needed for significance at the 5 per cent level.

Using the data in Table LII[83]

Chi-square (Chief of Staff) =

$$\frac{(79-80)^2+(81-80)^2+(79-80)^2+(81-80)^2+(79-80)^2+(81-80)^2}{80} = \frac{6}{80} = 0.08$$

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[81] Ibid.

[82] Ibid.

[83] Ibid.

Similarly, Chi-square (A-1) = 0.28

Chi-square (A-2) = 0.20

Chi-square (A-3) = 0.10

Chi-square (A-4) = 0.08

Chi-square (Asst. A-1) = 0.98

Chi-square (Asst. A-2) = 0.60

Chi-square (Asst. A-3) = 3.10

Chi-square (Asst. A-4) = 1.08

Chi-square (Comm. Off.) = 2.13

For 5 degrees of freedom, a value of 11.07 is needed for significance at the 5 per cent level.

Chi-square tests on the number of ratings given by students to their fellow students in the tactical problem will now be made. Using the data in Table LIII[84] and the greatest number of ratings given on any scale to students serving in a particular position as the expected number, Chi-square (Knowledge) =

$$\frac{(240-223)^2}{223} + \frac{(187-190)^2}{190} + \frac{(190-191)^2}{191} + \frac{(252-239)^2}{239} + \frac{(212-205)^2}{205} + \frac{(114-138)^2}{138} +$$

$$\frac{(91-99)^2}{99} + \frac{(173-172)^2}{172} + \frac{(148-155)^2}{155} + \frac{(194-189)^2}{189} = 7.57$$

Similarly Chi-square (Thinking) = 10.48

Chi-square (Initiative) = 5.71

Chi-square (Cooperation) = 0.04

Chi-square (Organizing Ability) = 20.38*

Chi-square (Expression) = 1.45

*For 9 degrees of freedom, a value of 16.92 is needed for significance at the 5 per cent level; a value of 21.67 is needed for significance at the 1 per cent level.

[84] Ibid.

Using the data in Table LIV[85]

$$\text{Chi-square (Chief of Staff)} = \frac{2(221-223)^2+(226-223)^2+2(224-223)^2+(223-223)^2}{223}$$

$$\text{Chi-square (Chief of Staff)} = \frac{19}{223} = 0.09$$

Similarly Chi-square (A-1) = 3.77

Chi-square (A-2) = 2.35

Chi-square (A-3) = 0.54

Chi-square (A-4) = 1.19

Chi-square (Asst. A-1) = 13.35*

Chi-square (Asst. A-2) = 6.33

Chi-square (Asst. A-3) = 6.08

Chi-square (Asst. A-4) = 8.58

Chi-square (Communications Officer) = 3.29

*For 5 degrees of freedom, a value of 11.07 is needed for significance at the 5 per cent level.

The expected number of ratings given on each scale in the strategic problem by instructors was 120 because there were 30 staffs which were rated by their assigned instructors on four different days. However, the Chief of Staff position was filled in only 13 of the 30 staffs, hence the expected number of ratings on each scale for this position was only 52. The actual number of ratings given are shown in each cell of Tables LV and LVI.[86] These numbers were each multiplied by a factor to bring the actual total, rows or columns, to the expected total. Chi-square tests on the number of ratings given by instructors to students

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[85] Ibid.

[86] Ibid.

in the strategic problem follow:

Using the data in Table L[87]

Chi-square (Knowledge) =

$$\frac{2(126-120)^2+2(122-120)^2+(123-120)^2+2(115-120)^2+(119-120)^2+(120-120)^2+(108-120)^2}{120} + \frac{(57-52)^2}{52}$$

Chi-square (Knowledge) = 2.85

Similarly Chi-square (Thinking) = 3.24

Chi-square (Initiative) = 2.30

Chi-square (Cooperation) = 2.25

Chi-square (Organizing Ability) = 10.35

Chi-square (Expression) = 3.40

For 9 degrees of freedom, a value of 16.92 is needed for significance at the 5 per cent level.

Using the data in Table LVI[88]

Chi-square (Commanding General) = $\frac{(118-120)^2+2(119-120)^2+3(121-120)^2}{120}$ = 0.08

Similarly Chi-square (Chief of Staff) = 0.02

Chi-square (A-1) = 0.30

Chi-square (A-2) = 0.16

Chi-square (A-3) = 0.12

Chi-square (A-4) = 0.13

Chi-square (Asst. A-1) = 2.13

Chi-square (Asst. A-2) = 1.18

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[87] Ibid

[88] Ibid

Chi-square (Asst. A-3) = 0.55

Chi-square (Asst. A-4) = 1.68

Chi-square (Communications Officer) = 0.72

For 5 degrees of freedom, a value of 11.07 is needed for significance at the 5 per cent level.

Chi-square tests on the number of ratings given by students to their fellow students in the strategic problem will now be made. Using the data in Table LVII[89] and the greatest number of ratings given on any scale to students serving in a particular position as the expected number, Chi-square (Knowledge) = $\frac{(411-384)^2}{384} + \frac{(165-161)^2}{161} + \frac{(292-298)^2}{298} +$

$\frac{(312-317)^2}{317} + \frac{(414-391)^2}{391} + \frac{(309-312)^2}{312} + \frac{(203-213)^2}{213} + \frac{(217-235)^2}{235} + \frac{(306-302)^2}{302} +$

$\frac{(195-213)^2}{213} + \frac{(312-310)^2}{310} = 7.01$

Similarly Chi-square (Thinking) = 4.25

Chi-square (Initiative) = 4.16

Chi-square (Cooperation) = 0.03

Chi-square (Organizing Ability) = 19.01*

Chi-square (Expression) = 1.64

*For 10 degrees of freedom, a value of 18.31 is needed for significance at the 5 per cent level; a value of 23.21 is needed for significance at the 1 per cent level.

Using the data in Table LVIII[90]

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[89] Ibid

[90] Ibid

Chi-square (Commanding General) =

$$\frac{(379-384)^2 + (384-384)^2 + 2(386-384)^2 + (382-384)^2 + (385-384)^2}{384}$$

Chi-square (Commanding General) = $\frac{38}{384}$ = 0.10

Similarly Chi-square (Chief of Staff) = 1.14

Chi-square (A-1) = 3.44

Chi-square (A-2) = 4.15

Chi-square (A-3) = 0.42

Chi-square (A-4) = 2.95

Chi-square (Asst. A-1) = 6.36

Chi-square (Asst. A-2) = 9.46

Chi-square (Asst. A-3) = 5.70

Chi-square (Asst. A-4) = 7.03

Chi-square (Communications Officer) = 5.92

For 5 degrees of freedom, a value of 11.07 is needed for significance at the 5 per cent level.

Based upon the number of omissions, Chi-square tests showed that instructors had some difficulty in rating organizing ability and assistants' positions. None of the tests were significant at the 5 per cent level, however. Students had quite a little difficulty in rating organizing ability (Chi-square significant at the 5 per cent level for both problems) and some difficulty in rating thinking and knowledge. They also found it easier to rate students serving in important staff positions than those serving as assistants. Only one Chi-square test was significant at the 5 per cent level, namely, the one on ratings given

to assistant personnel officers in the tactical problem. However, Chi-square values for all assistant positions in both problems were noticeably higher than those for positions of importance. The above data show that Hypothesis 5 is true.

To test Hypothesis 6 - "Ratings made by both students and instructors on fewer than six traits will correlate highly with composite ratings of which they are a part." - correlations of ratings on each of the six traits with composite ratings were made for officers rated in each staff position in each problem by both students and instructors.

Since an omission would not permit intercorrelations to be computed, only those ratings which were made by raters on all six traits were used. The sum of the ratings on all six traits was used to determine a students' final rating. Intercorrelations for ratings made in the tactical problem are shown in Tables LIX to LXXIX.[91] Intercorrelations for ratings made in the strategic problem are shown in Tables LXXIX to C.[92]

The above-mentioned intercorrelations on ratings given by both instructors and students are high. This shows that there is a lot of halo effect present and that raters are undoubtedly rating on just one factor - ability to do the specific job.

The multiple correlation technique was used to indicate how well composite ratings for each staff position in each problem could have been predicted from ratings on two or more traits. It was thought that perhaps a pattern of important traits would appear depending upon the staff position rated. First-order partial correlation coefficients

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[91] Ibid.

[92] Ibid.

were calculated holding constant the ratings of the trait that had the highest correlation with the composite rating. The formula which was used is

$$r_{13.2} = \frac{r_{13} - r_{12}\ r_{23}}{\sqrt{(1-r_{12}^2)\ (1-r_{23}^2)}}$$

where $r_{13.2}$ stands for the relationship between composite ratings (variable 1) and a trait rating (variable 3) when values in the trait having the highest correlation with the composite rating (variable 2) are held constant.

After the first partial correlation coefficients were all calculated, the highest one in each instance was selected in order to calculate the multiple correlation based upon two traits. The formula which was used is

$$1-R_{1(23)}^2 = (1-r_{12}^2)\ (1-r_{13.2}^2)$$

where $R_{1(23)}$ is the multiple correlation between composite ratings and ratings on two of the traits. Table XIII shows multiple correlations based upon two traits.

After two traits were found which had the highest relationship with the composite rating, they were held constant and second order partial correlation coefficients were calculated using the formula

$$r\ 14.23 = \frac{r_{14.2} - r_{13.2}\ r_{34.2}}{\sqrt{(1-r_{13.2}^2)\ (1-r_{34.2}^2)}}$$

where $r_{14.23}$ stands for the relationship between composite ratings (variable 1) and a trait rating (variable 4) when values in the two traits having the highest multiple correlation with the composite

rating (variables 2 and 3) are held constant. Multiple correlations based upon three traits were calculated using the formula

$$1-R^2_{1(234)} = (1-r^2_{12})\ (1-r^2_{13.2})\ (1-r^2_{14.23})$$

and are shown in Table XIV.

Upon studying Tables XIII and XIV, one discovers that the traits, Initiative, Organizing Ability and Thinking, contribute much more frequently to the multiple correlations with composite ratings than do the other three traits. As a result, multiple correlations with composite ratings using these three traits were calculated and are shown in Table XV. Multiple correlations of ratings on these traits with composite ratings given in the tactical and the strategic problems vary from .93 to .99 and average slightly less than .97, the average multiple correlation using the best three traits. Hence, it appears that students could be rated on Initiative, Organizing Ability and Thinking only, thus reducing the task of rating by fifty per cent.

A certain amount of spurious correlation is introduced by correlating ratings on one trait with the composite which is formed by summing it and five other ratings. This point was investigated by correlating ratings on one trait with the sum of the other five and making the comparison in Table XVI for five sets of ratings selected at random from the tactical problem.

Table XVI shows that the spuriousness was relatively small. Since composite ratings were used to determine students' grades, it appears that the correlation methods used to test Hypothesis 6 were appropriate.

TABLE XIII

MULTIPLE CORRELATIONS OF RATINGS ON TWO TRAITS WITH COMPOSITE RATINGS GIVEN IN THE TACTICAL AND STRATEGIC PROBLEMS

Positions Rated / Raters	C.G.	C/S	A-1	A-2	A-3	A-4	Asst A-1	Asst A-2	Asst A-3	Asst A-4	Communications Officer
Instructors											
Tactical Problem		$R_{1(34)}$ .97	$R_{1(34)}$ .95	$R_{1(26)}$ .95	$R_{1(36)}$ .96	$R_{1(67)}$ .95	$R_{1(35)}$ .96	$R_{1(26)}$ .97	$R_{1(56)}$ .95	$R_{1(67)}$ .95	$R_{1(34)}$ .94
Strategic Problem	$R_{1(34)}$ .91	$R_{1(24)}$ .92	$R_{1(34)}$ .93	$R_{1(46)}$ .94	$R_{1(47)}$ .95	$R_{1(34)}$ .94	$R_{1(36)}$ .93	$R_{1(36)}$ .95	$R_{1(34)}$ .96	$R_{1(34)}$ .93	$R_{1(36)}$ .90
Students											
Tactical Problem		$R_{1(34)}$ .95	$R_{1(46)}$ .95	$R_{1(25)}$ .95	$R_{1(36)}$ .95	$R_{1(46)}$ .96	$R_{1(46)}$ .97	$R_{1(35)}$ .96	$R_{1(27)}$ .94	$R_{1(36)}$ .95	$R_{1(34)}$ .95
Strategic Problem	$R_{1(34)}$ .94	$R_{1(36)}$ .94	$R_{1(34)}$ .94	$R_{1(36)}$ .95	$R_{1(34)}$ .94	$R_{1(36)}$ .94	$R_{1(34)}$ .94	$R_{1(34)}$ .95	$R_{1(35)}$ .94	$R_{1(36)}$ .97	$R_{1(26)}$ .94

1 - Composite Rating
2 - Knowledge
3 - Thinking
4 - Initiative
5 - Cooperation
6 - Organizing Ability
7 - Expression

$R_{1(23)}$ - Multiple Correlation of Composite Rating with Knowledge and Thinking

TABLE XIV

MULTIPLE CORRELATIONS OF RATINGS ON THREE TRAITS WITH COMPOSITE RATINGS GIVEN IN THE TACTICAL AND STRATEGIC PROBLEMS

Positions Rated / Raters	C.G.	C/S	A-1	A-2	A-3	A-4	Asst A-1	Asst A-2	Asst A-3	Asst A-4	Comm Off
Instructors											
Tactical Problem		$R_{1(347)}$ .98	$R_{1(346)}$ .97	$R_{1(267)}$ .97	$R_{1(356)}$ .97	$R_{1(467)}$ .97	$R_{1(357)}$ .98	$R_{1(246)}$ .98	$R_{1(356)}$ .98	$R_{1(367)}$ .97	$R_{1(346)}$ .97
Strategic Problem	$R_{1(346)}$ .96	$R_{1(246)}$ .96	$R_{1(345)}$ .96	$R_{1(346)}$ .96	$R_{1(347)}$ .97	$R_{1(346)}$ .97	$R_{1(356)}$ .98	$R_{1(367)}$ .96	$R_{1(346)}$ .98	$R_{1(346)}$ .96	$R_{1(367)}$ .95
Students											
Tactical Problem		$R_{1(346)}$ .97	$R_{1(246)}$ .97	$R_{1(257)}$ .97	$R_{1(356)}$ .97	$R_{1(346)}$ .98	$R_{1(346)}$ .99	$R_{1(357)}$ .98	$R_{1(267)}$ .97	$R_{1(346)}$ .97	$R_{1(346)}$ .97
Strategic Problem	1(345) .97	1(346) .98	1(345) .97	1(346) .97	1(345) .97	1(356) .97	1(234) .97	1(347) .97	1(357) .97	1(346) .99	1(246) .97

1 - Composite Rating
2 - Knowledge
3 - Thinking
4 - Initiative
5 - Cooperation
6 - Organizing Ability
7 - Expression

$R_{1(234)}$ - Multiple Correlation of Composite Rating with Knowledge, Thinking and Initiative

TABLE XV

MULTIPLE CORRELATIONS OF RATINGS ON THINKING, INITIATIVE AND ORGANIZING ABILITY WITH COMPOSITE RATINGS GIVEN IN THE TACTICAL AND STRATEGIC PROBLEMS

Position Rated / Raters	C.G.	C/S	A-1	A-2	A-3	A-4	Asst A-1	Asst A-2	Asst A-3	Asst A-4	Comm Off
Tactical Problem Instructors	.	.98	.97	.97	.97	.97	.97	.95	.97	.96	.97
Strategic Problem Instructors	.96	.95	.97	.96	.97	.97	.94	.96	.98	.96	.93
Tactical Problem Students		.97	.97	.95	.97	.98	.99	.98	.95	.97	.97
Strategic Problem Students	.97	.98	.96	.97	.95	.97	.97	.97	.97	.99	.96

TABLE XVI

SPURIOUS CORRELATION IN CORRELATING RATINGS WITH THE COMPOSITE RATINGS IN THE TACTICAL PROBLEM

Position Rated	Rated by	Trait	Correlation with Composite	Correlation with Sum of Other Five Ratings	Difference
Chief of Staff	Instructors	Thinking	.92	.89	.03
Intelligence Officer	Students	Knowledge	.88	.81	.07
Operations Officer	Instructors	Organization	.90	.88	.02
Assistant Personnel Officer	Instructors	Thinking	.93	.89	.04
Assistant Personnel Officer	Students	Organization	.93	.89	.04

Since the multiple correlations using the three traits, Initiative, Organizing Ability and Thinking, yielded values averaging .97, it was felt that the reliability of ratings should be studied further. The reliabilities of students' and instructors' ratings on the above three traits were compared with the reliabilities of their composite ratings. Composite ratings given by the five staffs from the tactical problem and by the five staffs from the strategic problem which were used to test Hypothesis 4 were studied. Students' ratings on each officer were divided at random into two groups for the sum of the above three traits and again for the composite ratings. Average ratings of each group were correlated using the Pearson Product-Moment Correlation Coefficient. The results were stepped up by the Spearman-Brown Formula to obtain the reliability of ratings of the entire group of students in each staff.

Since only one instructor rated each staff or group of students, it was impossible to obtain the reliability of instructors' ratings by using different instructors observing the same group. However, instructors' ratings on two successive days, the second and third, were used to obtain a measure of their reliability in rating. Table XVII shows the reliability of instructors' and students' ratings on first, Initiative, Organizing Ability and Thinking and then on composite ratings using all six scales.

In comparing the reliability of ratings on the three traits, Initiative, Organizing Ability and Thinking, with the reliability of ratings on all six scales, one finds that the former are only slightly smaller than the latter for both instructors' and students' ratings.

Thus, it appears that ratings on the three traits, Initiative, Organizing Ability and Thinking can be used to appraise students' performance on these problems because the multiple correlations with composite ratings are high and the reliabilities are only slightly less than those obtained for composite ratings. Hence, the data tend to confirm Hypothesis 6.

TABLE XVII

RELIABILITY OF INSTRUCTORS' AND STUDENTS' RATINGS OF STAFF MEMBERS' PERFORMANCE ON THE TACTICAL AND STRATEGIC PROBLEMS

Traits Rated / Problem	Initiative, Organizing Ability and Thinking		Composite Ratings (Six Scales)	
	Raters		Raters	
	Instructors	Students	Instructors	Students
Tactical	.61	.51	.76	.59
Strategic	.72	.42	.80	.48

CHAPTER V

SUMMARY, CONCLUSIONS AND SUGGESTIONS FOR FURTHER STUDY

SUMMARY

The purposes of this study were (1) to determine if ratings given by instructors and students to officers serving in planning staff positions indicate that there are real differences in their performances; (2) to discover instructors' and students' rating tendencies and the effect of the staff position of the officers whose performance was rated upon these tendencies; (3) to determine the reliability of ratings made by instructors and students (4) to determine if certain traits are easier to rate than others and if officers serving in certain staff positions are easier to rate than others; and (5) to investigate the possibility of using fewer rating scales in rating officers' performance in staff positions.

Students were assigned to the different staffs and to staff positions at random so that analysis of variance could be used. Each instructor who rated was assigned to a staff in the same manner.

The graphic rating scales were presented to instructors and students by the officer in charge of evaluation in a briefing on how to use the rating scales. Students had had several previous rating experiences in the school in that they rated each other in oral expression several times just prior to taking part in the tactical and strategic problems. Most instructors had participated in in-service rater training.

FINDINGS

1. Differences in the performance of officers serving in a staff position as measured by ratings of their fellow staff officers and their instructors cannot be attributed to chance alone.

2. Instructors and students had a tendency to rate officers serving in key staff positions more leniently than they rated their subordinates.

3. Students rated their fellow staff officers more leniently than did instructors.

4. There was interaction between instructors' and students' ratings on all traits except Expression and this interaction increased with experience in the staff problems.

5. Students found it easier to rate the performance of their fellow officers serving in positions of importance than to rate the performance of those serving in minor positions as assistants.

6. Both instructors and students had more difficulty in rating students on Organizing Ability than on any other trait.

7. Students and instructors rated most reliably on Expression and least reliably on Thinking.

8. Although the reliabilities of instructors' and students' ratings on most traits were relatively low, the reliabilities of their ratings on Initiative, Organizing Ability, and Thinking combined and on the composite of the six scales were substantially higher.

9. Intercorrelations of ratings on the six traits were high thus indicating the presence of halo.

10. Ratings on Initiative, Organizing Ability, and Thinking produced the highest multiple correlations with composite ratings in most instances. Reliabilities of composite ratings of instructors and students on these three scales compare favorably with reliabilities of composite ratings of instructors and students on all six scales.

CONCLUSIONS

For years the primary objective of most rating schemes has been to obtain an index of efficiency of subordinates. In this study, we have had subordinates rating their superiors as well. Thus by broadening the base or increasing the number of raters, it was hoped that the ratings would be improved. Subordinates are often in a better position to rate their superiors and fellow workers than are outside observers. Mutual ratings between staff members should promote sympathy and understanding for each other's problems. They should help produce a more efficient staff officer. The knowledge that he is being evaluated by his subordinates, as well as by his own superiors, should cause him to be more alert and more receptive to criticism.

On the other hand, supervisors might attempt to curry favor with subordinates by relaxing standards and refraining from necessary criticisms and decisions, thus bringing about a breakdown of staff morale. Sometimes supervisors, for fear of getting low ratings themselves, may make their ratings spuriously high. In other instances, subordinates with real or fancied grievances may find this a means of getting even. However, there is safety in numbers. Thus the effect of extreme ratings,

either high or low, is reduced when mean ratings derived from independent ratings of several observers are used as they were in this problem.

Hypothesis 1 was proved false. Students tended to agree rather than disagree on the ratings they gave to fellow officers serving in the several staff positions. Hence, differences in the performances of officers in the several staff positions cannot be attributed to chance alone.

Hypothesis 2 was also proved false for instructors making independent daily ratings of staff officers' performances tended to agree from day to day with their other ratings. It should be pointed out that although the daily ratings of each instructor are theoretically independent, the systematic error of each will help to make an analysis of variance significant.

Hypothesis 3 was shown to be false as students rated more leniently than instructors on all scales. However, both students and instructors gave their highest ratings on cooperation and their lowest ratings on expression.

It is believed that Air Command and Staff School students enter into the tactical and strategic problems with a mental set or frame of mind keyed to cooperation; that is, each student displays cooperation at every opportunity and evaluators, both student and instructor, being aware of this, give students high ratings on this count. On the other hand, the low ratings which were given on expression are probably the result of the unit of instruction in that area which preceded the tactical problem. Both students and instructors have been critical of

students' ability to express themselves orally. Here, then, in both the tactical and strategic problems, there are opportunities to apply what they have learned when they studied the unit on oral expression.

Both students and instructors rate officers serving in positions of importance higher than they rate officers serving in subordinate positions. Hence, in fairness to the student officer, the assignments to the staff positions should be equitably distributed so that an officer will have one experience serving in a position of major importance and one serving in a subordinate position if possible. Then too, the officer should become a better staff officer and have more appreciation of what is involved in other staff officers' jobs after having had two different staff assignments or sets of experiences. This latter point is further demonstrated by the fact that interaction is more significant in the analyses of variance on ratings in the strategic problem. This interaction is undoubtedly caused by changed sets of values held by students who have served in positions of importance who later served in subordinate positions or by changed sets of values held by those who served in subordinate positions who later served in positions of importance.

Hypothesis 4 was confirmed. It was not surprising to find that both students and instructors rated most reliably on oral expression, the area in which they had had the greatest amount of prior experience. Oral expression is also something which is readily observable. The reliability of ratings on individual scales was rather low but the reliability of a composite of the three scales, Initiative, Organizing

Ability and Thinking, was somewhat higher. Reliability of ratings was highest when all six scales were used. Reported reliabilities of instructors' ratings were somewhat higher than those of students; however, it must be pointed out that here again the systematic error of individual instructors contributed toward these results.

Hypothesis 5 was confirmed. Chi-square tests showed that organizing ability was difficult to rate in some instances and that subordinate positions were generally more difficult for students to rate on this characteristic than were positions of importance. Few tests were significant at the 5 per cent level; nevertheless, the trend was clearly apparent. The duties of the several staff positions were different - some did not require much organizing ability - and the importance of most of them varied depending upon whether the problem was tactical or strategic.

Hypothesis 6 was confirmed. By using ratings based upon three scales, Initiative, Organizing Ability and Thinking, correlations in the neighborhood of .97 were obtained with composite ratings based upon the six scales. The reliability of ratings based upon the above three scales is somewhat lower than the reliability of ratings based upon all six scales. However, it is felt that the small increase in reliability using all six scales is not worth all of the extra rating work required when an abbreviated set of ratings based upon three scales yields results which compare so favorably with the longer set.

Authorities recognize that the keystone of any rating program is the individual rater's judgment. Two essentials for securing reliable rater judgments are: (1) Raters must be taught to make accurate and

consistent judgments. (2) Raters must also have the potential ability and the desire to make such ratings.

This study demonstrates that the ability to make accurate and consistent ratings cannot be taught overnight. It takes time for raters to learn the purposes of a rating system, something about the distribution of abilities or traits to be rated and how to observe. Students and instructors were able to rate Expression with greater reliability than any other trait, not only because they could observe and listen to the staff officer speak, but also because they had more experience and training in this area. They were more critical observers with respect to Expression and gave students lower ratings on this trait than on any other one. Raters must be trained if their ratings are to be of much value.

In this study, instructors had their full time available for observation and rating. Students had a limited amount of time; observations were made while they worked as staff officers and final ratings were made during the morning of the last day for each problem. One hour was set aside for rating on each problem. The Chi-square tests show that students tend to have more difficulty in observing and rating their fellow staff officers than do their instructors. Hence, sufficient time must be provided for observation and rating. Students must be motivated to make better observations. The work sheet[93] was developed to encourage students to plan observations. It was also developed to make both students and instructors "rater conscious" and to give

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93 Ibid.

them opportunities to translate observations into meaningful judgments and record them.

The desire of the rater to formulate accurate and consistent judgments does not develop automatically nor can it be established by order. The willingness of the rater to rate depends in large part on how he is motivated. Attention should be given to making sure that he understands the rating program. He should be able to see the need which the rating fulfills, how it affects him and how other staff officers will be affected by the ratings. He should accept the stated purpose of the rating program rather than invent one of his own.

The time and attention which will be given to a rating program will be directly proportional to the interest and attention shown by higher authority. Hence, key personnel (commandant, supervisors and key instructors) should be "sold" first. The "selling" of key personnel involves discussing and formulating a rating program which they feel will be helpful to them. They should have a part in developing the rating instrument to include formulating definitions or descriptions and setting up procedures to be followed. They should also have the experience of trying out the rating form and evaluating the rating procedure.

It is felt that more time should have been given to training both instructors and students to rate better. However, the mission of the school did not list rater training as being of primary importance. Technical information and staff work are deemed of much greater importance so little time could be given to rater training. It is believed

that this situation is typical of most schools, civilian and military, for administrators can seem to find little space in their curricula for rater training. Many of them would hesitate to allow students to help determine other students' ratings.

However, the rating situation was ideal in several respects. The tactical and strategic problems were of such a nature that students worked together for five days in solving each problem. There were several staff meetings, a number of smaller conferences, and many opportunities for close contacts. There was ample opportunity for instructors to observe students in action. Some students, because of their staff positions, were better able to observe and to be observed than others. Generally speaking, there was ample opportunity for them to rate and most students were very cooperative during both problems. As a result, there were comparatively large numbers of raters and ratings.

Considering the advantages of the present study over the typical class room situation, results are not particularly encouraging. The reliability of ratings is about the same as would be expected in the classroom situation. The students' tendencies toward leniency and halo and their tendency to be influenced by positions of importance might also be expected in the classroom situation. Multiple correlations based upon the best three of the six traits studied when compared with multiple correlations based upon the three traits, Initiative, Organizing Ability, and Thinking, show practically no differences. This might be interpreted as follows:

It does not matter much whether students in this study were rated on the three traits which correlated best with composite ratings in each instance, on Initiative, Organizing Ability and Thinking, or on all six traits. A general halo makes it nearly impossible to get a clear picture of an officer's strong and weak points.

Although the training of raters has undoubtedly improved the quality of ratings, it is felt that graphic scales like those in the present study require too much training time if acceptable results are to be obtained. Acceptable ratings have been obtained only as a result of continuous work on the part of the faculty and several consultants.

SUGGESTIONS FOR FURTHER STUDY

If it is at all possible, the reliability of instructors' ratings should be studied by having two or more instructors independently and simultaneously rate the performance of staff members. Thus the effect of systematic error could be eliminated from reported measures of reliability.

The effect of the staff officer's rank on the ratings he receives might also be studied by making a two-way classification for each of the six traits on which officers were rated in each staff position. Ranks of officers rated would be classified on one axis and raters, instructor and student, would be classified on the other axis. An analysis of variance applying the method of unweighted averages based upon disproportionate sub-class numbers would be used.

The possibility of rating only the work products which are produced by individual officers should be studied. Although the plan seems impractical now, it might be that certain subordinate positions which require detailed work on estimates of situations and logistics calculations might be evaluated in this manner.

The possibility of using the Forced-Choice technique in rating staff officers' performance should be studied. This technique would force the rater to choose between descriptive phrases which appear of equal value (have the same preference index) but are different in validity (discrimination index). Thus it reduces the rater's ability to control the final result of his ratings. This technique requires five steps: (1) procurement of descriptive essays of successful and unsuccessful performance, (2) preparation of a complete list of descriptive phrases or adjectives, (3) determination of preference and discriminative indices for each phrase, (4) pairing alternatives so that preference indices are the same and discriminative indices are different, being negligible for one alternative, and (5) try-out on a specified criterion group.

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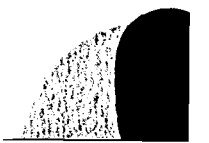

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APPENDIX

THE AIR UNIVERSITY
AIR COMMAND AND STAFF SCHOOL
Maxwell Air Force Base, Alabama

Class 49A

26 April 1949

FINAL SCHOOL PROBLEM
Cover Sheet for Work Sheets

1. A fair and accurate report of a student's staff effectiveness will result if you will make frequent planned observations of his performance throughout the school problem. Observations should be recorded on the work sheet (49AFSP FORM #8 DTD 26 Apr 49) at the close of the day in which they have been made. The ratings are accomplished by comparing each student's behavior with the descriptions on the scale at the top of the worksheet and by copying the appropriate numbers in the columns opposite his name.

2. All students who have been observed should be rated with respect to one trait before going on to the next. A space for remarks has been provided so that you can record notes to assist in making ratings each day.

3. At the end of the problem, you will consider separately each scale and the trait which it represents.

4. A single rating sheet, (49A FORM #6 DTD 26 Apr 49) will be provided for you to summarize all ratings for the problem. Write down the <u>one number</u> on each scale, which, in your opinion, indicates the degree of effectiveness demonstrated by the student on that trait.

STAFF NO. _____ STUDENT WORK SHEET RATER _____

Rate the student from 1 to 9 on the trait described below by writing the number that best appraises his work on this problem in the proper column opposite his name. If you feel that you have not had sufficient evidence to render a judgment, place an X in the proper column and make plans for observing the student in an activity involving the trait.

EXPRESSION

1 2	3 4	5 6	7 8	9
Poor in command of words, enunciation, grammar. Unconvincing	Often pauses for words or has to repeat to clarify. Others have to fully rephrase his remarks.	Can express himself adequately but not forcefully.	Usually expresses ideas clearly. Is reasonably convincing.	Speaks clearly. Makes meaning clear by precise use of words and forceful illustrations.

STUDENTS NAME	DAILY RATINGS Mon	Tues	Wed	Thur	Fri	REMARKS

STAFF NO. _____ STUDENT WORK SHEET RATER _____

Rate the student from 1 to 9 on the trait described below by writing the number that best appraises his work on this problem in the proper column opposite his name. If you feel that you have not had sufficient evidence to render a judgment, place an X in the proper column and make plans for observing the student in an activity involving the trait.

ORGANIZING ABILITY

1	2	3	4	5	6	7	8	9
Inefficient planning, gets in way of others causing loss of time; falls behind schedule.		Plans own work fairly well, but is deficient in coordinating.		Methodical worker; fits in well; turns out work on schedule.		Planning of work furthers project; staff able to depend on his maintaining an accelerated schedule.		Efficient planning and coordinating save vital time or contribute to superior solution.

	DAILY RATINGS					
STUDENT NAME	Mon	Tues	Wed	Thurs	Fri	REMARKS

STAFF NO. _____ STUDENT WORK SHEET RATER _____

Rate the student from 1 to 9 on the trait described below by writing the number that best appraises his work on this problem in the proper column opposite his name. If you feel that you have not had sufficient evidence to render a judgment, place an X in the proper column and make plans for observing the student in an activity involving the trait.

COOPERATION IN GROUP WORK

1	2	3	4	5	6	7	8	9
Tends to be vague, tedious, stubborn. Quibbles, digresses. Contributed both infrequently and briefly.		Occasionally digresses, quibbles, or is antagonistic. Contributions of limited value due to brevity or infrequency.		Fits in; presents no problem himself; promotes group work moderately. Participates unevenly.		Helps to correct misunderstandings; points up discussions. Speaks on numerous topics, but not obtrusively		Clarifies points. Takes active part in all discussions but is not domineering. Excellent timing.

STUDENT NAME	DAILY RATINGS Mon	Tues	Wed	Thurs	Fri	REMARKS

STAFF NO. _____ RATER _____

STUDENT WORK SHEET
FINAL SCHOOL PROBLEM
AIR COMMAND AND STAFF SCHOOL

Rate the student from 1 to 9 on the trait described below by writing the number that best appraises his work on this problem in the proper column opposite his name. If you feel that you have not had sufficient evidence to render a judgement, place an X in the proper column and make plans for observing the student in an activity involving the trait.

INITIATIVE

1	2	3	4	5	6	7	8	9
Passive, lets others guide and stimulate; or leads aimlessly.		Assumes leadership only when pressed to do so. Exerts little helpful influence on course of work or discussion.		Occasionally assumes leadership, usually content to follow. Has some influence on course of work and discussion.		Often takes lead and is accepted by others. Often directs discussion tactfully into useful channels.		Natural leader. Clarifies issues; summarizes; stimulates participation of members. Takes major responsibility for guiding work and discussion.

STUDENT NAME	DAILY RATINGS Mon	Tues	Wed	Thurs	Fri	REMARKS

STAFF NO. _____ STUDENT WORK SHEET RATER: _____

Rate the student from 1 to 9 on the trait described below by writing the number that best appraises his work on this problem in the proper column opposite his name. If you feel that you have not had sufficient evidence to render a judgment, place an X in the proper column and make plans for observing the student in an activity involving the trait.

THINKING: REACHING SOUND CONCLUSIONS

1	2	3	4	5	6	7	8	9
Confuses opinion with fact. Does not think problems through logically. Follows habit or rule of thumb.		Tends to be unreliable. Contributions likely to miss main issue involved.		Contributions generally good, well-thought out.		Generally clear, unbiased thinker, producing sound ideas. Good critical judgment.		Produces valuable new ideas, illustrations, summaries. Excellent critical judgment.

STUDENT NAME	DAILY RATINGS Mon	Tues	Wed	Thurs	Fri	REMARKS

STAFF NO. _____ STUDENT WORK SHEET RATER: _____

Rate the student from 1 to 9 on the trait described below by writing the number that best appraises his work on this problem in the proper column opposite his name. If you feel that you have not had sufficient evidence to render a judgment, place an X in the proper column and make plans for observing the student in an activity involving the trait.

KNOWLEDGE

1	2	3	4	5	6	7	8	9
Lacks basic information applicable to the problem.		Some knowledge of facts and factors, but relies chiefly upon personal experience.		Applies many facts and ideas to the problem, but gaps are apparent.		Possess considerable background of facts and ideas applicable to the problem.		Can marshal a great store of facts and ideas to cope with all aspects of the problem.

	DAILY RATINGS				
STUDENT NAME	Mon	Tues	Wed	Thurs	Fri

THE AIR UNIVERSITY
AIR COMMAND AND STAFF SCHOOL
Maxwell Air Force Base, Alabama

Evaluation Form

a. For definition of traits see Student Work Sheets (49A FSP FORM #8 Dtd 26 April 49)

b. Rating scale: Not Obs X | Below Average 1 : 2 : 3 | Average 4 : 5 : 6 | Above Average 7 : 8 : 9

Code No. of Rater _____

Staff or Group No. _____

Instruction _____

Date _____

Problem Designation _____

STAFF ASSIGNMENT	NAME AND RANK	EXPRESSION ORGANIZATION	COOPERATION	INITIATIVE	THINKING (SOUND CONCLUSIONS)	KNOWLEDGE	AVERAGE (To one Decimal)

49A FSP FORM #6 Dtd 26 Apr 49

INSTRUCTIONS

1. Evaluation procedures for the student rating of other students will be as follows:

a. Each student will rate each other student on the same staff. The not observed (X) can and should be entered on the form wherever applicable except as indicated below.

Rater:			
1. C.G. and C/S	Will rate on 6 characteristics		All Staff Members
2. A-1, A-2, A-3, A-4	" " " 6	"	C.G. C/S All members of their respective Staff Sections, and each other Section Chief.
3. Assistant A-1, A-2 A-3, A-4	" " " 6	"	Section Chief and all other members of the same staff section.

b. Students should maintain work sheets during each phase of the problem in order to render an accurate and objective evaluation of each student of the staff at the completion of that phase. The rating should reflect on evaluation of students' work throughout the entire tactical or strategic phase of the School Problem.

c. A final rating will be entered on this form and turned into the instructor upon completion. Work sheets may be retained by the students.

d. Code numbers will be used by the rating students (Code No. will correspond to the number of the issued folder). For students being rated, the name (not the Code No.) will be used.

WAR DEPARTMENT

INSTRUCTIONS FOR RATING COMMISSIONED OFFICERS

Significance of the Rating Scale.

1. Under General Orders 46 and 85 (W. D., 1918) all officers in the Army below the rank of Brigadier General will be rated quarterly according to the Officers' Rating Scale. Circular No. 73 (W. D., 1918) provides that a final rating will be given each officer just prior to separation from the service. The rating of an officer is a numerical expression of the degree in which he possesses the five essential qualifications of an officer, namely; (1) Physical Qualities, (2) Intelligence, (3) Leadership, (4) Personal Qualities, and (5) General Value to the Service. The rating is made by comparing him in each of these respects with officers of the next higher rank.

2. Promotions, discharges, and subsequent appointments are determined as a rule by ratings. Making just and accurate ratings is therefore one of the most serious duties of an officer. Proper rating is largely dependent on the possession of an accurate Rating Scale. Each rating officer makes his own scale, using the reverse of this form.

How to Make the Scale.

3. Write on small slips of paper the names of from 12 to 25 officers of your own rank and not above the average age of that rank. They should be men with whom you have served or with whom you are well acquainted. Include officers whose qualifications are extremely poor as well as those who are highly efficient. If these names do not include all the grades for each of the five qualifications, others may be added.

4. Look over your names from the viewpoint of Physical Qualities only. Disregard every other characteristic of each officer except the way in which he impresses his men by his physique, bearing, neatness, voice, energy, and endurance. Arrange the names on the slips of paper in order from highest to lowest on the basis of the physical qualities of the men. Select that officer who surpasses all the others in this qualification and enter his name on the line marked Highest under Physical Qualities. Then select the one who most conspicuously lacks these qualities and enter his name on the line marked Lowest. Select the officer who seems about halfway between the two previously selected and who represents about the general average in physical qualities; enter his name on the line marked Middle. Select the officer who is halfway between middle and highest; enter his name on the line marked High. Select the one who ranks halfway between middle and lowest; enter his name on the line marked Low.

5. In the same manner make out scales for each of the other four qualifications (Intelligence, Leadership, Personal Qualities, and General Value to the Service).

6. Each officer whose name appears on the scale should be one who exhibits clearly and distinctly the qualification and the degree of the qualification for which he has been chosen.

7. The names for Highest and Lowest on each section of the Scale must represent extreme cases. The name for the Middle should be that of an average officer, halfway between extremes. High and Low should be halfway between the Middle and the extremes. An even gradation of merit is important.

8. In making or using any section of the Scale, consider only the qualification it covers, totally disregarding all the others.

9. In rating subordinates of more than one grade the best practice is to make separate scales for each grade, using always the names of officers one grade higher than that of the subordinate to be rated. However, in exceptional cases good results have been secured where a Scale constructed of captains is used for rating both lieutenants and captains, and a Scale constructed of colonels is used for rating all ranks of field officers.

Fig. 1 - Army Rating Scale Instructions

Points for Special Attention

10. Rate your subordinate for Physical Qualities first. Consider how he impresses his men by his physique, bearing, neatness, voice, energy, and endurance. Compare him with each of the five officers in section I of your Rating Scale, and give him the number of points following the name of the officer he most nearly equals. If he falls between two officers in the Scale, give him a number accordingly (e. g., if between Low and Middle, give him 7, 7½, or 8).

11. Rate the subordinate in a corresponding manner for each of the other four essential qualifications.

12. In rating, make a man-to-man comparison of the subordinate with the officers whose names appear on your scale. Disregard the numerical equivalent until you have made these concrete comparisons.

13. When rating several subordinates, rate all of them on each qualification before adding the total for any one.

14. This is not a percentage system and you should not allow yourself to fix in mind any particular number of points you think the subordinate ought to get.

15. The total rating for a subordinate is the sum of the ratings you give him in the five separate qualities. If these directions are followed carefully the average of any considerable group of officers rated will not be over 60 points.

16. Each officer below the rank of Brigadier General will be rated by his immediate superior. Ratings will be revised or approved by the immediate superior of the officer making the rating. Each revising officer will be held responsible for the ratings made by his subordinates.

I. Physical Qualities

Physique, bearing, neatness, voice, energy and endurance. (Consider how he impresses his men in the above respects.)

Highest	15
High	12
Middle	9
Low	6
Lowest	3

II. Intelligence

Accuracy, ease in learning, ability to grasp quickly the point of view of commanding officer, to issue clear and intelligent orders, to estimate a new situation, and to arrive at a sensible decision in a crisis.

Highest	15
High	12
Middle	9
Low	6
Lowest	3

III. Leadership

Initiative, force, self reliance, decisiveness, tact, ability to inspire men and to command their obedience, loyalty and cooperation.

Highest	15
High	12
Middle	9
Low	6
Lowest	3

IV. Personal Qualities

Industry, dependability, loyalty, readiness to shoulder responsibility for his own acts, freedom from conceit and selfishness, readiness and ability to cooperate.

Highest	15
High	12
Middle	9
Low	6
Lowest	3

V. General Value to the Service

His professional knowledge, skill and experience; success as an administrator and instructor; ability to get results.

Highest	40
High	32
Middle	24
Low	16
Lowest	8

Fig. 2 - Army Rating Scale

(SCALE E)

GRAPHIC RATING SCALE

FOR

EXECUTIVES, DEPARTMENT HEADS, FOREMEN AND SUPERVISORS

INSTRUCTIONS FOR MAKING OUT THIS REPORT:—

Before attempting to rate this supervisor, re-read carefully the definition of each quality immediately before rating the supervisor in that quality. Base your rating on the work this supervisor is actually doing at this time. Indicate your rating in each quality by placing a check (✓) on the line just where you think it ought to be. For instance, if in Quality I, you think the person you are rating ranks somewhere between Indifferent and Favorable, put your check on the line somewhere between these two points.

Afterwards read Supplementary Instructions on reverse.

Name of Executive Doing Rating: E.H.WILSON

Name of Supervisor Being Rated: GEO. BARKER

Department or Division: SALES

Supervisor's Department or Division: SALES

Group or Unit: RESEARCH

Supervisor's Group or Unit: RESEARCH

QUALITIES	REPORT	
I. Consider his success in winning confidence and respect through his appearance and manner.	Inspiring · Favorable · Indifferent · Unfavorable · Repellent	4
II. Consider his success in doing things in new and better ways and in adapting improved methods to his own work.	Highly Constructive · Successful · Fairly Progressive · Routine Worker	7
III. Consider his success in winning the cooperation of his subordinates, in welding them into a loyal and effective working unit.	Capable and Forceful Leader · Handles Workers Well · Fails To Command Confidence · Frequent Friction In His Department	6
IV. Consider his success in organizing the work of his department or unit, both by delegating authority wisely and by making certain that results are achieved.	Effective Even Under Difficult Circumstances · Effective Under Normal Circumstances · Lacks Planning Ability · Inefficient	8
V. Consider his success in making his department or unit a smooth running part of the whole organization; his knowledge and appreciation of the problems of other departments.	Exceptionally Cooperative · Cooperative · Not Helpful · Difficult To Handle · Obstructionist	10
VI. Consider his success in improving his subordinates by imparting information, creating interest, developing talent and arousing ambition.	Develops Workers of High Calibre · Develops Workers Satisfactorily · Neglects To Develop Workers · Discourages and Misinforms Workers	8
VII. Consider his success in applying specialized knowledge in his particular field, whether by his own knowledge of ways and means or through his use of sources of information.	Expert · Competent · Uninformed · Neglects and Misinterprets the Facts	9

DATE:

Final Rating: B

Total Rating: 52

(OVER)

Fig. 3 - Face of graphic rating scale for executives, department heads, foremen and supervisors

SUPPLEMENTARY INSTRUCTIONS TO RATOR

On the face of this Scale, you have entered by a check (✓) your judgment of the subordinate in seven specific qualities regarded as important by the management. In addition, you are requested to check (✓) the appropriate boxes below, stating your reasons, advice, etc., in each instance, and to give the desired information in 5 and 6.

1. This employee (individual being rated) should be considered for promotion at the first opportunity. ✓

Reasons and suggested line of promotion His personality is against him but he is popular with his subordinates and has a learning. To Asst. Mgr. of Sales Research

2. He should be transferred to other work. ☐

Reasons and suggested line of work

3. He is ambitious to progress and should be advised how best to qualify himself for advancement. ✓

Remarks Wants advice as to best course of study to take up.

4. He desires advice as to his present and future opportunities. ☐

Remarks

5. He is taking special courses in Business English

6. He desires special or further training in Statistical procedure

7. A conference with the Personnel Division is desired with reference to this employe. ☐

THE GRAPHIC RATING SCALE FOR EXECUTIVES

ITS PURPOSE AND USE

1. The Graphic Rating Scale is a practical method through which each executive's and each supervisor's ability and fitness for increased responsibilities can be known quickly, with a reasonable degree of accuracy and with uniformity throughout the Company.

2. Each department head, chief clerk, etc., rates the group heads, assistants and others in supervisory positions who are subordinate to him. Conversely each person in an executive or supervisory position is rated by several (usually three) superiors. This ensures a well-balanced judgment in each instance. Where marked differences of opinion occur, the reasons are discussed to find the facts.

3. This Rating Scale has been devised after careful consideration of the best practices throughout the country. It makes it possible for the department head, etc., to form and express his judgments accurately and with minimum effort. It protects the subordinate against snap judgment and against hasty and ill-considered appraisal of his abilities.

4. Each executive and supervisor in the Company is rated periodically, every few months. This data is entered on the individual's Qualification Card and is considered in salary increase and in promotion.

5. All ratings are confidential. Any person desiring information as to his own ratings can obtain it from his Qualification Card in the Personnel Division.

Fig. 4 - Reverse of graphic rating scale for executives, department heads, foremen, and supervisors

GRAPHIC RATING CARD

Name of Student _____

Judge the student in each quality, independently of all other qualities. Indicate your ratings in each quality by placing an "X" on the line at a point that approximately reports the student's standing.

1. Intelligence	Keen, thorough thinker	Alert; good judgment	Fair understanding; common sense	Learns poorly; unsound thinker	Dull; poor judgment
2. Industry	Exceptionally industrious	Steady, hard worker	Fairly industrious	Takes things easy	Lazy
3. Accuracy	Extremely accurate & careful	High degree of accuracy	Moderately accurate	Inexact, somewhat careless	Slovenly
4. Co-operativeness	Unusually willing, co-operative	Good team-worker	Fairly co-operative	Difficult to work with	Trouble-maker, antagonistic
5. Initiative	Creative, aggressive, original	Energetic, some originality	Moderately independent	Lacks originality or aggressiveness	Routine worker; passive
6. Moral Trustworthiness	Merits complete confidence	Recognized as trustworthy	Fairly reliable	Doubtful reliability	Untrustworthy
7. Leadership Ability	Capable, forceful, winning; "born leader"	Leads well under most circumstances	Fairly effective leader	Unable to lead; unimpressive	Submissive, antagonistic or repellent

Fig. 5 - Graphic Rating Card

TABLE XVIII

A SUMMARY OF RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN TWENTY DIFFERENT STAFFS ON THINKING IN THE TACTICAL PROBLEM

Positions Rated / Raters	C/S	A-1	A-2	A-3	A-4	A/A-1	A/A-2	A/A-3	A/A-4	Comm Off	Totals
Students: No. of Ratings	223	170	176	229	194	102	80	157	131	172	
Students: Average Rating	7.0	6.8	6.7	6.8	7.0	6.5	6.7	6.6	6.8	6.9	67.8
Instructors: No. of Ratings	79	75	76	77	78	67	55	70	70	67	
Instructors: Average Rating	6.4	6.2	5.8	6.2	6.3	6.0	6.0	5.8	6.0	6.5	61.2
Totals	13.4	13.0	12.5	13.0	13.3	12.5	12.7	12.4	12.8	13.4	129.0

TABLE XIX

AN ANALYSIS OF VARIANCE OF ORIGINAL RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN TWENTY DIFFERENT STAFFS ON THINKING IN THE TACTICAL PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square
Total	2347		
Between Officer Means	19		
Within Officer Ratings by the Same Group	2328	1727.66	0.74

TABLE XX

AN ANALYSIS OF VARIANCE OF RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN TWENTY DIFFERENT STAFFS ON THINKING IN THE TACTICAL PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Total	19	2.93		
Positions	9	0.65	0.07	7.00**
Raters	1	2.18	2.18	218.00**
Interaction (Positions x Raters)	9	0.10	0.01	1.00
Error	2328		0.01	

** Significant at the 1% level.

TABLE XXI

A SUMMARY OF RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN TWENTY DIFFERENT STAFFS ON INITIATIVE IN THE TACTICAL PROBLEM

Positions Rated / Raters	C/S	A-1	A-2	A-3	A-4	A/A-1	A/A-2	A/A-3	A/A-4	Comm Off	Totals
Students: No. of Ratings	221	171	179	231	195	113	84	154	132	174	
Students: Average Rating	7.0	6.9	6.8	7.0	7.1	6.6	6.8	6.7	7.0	6.9	68.8
Instructors: No. of Ratings	78	78	78	77	78	75	57	72	75	75	
Instructors: Average Rating	6.6	6.2	5.8	6.6	6.5	6.0	5.9	5.8	6.2	6.2	61.8
Totals	13.6	13.1	12.6	13.6	13.6	12.6	12.7	12.5	13.2	13.1	130.6

TABLE XXII

AN ANALYSIS OF VARIANCE OF ORIGINAL RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN TWENTY DIFFERENT STAFFS ON INITIATIVE IN THE TACTICAL PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square
Total	2396		
Between Officer Means	19		
Within Officer Ratings by the Same Group	2377	1791.08	0.75

TABLE XXIII

AN ANALYSIS OF VARIANCE OF RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN TWENTY DIFFERENT STAFFS ON INITIATIVE IN THE TACTICAL PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Total	19	3.52		
Positions	9	0.88	0.10	10.00**
Raters	1	2.45	2.45	245.00**
Interaction (Positions x Raters)	9	0.19	0.02	2.00*
Error	2377		0.01	

* Significant at the 5% level.
** Significant at the 1% level.

TABLE XXIV

A SUMMARY OF RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN TWENTY DIFFERENT STAFFS ON COOPERATION IN THE TACTICAL PROBLEM

Positions Rated / Raters	C/S	A-1	A-2	A-3	A-4	A/A-1	A/A-2	A/A-3	A/A-4	Comm Off	Totals
No. of Ratings Students	220	190	189	238	205	138	99	172	155	189	
Average Rating	7.2	7.1	7.1	7.2	7.3	7.1	7.1	7.0	7.2	7.2	71.5
No. of Ratings Instructors	79	79	78	79	79	75	57	75	75	74	
Average Rating	6.9	6.6	6.1	6.6	6.7	6.3	6.3	6.1	6.4	6.7	64.7
Totals	14.1	13.7	13.2	13.8	14.0	13.4	13.4	13.1	13.6	13.9	136.2

TABLE XXV

AN ANALYSIS OF VARIANCE OF ORIGINAL RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN TWENTY DIFFERENT STAFFS ON COOPERATION IN THE TACTICAL PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square
Total	2544		
Between Officer Means	19		
Within Officer Ratings by the Same Group	2525	2051.14	0.81

TABLE XXVI

AN ANALYSIS OF VARIANCE OF RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN TWENTY DIFFERENT STAFFS ON COOPERATION IN THE TACTICAL PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Total	19	3.04		
Positions	9	0.52	0.06	6.00**
Raters	1	2.31	2.31	231.00**
Interaction (Positions x Raters)	9	0.21	0.02	2.00*
Error	2525		0.01	

* Significant at the 5% level
** Significant at the 1% level

TABLE XXVII

A SUMMARY OF RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN TWENTY DIFFERENT STAFFS ON ORGANIZING ABILITY IN THE TACTICAL PROBLEM

Positions Rated / Raters	C/S	A-1	A-2	A-3	A-4	A/A-1	A/A-2	A/A-3	A/A-4	Comm Off	Totals
Students: No. of Ratings	218	164	166	230	186	97	73	136	112	159	
Students: Average Rating	6.8	6.9	6.6	6.7	6.9	6.5	6.5	6.3	6.7	6.7	66.6
Instructors: No. of Ratings	78	77	74	77	76	67	51	59	65	61	
Instructors: Average Rating	6.2	6.3	5.8	6.2	6.6	6.1	6.1	5.9	6.1	6.6	61.9
Totals	13.0	13.2	12.4	12.9	13.5	12.6	12.6	12.2	12.8	13.3	128.5

TABLE XXVIII

AN ANALYSIS OF VARIANCE OF ORIGINAL RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN TWENTY DIFFERENT STAFFS ON ORGANIZING ABILITY IN THE TACTICAL PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square
Total	2225		
Between Officer Means	19		
Within Officer Ratings by the Same Group	2206	1922.15	0.87

TABLE XXIX

AN ANALYSIS OF VARIANCE OF RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN TWENTY DIFFERENT STAFFS ON ORGANIZING ABILITY IN THE TACTICAL PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Total	19	2.04		
Positions	9	0.77	0.09	9.00**
Raters	1	1.11	1.11	111.00**
Interaction (Positions x Raters)	9	0.16	0.02	2.00*
Error	2206		0.01	

* Significant at the 5% level
** Significant at the 1% level

TABLE XXX

A SUMMARY OF RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN TWENTY DIFFERENT STAFFS ON EXPRESSION IN THE TACTICAL PROBLEM

Positions Rated / Raters	C/S	A-1	A-2	A-3	A-4	A/A-1	A/A-2	A/A-3	A/A-4	Comm Off	Totals
No. of Ratings	221	190	191	239	203	126	96	170	143	185	
Students											
Average Rating	6.8	6.6	6.4	6.6	6.6	6.1	6.4	6.3	6.6	6.4	64.8
No. of Ratings	79	79	79	77	79	72	55	76	72	73	
Instructors											
Average Rating	6.5	5.9	5.6	6.2	6.1	5.7	5.9	5.8	6.0	6.2	59.9
Totals	13.3	12.5	12.0	12.8	12.7	11.8	12.3	12.1	12.6	12.6	124.7

TABLE XXXI

AN ANALYSIS OF VARIANCE OF ORIGINAL RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN TWENTY DIFFERENT STAFFS ON EXPRESSION IN THE TACTICAL PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square
Total	2504		
Between Officer Means	19		
Within Officer Ratings by the Same Group	2485	1791.31	0.72

TABLE XXXII

AN ANALYSIS OF VARIANCE OF RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN TWENTY DIFFERENT STAFFS ON EXPERSSION IN THE TACTICAL PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Total	19	2.21		
Positions	9	0.87	0.10	10.00**
Raters	1	1.21	1.21	121.00**
Interaction (Positions x Raters)	9	0.13	0.01	1.00
Error	2485		0.01	

**Significant at the 1% level.

TABLE XXXIII

A SUMMARY OF RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN THIRTY DIFFERENT STAFFS ON KNOWLEDGE APPLIED TO THE SOLUTION OF THE STRATEGIC PROBLEM

Positions Rated / Raters	CG*	C/S	A-1	A-2	A-3	A-4	A/A-1	A/A-2	A/A-3	A/A-4	Comm Off	Totals
No. of Ratings Students	377	151	268	286	380	283	186	199	281	179	286	
Average Rating	6.8	6.4	6.5	6.6	6.5	6.7	7.0	6.6	7.0	6.8	7.2	74.1
No. of Ratings Instructors	123	56	119	120	123	119	112	116	117	106	112	
Average Rating	6.8	6.4	6.3	6.2	6.3	6.4	6.5	6.1	6.7	6.3	6.6	70.6
Totals	13.6	12.8	12.8	12.8	12.8	13.1	13.5	12.7	13.7	13.1	13.8	144.7

* Commanding General

TABLE XXXIV

AN ANALYSIS OF VARIANCE OF ORIGINAL RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN THIRTY DIFFERENT STAFFS ON KNOWLEDGE APPLIED TO THE SOLUTION OF THE STRATEGIC PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square
Total	4098		
Between Officer Means	21		
Within Officer Ratings by the Same Group	4077	2748.10	0.67

TABLE XXXV

AN ANALYSIS OF VARIANCE OF RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN THIRTY DIFFERENT STAFFS ON KNOWLEDGE APPLIED TO THE SOLUTION OF THE STRATEGIC PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Total	21	1.64		
Positions	10	0.88	0.088	17.60**
Raters	1	0.56	0.560	112.00**
Interaction (Positions x Raters)	10	0.20	0.020	4.00**
Error	4077		0.005	

** Significant at the 1% level.

TABLE XXXVI

A SUMMARY OF RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN THIRTY DIFFERENT STAFFS ON THINKING IN THE STRATEGIC PROBLEM

Positions Rated / Raters	CG	C/S	A-1	A-2	A-3	A-4	A/A-1	A/A-2	A/A-3	A/A-4	Comm Off	Totals
Students: No. of Ratings	382	155	274	299	385	292	195	206	290	190	296	
Students: Average Rating	6.8	6.5	6.6	6.7	6.4	6.7	6.9	6.6	7.0	6.9	6.9	74.0
Instructors: No. of Ratings	124	56	119	123	126	117	114	115	113	107	114	
Instructors: Average Rating	6.8	6.5	6.2	6.3	6.3	6.5	6.4	6.1	6.6	6.3	6.3	70.3
Totals	13.6	13.0	12.8	13.0	12.7	13.2	13.3	12.7	13.6	13.2	13.2	144.3

TABLE XXXVII

AN ANALYSIS OF VARIANCE OF ORIGINAL RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN THIRTY DIFFERENT STAFFS ON THINKING IN THE STRATEGIC PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square
Total	4191		
Between Officer Means	21		
Within Officer Ratings by the Same Group	4170	3154.00	0.76

TABLE XXXVIII

AN ANALYSIS OF VARIANCE OF RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN THIRTY DIFFERENT STAFFS ON THINKING IN THE STRATEGIC PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Total	21	1.37		
Positions	10	0.50	0.050	10.00**
Raters	1	0.62	0.620	124.00**
Interaction (Positions x Raters)	10	0.25	0.025	5.00**
Error	4170		0.005	

** Significant at the 1% level.

TABLE XXXIX

A SUMMARY OF RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN THIRTY DIFFERENT STAFFS ON INITIATIVE IN THE STRATEGIC PROBLEM

Positions Rated / Raters	CG	C/S	A-1	A-2	A-3	A-4	A/A-1	A/A-2	A/A-3	A/A-4	Comm Off	To-tals
No. of Ratings	384	160	277	300	383	298	187	212	289	193	296	
Students												
Average Rating	6.9	6.5	6.7	6.9	6.8	6.8	6.9	6.7	7.0	6.9	6.8	74.9
No. of Ratings	126	55	124	124	127	121	118	120	118	110	115	
Instructors												
Average Rating	6.9	6.4	6.4	6.3	6.5	6.5	6.5	6.3	6.4	6.2	6.3	70.7
Totals	13.8	12.9	13.1	13.2	13.3	13.3	13.4	13.0	13.4	13.1	13.1	145.6

TABLE XL

AN ANALYSIS OF VARIANCE OF ORIGINAL RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN THIRTY DIFFERENT STAFFS ON INITIATIVE IN THE STRATEGIC PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square
Total	4236		
Between Officer Means	21		
Within Officer Ratings by the Same Group	4215	3300.70	0.78

TABLE XLI

AN ANALYSIS OF VARIANCE OF RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN THIRTY DIFFERENT STAFFS ON INITIATIVE IN THE STRATEGIC PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Total	21	1.33		
Positions	10	0.31	0.031	6.20**
Raters	1	0.80	0.800	160.00**
Interaction (Positions x Raters)	10	0.22	0.022	4.40**
Error	4215		0.005	

**Significant at the 1% level.

TABLE XLII

A SUMMARY OF RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN THIRTY DIFFERENT STAFFS ON COOPERATION IN THE STRATEGIC PROBLEM

Positions Rated / Raters	CG	C/S	A-1	A-2	A-3	A-4	A/A-1	A/A-2	A/A-3	A/A-4	Comm Off	To-tals
No. of Ratings Students	380	161	298	317	390	312	213	235	302	213	310	
Average Rating	7.2	6.9	7.2	7.2	7.0	7.2	7.1	6.9	7.2	7.1	7.1	78.1
No. of Ratings Instructors	124	56	125	124	125	120	116	119	117	110	115	
Average Rating	7.1	6.8	6.6	6.7	6.6	6.6	6.4	6.3	6.5	6.4	6.3	72.3
Totals	14.3	13.7	13.8	13.9	13.6	13.8	13.5	13.2	13.7	13.5	13.4	150.4

TABLE XLIII

AN ANALYSIS OF VARIANCE OF ORIGINAL RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN THIRTY DIFFERENT STAFFS ON COOPERATION IN THE STRATEGIC PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square
Total	4381		
Between Officer Means	21		
Within Officer Ratings by the Same Group	4360	3801.40	0.87

TABLE XLIV

AN ANALYSIS OF VARIANCE OF RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN THIRTY DIFFERENT STAFFS ON COOPERATION IN THE STRATEGIC PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Total	21	2.23		
Positions	10	0.42	0.042	7.00**
Raters	1	1.53	1.530	255.00**
Interaction (Positions x Raters)	10	0.28	0.028	4.67**
Error	4360		0.006	

** Significant at the 1% level.

TABLE XLV

A SUMMARY OF RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN THIRTY DIFFERENT STAFFS ON ORGANIZING ABILITY IN THE STRATEGIC PROBLEM

Positions Rated / Raters	CG	C/S	A-1	A-2	A-3	A-4	A/A-1	A/A-2	A/A-3	A/A-4	Comm Off	To-tals
No. of Ratings	384	147	263	280	378	279	169	184	254	170	261	
Students												
Average Rating	6.6	6.4	6.6	6.7	6.1	6.6	6.8	6.7	6.7	6.7	6.7	72.6
No. of Ratings	126	54	121	121	123	119	99	106	110	96	105	
Instructors												
Average Rating	6.8	6.2	6.4	6.4	6.3	6.4	6.6	6.3	6.5	6.2	6.3	70.4
Totals	13.4	12.6	13.0	13.1	12.4	13.0	13.4	13.0	13.2	12.9	13.0	143.0

TABLE XLVI

AN ANALYSIS OF VARIANCE OF ORIGINAL RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN THIRTY DIFFERENT STAFFS ON ORGANIZING ABILITY IN THE STRATEGIC PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square
Total	3948		
Between Officer Means	21		
Within Officer Ratings by the Same Group	3927	3216.20	0.82

TABLE XLVII

AN ANALYSIS OF VARIANCE OF RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN THIRTY DIFFERENT STAFFS ON ORGANIZING ABILITY IN THE STRATEGIC PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Total	21	0.92		
Positions	10	0.45	0.045	7.50**
Raters	1	0.22	0.220	36.67**
Interaction (Positions x Raters)	10	0.25	0.025	4.17**
Error	3927		0.006	

** Significant at the 1% level.

TABLE XLVIII

A SUMMARY OF RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN THIRTY DIFFERENT STAFFS ON EXPRESSION IN THE STRATEGIC PROBLEM

Positions Rated / Raters	CG	C/S	A-1	A-2	A-3	A-4	A/A-1	A/A-2	A/A-3	A/A-4	Comm Off	To-tals
No. of Ratings Students	383	159	292	317	391	305	196	229	300	202	309	
Average Rating	6.7	6.5	6.5	6.6	6.2	6.5	6.7	6.4	6.8	6.6	6.4	71.9
No. of Ratings Instructors	126	56	124	125	126	122	110	120	117	111	112	
Average Rating	6.5	6.1	6.1	6.3	6.2	6.4	6.4	6.1	6.4	6.2	6.0	68.7
Totals	13.2	12.6	12.6	12.9	12.4	12.9	13.1	12.5	13.2	12.8	12.4	140.6

TABLE XLIX

AN ANALYSIS OF VARIANCE OF ORIGINAL RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN THIRTY DIFFERENT STAFFS ON EXPRESSION IN THE STRATEGIC PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square
Total	4331		
Between Officer Means	21		
Within Officer Ratings by the Same Group	4310	3010.70	0.70

TABLE L

AN ANALYSIS OF VARIANCE OF RATINGS GIVEN BY STUDENTS AND INSTRUCTORS TO STUDENTS IN THIRTY DIFFERENT STAFFS ON EXPRESSION IN THE STRATEGIC PROBLEM

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
Total	21	1.02		
Positions	10	0.46	0.046	9.20**
Raters	1	0.47	0.470	94.00**
Interaction (Positions x Raters)	10	0.09	0.009	1.80
Error	4310		0.005	

**Significant at the 1% level.

TABLE LI

NUMBER OF RATINGS GIVEN BY INSTRUCTORS TO STUDENTS IN THE TACTICAL PROBLEM

Positions Rated / Traits Rated	C/S	A-1	A-2	A-3	A-4	A/A-1	A/A-2	A/A-3	A/A-4	Comm Off	Total
Actual No. of Ratings	78	74	77	76	77	69	53	69	73	70	716
Knowledge											
Adjusted No. of Ratings	87	83	86	85	86	77	59	77	82	78	800
Actual No. of Ratings	79	75	76	77	78	67	55	70	70	67	714
Thinking											
Adjusted No. of Ratings	88	84	85	86	87	75	62	79	79	75	800
Actual No. of Ratings	78	78	78	77	78	75	57	72	75	75	743
Initiative											
Adjusted No. of Ratings	84	84	84	83	84	81	61	77	81	81	800
Actual No. of Ratings	79	79	78	79	79	75	57	75	75	74	750
Cooperation											
Adjusted No. of Ratings	84	84	84	84	84	80	61	80	80	79	800
Actual No. of Ratings	78	77	74	77	76	67	51	59	65	61	685
Organizing Ability											
Adjusted No. of Ratings	91	90	86	90	89	78	60	69	76	71	800
Actual No. of Ratings	79	79	79	77	79	72	55	76	72	73	741
Expression											
Adjusted No. of Ratings	85	85	85	83	85	78	60	82	78	79	800
Expected Number	80	80	80	80	80	80	80	80	80	80	800

TABLE LII

NUMBER OF RATINGS GIVEN BY INSTRUCTORS TO STUDENTS IN THE TACTICAL PROBLEM

Positions Rated / Traits Rated	C/S	A-1	A-2	A-3	A-4	A/A-1	A/A-2	A/A-3	A/A-4	Comm Off	Expected Number
Actual No. of Ratings	78	74	77	76	77	69	53	69	73	70	
Knowledge											80
Adjusted No. of Ratings	79	77	80	78	80	78	78	79	81	80	
Actual No. of Ratings	79	75	76	77	78	67	55	70	70	67	
Thinking											80
Adjusted No. of Ratings	81	78	79	80	80	76	81	80	78	77	
Actual No. of Ratings	78	78	78	77	78	75	57	72	75	75	
Initiative											80
Adjusted No. of Ratings	79	81	81	80	80	84	83	82	84	86	
Actual No. of Ratings	79	79	78	79	79	75	57	75	75	74	
Cooperation											80
Adjusted No. of Ratings	81	82	81	82	81	85	83	85	84	84	
Actual No. of Ratings	78	77	74	77	76	67	51	59	65	61	
Organizing Ability											80
Adjusted No. of Ratings	79	80	77	80	78	76	75	67	73	70	
Actual No. of Ratings	79	79	79	77	79	72	55	76	72	73	
Expression											80
Adjusted No. of Ratings	81	82	82	80	81	81	80	87	80	83	
Totals											480
Actual No. of Ratings	471	462	462	463	467	425	328	421	430	420	
Adjusted No. of Ratings	480	480	480	480	480	480	480	480	480	480	

TABLE LIII

NUMBER OF RATINGS GIVEN BY STUDENTS TO THEIR FELLOW STUDENTS IN THE TACTICAL PROBLEM

Positions Rated / Traits Rated	C/S	A-1	A-2	A-3	A-4	A/A-1	A/A-2	A/A-3	A/A-4	Comm Off	Total
Actual No. of Ratings	218	170	173	229	193	104	83	157	135	177	1639
Knowledge											
Adjusted No. of Ratings	240	187	190	252	212	114	91	173	148	194	1801
Actual No. of Ratings	223	170	176	229	194	102	80	157	131	172	1634
Thinking											
Adjusted No. of Ratings	246	187	194	252	214	112	88	173	144	190	1800
Actual No. of Ratings	221	171	179	231	195	113	84	154	132	174	1654
Initiative											
Adjusted No. of Ratings	241	186	195	252	212	123	91	168	144	189	1801
Actual No. of Ratings	220	190	189	238	205	138	99	172	155	189	1795
Cooperation											
Adjusted No. of Ratings	221	191	190	239	206	138	99	172	155	190	1801
Actual No. of Ratings	218	164	166	230	186	97	73	136	112	159	1541
Organizing Ability											
Adjusted No. of Ratings	255	192	194	269	217	113	85	159	131	186	1801
Actual No. of Ratings	221	190	191	239	203	126	96	170	143	185	1764
Expression											
Adjusted No. of Ratings	225	194	195	244	207	129	98	174	146	189	1801
Expected Number	223	190	191	239	205	138	99	172	155	189	1801

TABLE LIV

NUMBER OF RATINGS GIVEN BY STUDENTS TO THEIR FELLOW STUDENTS IN THE TACTICAL PROBLEM

Positions Rated / Traits Rated	C/S	A-1	A-2	A-3	A-4	A/A-1	A/A-2	A/A-3	A/A-4	Comm Off
Actual No. of Ratings	218	170	173	229	193	104	83	157	135	177
Knowledge										
Adjusted No. of Ratings	221	184	184	235	202	127	96	171	155	190
Actual No. or Ratings	223	170	176	229	194	102	80	157	131	172
Thinking										
Adjusted No. of Ratings	226	184	188	235	203	124	92	171	151	185
Actual No. of Ratings	221	171	179	231	195	113	84	154	132	174
Initiative										
Adjusted No. of Ratings	224	185	191	237	204	138	97	168	152	187
Actual No. of Ratings	220	190	189	238	205	138	99	172	155	189
Cooperation										
Adjusted No. of Ratings	223	205	202	245	214	168	114	188	178	203
Actual No. of Ratings	218	164	166	230	186	97	73	136	112	159
Organizing Ability										
Adjusted No. or Ratings	221	177	177	236	195	118	85	148	129	171
Actual No. of Ratings	221	190	191	239	203	126	96	170	143	185
Expression										
Adjusted No. of Ratings	224	205	204	246	212	153	111	186	165	198
Actual No. of Ratings	1321	1055	1074	1396	1176	680	515	946	808	1056
Total										
Adjusted No. of Ratings	1339	1140	1146	1434	1230	828	595	1032	930	1134

TABLE LV

NUMBER OF RATINGS GIVEN BY INSTRUCTORS
TO STUDENTS IN THE STRATEGIC PROBLEM

Positions Rated / Traits Rated	CG	C/S	A-1	A-2	A-3	A-4	A/A-1	A/A-2	A/A-3	A/A-4	Comm Off	Totals
Actual No. of Ratings	123	56	119	120	123	119	112	116	117	106	112	1223
Knowledge												
Adjusted No. of Ratings	126	57	122	123	126	122	115	119	120	108	115	1253
Actual No. of Ratings	124	56	119	123	126	117	114	115	113	107	114	1228
Thinking												
Adjusted No. of Ratings	126	57	121	125	129	119	116	117	115	109	116	1250
Actual No. of Ratings	126	55	124	124	127	121	118	120	118	110	115	1258
Initiative												
Adjusted No. of Ratings	125	55	123	123	126	120	117	119	117	109	114	1248
Actual No. of Ratings	124	56	125	124	125	120	116	119	117	110	115	1251
Cooperation												
Adjusted No. of Ratings	124	56	125	124	125	120	116	119	117	110	115	1251
Actual No. of Ratings	126	54	121	121	123	119	99	106	110	96	105	1180
Organizing Ability												
Adjusted No. of Ratings	134	57	128	128	131	126	105	112	117	102	111	1251
Actual No. of Ratings	126	56	124	125	126	122	110	120	117	111	112	1249
Expression												
Adjusted No. of Ratings	126	56	124	125	126	122	110	120	117	111	112	1249
Expected Numbers	120	52	120	120	120	120	120	120	120	120	120	1252

TABLE LVI

NUMBER OF RATINGS GIVEN BY INSTRUCTORS TO STUDENTS IN THE STRATEGIC PROBLEM

Positions Rated / Traits Rated	CG	C/S	A-1	A-2	A-3	A-4	A/A-1	A/A-2	A/A-3	A/A-4	Comm Off
Actual No. of Ratings	123	56	119	120	123	119	112	116	117	106	112
Knowledge											
Adjusted No. of Ratings	118	52	117	117	118	119	120	120	122	119	120
Actual No. of Ratings	124	56	119	123	126	117	114	115	113	107	114
Thinking											
Adjusted No. of Ratings	119	52	117	120	121	117	123	119	117	120	122
Actual No. of Ratings	126	55	124	124	127	121	118	120	118	110	115
Initiative											
Adjusted No. of Ratings	121	52	122	121	122	121	127	124	123	124	123
Actual No. of Ratings	124	56	125	124	125	120	116	119	117	110	115
Cooperation											
Adjusted No. of Ratings	119	52	123	121	120	120	125	123	122	124	123
Actual No. of Ratings	126	54	121	121	123	119	99	106	110	96	105
Organizing Ability											
Adjusted No. of Ratings	121	51	119	118	118	119	107	110	114	108	112
Actual No. of Ratings	126	56	124	125	126	122	110	120	117	111	112
Expression											
Adjusted No. of Ratings	121	52	122	122	121	122	118	124	122	125	120
Actual No. of Ratings	749	333	732	737	750	718	669	696	692	640	673
Totals											
Adjusted No. of Ratings	719	311	720	719	720	718	720	720	720	720	720

TABLE LVII

NUMBER OF RATINGS GIVEN BY STUDENTS TO THEIR FELLOW STUDENTS IN THE STRATEGIC PROBLEM

Positions Rated / Traits Rated	CG	C/S	A-1	A-2	A-3	A-4	A/A-1	A/A-2	A/A-3	A/A-4	Comm Off	Totals
Knowledge												
Actual No. of Ratings	377	151	268	286	380	283	186	199	281	179	286	2876
Adjusted No. of Ratings	411	165	292	312	414	309	203	217	306	195	312	3136
Thinking												
Actual No. of Ratings	382	155	274	299	385	292	195	206	290	190	296	2964
Adjusted No. of Ratings	404	164	290	316	407	309	206	218	307	201	313	3135
Initiative												
Actual No. of Ratings	384	160	277	300	383	298	187	212	289	193	296	2979
Adjusted No. of Ratings	404	168	292	316	403	314	197	223	304	203	312	3136
Cooperation												
Actual No. of Ratings	380	161	298	317	390	312	213	235	302	213	310	3131
Adjusted No. of Ratings	381	161	298	318	391	312	213	235	302	213	310	3134
Organizing Ability												
Actual No. of Ratings	384	147	263	280	378	279	169	184	254	170	261	2769
Adjusted No. of Ratings	435	166	298	317	428	316	191	208	288	193	296	3136
Expression												
Actual No. of Ratings	383	159	292	317	391	305	196	229	300	202	309	3083
Adjusted No. of Ratings	390	162	297	322	398	310	199	233	305	205	314	3135
Expected Number	384	161	298	317	391	312	213	235	302	213	310	3136

TABLE LVIII

NUMBER OF RATINGS GIVEN BY STUDENTS TO THEIR FELLOW STUDENTS IN THE STRATEGIC PROBLEM

Positions Rated / Traits Rated	CG	C/S	A-1	A-2	A-3	A-4	A/A-1	A/A-2	A/A-3	A/A-4	Comm Off
Knowledge											
Actual No. of Ratings	377	151	268	286	380	283	186	199	281	179	286
Adjusted No of Ratings	379	156	287	302	386	299	207	222	297	199	303
Thinking											
Actual No. of Ratings	382	155	274	299	385	292	195	206	290	190	296
Adjusted No of Ratings	384	160	293	316	392	309	217	230	306	212	313
Initiative											
Actual No. of Ratings	384	160	277	300	383	298	187	212	289	193	296
Adjusted No of Ratings	386	166	296	317	389	315	209	236	305	215	313
Cooperation											
Actual No. of Ratings	380	161	298	317	390	312	213	235	302	213	310
Adjusted No of Ratings	382	167	319	335	397	330	238	262	319	237	328
Organizing Ability											
Actual No. of Ratings	384	147	263	280	378	279	169	184	254	170	261
Adjusted No of Ratings	386	152	281	296	384	295	188	205	268	189	276
Expression											
Actual No. of Ratings	383	159	292	317	391	305	196	229	300	202	309
Adjusted No of Ratings	385	165	312	335	398	323	219	255	317	225	327
Totals											
Actual No. of Ratings	2290	933	1672	1799	2307	1769	1146	1265	1716	1147	1758
Adjusted No of Ratings	2302	966	1788	1901	2346	1871	1278	1410	1812	1277	1860

TABLE LIX

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY INSTRUCTORS TO CHIEFS OF STAFF IN THE TACTICAL PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.769	.696	.729	.801	.731	.884
Organizing Ability		....	.653	.779	.830	.762	.912
Cooperation			....	.707	.719	.636	.819
Initiative				....	.777	.787	.902
Thinking					....	.782	.921
Knowledge						....	.880
Composite							....

N = 78

TABLE LX

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY STUDENTS TO CHIEFS OF STAFF IN THE TACTICAL PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.630	.488	.670	.602	.592	.791
Organizing Ability		....	.438	.690	.687	.642	.859
Cooperation			....	.667	.627	.688	.811
Initiative				....	.648	.673	.868
Thinking					....	.712	.848
Knowledge						....	.845
Composite							....

N = 188

TABLE LXI

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY INSTRUCTORS TO OFFICERS IN CHARGE OF PERSONNEL IN THE TACTICAL PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.472	.525	.613	.590	.497	.745
Organizing Ability		....	.621	.596	.704	.711	.808
Cooperation			....	.709	.773	.680	.853
Initiative				....	.753	.689	.863
Thinking					....	.781	.912
Knowledge						....	.862
Composite							....

N = 72

TABLE LXII

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY STUDENTS TO OFFICERS IN CHARGE OF PERSONNEL IN THE TACTICAL PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.633	.552	.560	.551	.531	.759
Organizing Ability		....	.717	.704	.760	.673	.895
Cooperation			....	.701	.610	.551	.830
Initiative				....	.661	.647	.856
Thinking					....	.733	.856
Knowledge						....	.819
Composite							....

N = 141

TABLE LXIII

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY INSTRUCTORS TO OFFICERS IN CHARGE OF INTELLIGENCE IN THE TACTICAL PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.690	.545	.591	.617	.560	.783
Organizing Ability		....	.599	.780	.821	.760	.909
Cooperation			....	.606	.622	.637	.775
Initiative				....	.762	.771	.886
Thinking					....	.789	.897
Knowledge						....	.878
Composite							....

N = 72

TABLE LXIV

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY STUDENTS TO OFFICERS IN CHARGE OF INTELLIGENCE IN THE TACTICAL PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.641	.560	.602	.612	.680	.811
Organizing Ability		....	.639	.621	.623	.666	.827
Cooperation			....	.711	.597	.604	.817
Initiative				....	.669	.699	.858
Thinking					....	.770	.852
Knowledge						....	.876
Composite							....

N = 136

TABLE LXV

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY INSTRUCTORS TO OFFICERS IN CHARGE OF OPERATIONS IN THE TACTICAL PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.749	.624	.595	.635	.628	.819
Organizing Ability		....	.744	.753	.728	.720	.902
Cooperation			....	.754	.695	.691	.865
Initiative				....	.728	.704	.869
Thinking					....	.822	.883
Knowledge						....	.871
Composite							....

N = 75

TABLE LXVI

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY STUDENTS TO OFFICERS IN CHARGE OF OPERATIONS IN THE TACTICAL PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.627	.581	.651	.687	.663	.822
Organizing Ability		....	.617	.704	.687	.695	.852
Cooperation			....	.639	.632	.580	.799
Initiative				....	.749	.702	.870
Thinking					....	.776	.891
Knowledge						....	.863
Composite							....

N = 195

TABLE LXVII

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY INSTRUCTORS TO OFFICERS IN CHARGE OF SUPPLY IN THE TACTICAL PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.523	.520	.657	.569	.674	.783
Organizing Ability		....	.794	.694	.749	.627	.874
Cooperation			....	.691	.718	.511	.843
Initiative				....	.656	.631	.855
Thinking					....	.608	.872
Knowledge						....	.813
Composite							....

N = 76

TABLE LXVIII

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY STUDENTS TO OFFICERS IN CHARGE OF SUPPLY IN THE TACTICAL PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.744	.664	.739	.672	.722	.861
Organizing Ability		....	.731	.766	.751	.779	.911
Cooperation			....	.733	.714	.652	.851
Initiative				....	.740	.734	.893
Thinking					....	.736	.875
Knowledge						....	.877
Composite							....

N =162

TABLE LXIX

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY INSTRUCTORS TO ASSISTANT PERSONNEL OFFICERS IN THE TACTICAL PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.524	.594	.623	.664	.607	.789
Organizing Ability		....	.746	.669	.803	.682	.845
Cooperation			....	.777	.769	.637	.877
Initiative				....	.771	.646	.875
Thinking					....	.785	.927
Knowledge						....	.843
Composite							....

N = 60

TABLE LXX

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY STUDENTS TO ASSISTANT PERSONNEL OFFICERS IN THE TACTICAL PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.808	.551	.623	.666	.632	.821
Organizing Ability		....	.724	.783	.759	.790	.933
Cooperation			....	.761	.646	.662	.832
Initiative				....	.724	.764	.892
Thinking					....	.750	.868
Knowledge						....	.878
Composite							....

N = 86

TABLE LXXI

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY INSTRUCTORS TO ASSISTANT INTELLIGENCE OFFICERS IN THE TACTICAL PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.611	.549	.725	.548	.717	.823
Organizing Ability		....	.686	.754	.692	.663	.857
Cooperation			....	.613	.659	.780	.835
Initiative				....	.689	.700	.877
Thinking					....	.768	.841
Knowledge						....	.900
Composite							....

N = 49

TABLE LXXII

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY STUDENTS TO ASSISTANT INTELLIGENCE OFFICERS IN THE TACTICAL PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.688	.611	.613	.735	.472	.834
Organizing Ability		....	.729	.680	.725	.683	.876
Cooperation			....	.809	.625	.628	.856
Initiative				....	.714	.684	.870
Thinking					....	.766	.880
Knowledge						....	.840
Composite							....

N = 74

TABLE LXXIII

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY INSTRUCTORS TO ASSISTANT OPERATIONS OFFICERS IN THE TACTICAL PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.702	.665	.656	.543	.636	.812
Organizing Ability		....	.692	.723	.636	.700	.857
Cooperation			....	.759	.698	.738	.891
Initiative				....	.683	.647	.862
Thinking					....	.787	.849
Knowledge						....	.878
Composite							....

N = 55

TABLE LXXIV

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY STUDENTS TO ASSISTANT OPERATIONS OFFICERS IN THE TACTICAL PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.673	.661	.667	.693	.685	.863
Organizing Ability		....	.623	.656	.676	.700	.857
Cooperation			....	.611	.598	.635	.816
Initiative				....	.662	.697	.846
Thinking					....	.668	.820
Knowledge						....	.861
Composite							....

N = 130

TABLE LXXV

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY INSTRUCTORS TO ASSISTANT SUPPLY OFFICERS IN THE TACTICAL PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.555	.454	.642	.495	.718	.787
Organizing Ability		....	.750	.742	.726	.635	.879
Cooperation			....	.686	.662	.466	.805
Initiative				....	.625	.614	.868
Thinking					....	.617	.828
Knowledge						....	.810
Composite							....

N = 62

TABLE LXXVI

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY STUDENTS TO ASSISTANT SUPPLY OFFICERS IN THE TACTICAL PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.706	.477	.551	.656	.545	.809
Organizing Ability		....	.643	.641	.605	.557	.860
Cooperation			....	.549	.619	.413	.779
Initiative				....	.568	.550	.799
Thinking					....	.600	.838
Knowledge						....	.747
Composite							....

N = 106

TABLE LXXVII

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY INSTRUCTORS TO COMMUNICATIONS OFFICERS IN THE TACTICAL PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.475	.524	.570	.668	.433	.781
Organizing Ability		....	.381	.585	.592	.535	.761
Cooperation			....	.636	.552	.390	.727
Initiative				....	.695	.467	.842
Thinking					....	.618	.885
Knowledge						....	.690
Composite							....

N = 59

TABLE LXXVIII

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY STUDENTS TO COMMUNICATIONS OFFICERS IN THE TACTICAL PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.678	.490	.635	.764	.608	.835
Organizing Ability		....	.608	.731	.713	.670	.870
Cooperation			....	.742	.631	.590	.778
Initiative				....	.689	.672	.880
Thinking					....	.748	.876
Knowledge						....	.838
Composite							....

N = 148

TABLE LXXIX

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY INSTRUCTORS TO COMMANDING GENERALS IN THE STRATEGIC PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.300	.198	.358	.454	.446	.633
Organizing Ability		....	.551	.625	.519	.585	.790
Cooperation			....	.524	.425	.352	.638
Initiative				....	.644	.610	.828
Thinking					....	.673	.827
Knowledge						....	.634
Composite							....

N = 122

TABLE LXXX

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY STUDENTS TO COMMANDING GENERALS IN THE STRATEGIC PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.573	.575	.627	.599	.615	.787
Organizing Ability		....	.664	.710	.645	.618	.850
Cooperation			....	.694	.603	.643	.835
Initiative				....	.664	.667	.880
Thinking					....	.731	.839
Knowledge						....	.749
Composite							....

N = 373

TABLE LXXXI

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY INSTRUCTORS TO CHIEFS OF STAFF IN THE STRATEGIC PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.192	-.033	.112	-.153	-.089	.271
Organizing Ability		....	.543	.505	.309	.294	.683
Cooperation			....	.578	.374	.253	.656
Initiative				....	.648	.466	.855
Thinking					....	.753	.767
Knowledge						....	.696
Composite							....

N = 44

TABLE LXXXII

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY STUDENTS TO CHIEFS OF STAFF IN THE STRATEGIC PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.635	.500	.591	.611	.613	.777
Organizing Ability		.....	.688	.571	.710	.716	.862
Cooperation			....	.596	.665	.581	.813
Initiative				....	.641	.644	.805
Thinking					....	.778	.881
Knowledge						....	.868
Composite							....

N = 141

TABLE LXXXIII

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY INSTRUCTORS TO OFFICERS IN CHARGE OF PERSONNEL IN THE STRATEGIC PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.550	.380	.471	.541	.522	.723
Organizing Ability		....	.591	.607	.600	.538	.813
Cooperation			....	.631	.550	.517	.759
Initiative				....	.611	.568	.812
Thinking					....	.767	.857
Knowledge						....	.819
Composite							....

N = 115

TABLE LXXXIV

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY STUDENTS TO OFFICERS IN CHARGE OF PERSONNEL IN THE STRATEGIC PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.584	.471	.615	.662	.610	.798
Organizing Ability		....	.516	.703	.693	.642	.846
Cooperation			....	.569	.501	.490	.732
Initiative				....	.668	.609	.853
Thinking					....	.692	.857
Knowledge						....	.818
Composite							....

N = 245

TABLE LXXXV

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY INSTRUCTORS TO OFFICERS IN CHARGE OF INTELLIGENCE IN THE STRATEGIC PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.646	.416	.515	.416	.561	.750
Organizing Ability		....	.587	.581	.594	.507	.818
Cooperation			....	.641	.559	.477	.760
Initiative				....	.612	.630	.846
Thinking					....	.639	.794
Knowledge						....	.802
Composite							....

N = 116

TABLE LXXXVI

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY STUDENTS TO OFFICERS IN CHARGE OF INTELLIGENCE IN THE STRATEGIC PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.688	.550	.594	.667	.590	.810
Organizing Ability		....	.669	.706	.749	.645	.878
Cooperation			....	.699	.706	.572	.828
Initiative				....	.737	.655	.859
Thinking					....	.690	.895
Knowledge						....	.808
Composite							....

N = 257

TABLE LXXXVII

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY INSTRUCTORS TO OFFICERS IN CHARGE OF OPERATIONS IN THE STRATEGIC PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.708	.385	.662	.561	.664	.833
Organizing Ability		....	.450	.679	.528	.550	.830
Cooperation			....	.563	.329	.261	.623
Initiative				....	.677	.659	.885
Thinking					....	.797	.803
Knowledge						....	.814
Composite							....

N = 117

TABLE LXXXVIII

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY STUDENTS TO OFFICERS IN CHARGE OF OPERATIONS IN THE STRATEGIC PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.504	.606	.663	.710	.640	.843
Organizing Ability		....	.497	.519	.517	.475	.658
Cooperation			....	.630	.622	.535	.805
Initiative				....	.653	.651	.846
Thinking					....	.728	.868
Knowledge						....	.820
Composite							....

N = 367

TABLE LXXXIX

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY INSTRUCTORS TO OFFICERS IN CHARGE OF SUPPLY IN THE STRATEGIC PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.617	.481	.654	.631	.617	.815
Organizing Ability		....	.472	.547	.643	.598	.788
Cooperation			....	.631	.613	.520	.743
Initiative				....	.697	.654	.854
Thinking					....	.744	.853
Knowledge						....	.846
Composite							....

N = 113

TABLE XC

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY STUDENTS TO OFFICERS IN CHARGE OF SUPPLY IN THE STRATEGIC PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.666	.530	.579	.617	.602	.800
Organizing Ability		....	.610	.652	.620	.645	.848
Cooperation			....	.680	.593	.566	.810
Initiative				....	.651	.618	.843
Thinking					....	.705	.838
Knowledge						....	.826
Composite							....

N = 254

TABLE XCI

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY INSTRUCTORS TO ASSISTANT PERSONNEL OFFICERS IN THE STRATEGIC PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.366	.449	.259	.271	.159	.540
Organizing Ability		....	.531	.684	.449	.620	.805
Cooperation			....	.468	.486	.507	.792
Initiative				....	.545	.573	.782
Thinking					....	.685	.768
Knowledge						....	.793
Composite							....

N = 91

TABLE XCII

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY STUDENTS TO ASSISTANT PERSONNEL OFFICERS IN THE STRATEGIC PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.624	.473	.496	.661	.608	.778
Organizing Ability		....	.600	.589	.713	.649	.847
Cooperation			....	.724	.608	.553	.817
Initiative				....	.570	.489	.796
Thinking					....	.721	.863
Knowledge						....	.812
Composite							....

N = 146

TABLE XCIII

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY INSTRUCTORS TO ASSISTANT INTELLIGENCE OFFICERS IN THE STRATEGIC PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.582	.318	.487	.575	.663	.755
Organizing Ability		....	.469	.642	.549	.608	.809
Cooperation			....	.457	.550	.411	.677
Initiative				....	.704	.630	.832
Thinking					....	.748	.862
Knowledge						....	.837
Composite							....

N = 93

TABLE XCIV

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY STUDENTS TO ASSISTANT INTELLIGENCE OFFICERS IN THE STRATEGIC PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.668	.559	.596	.669	.630	.809
Organizing Ability		....	.630	.661	.774	.645	.868
Cooperation			....	.682	.681	.574	.823
Initiative				....	.686	.646	.847
Thinking					....	.725	.895
Knowledge						....	.831
Composite							....

N = 158

TABLE XCV

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY INSTRUCTORS TO ASSISTANT OPERATIONS OFFICERS IN THE STRATEGIC PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.573	.586	.725	.620	.701	.837
Organizing Ability		....	.565	.612	.689	.667	.815
Cooperation			....	.747	.503	.520	.786
Initiative				....	.578	.709	.880
Thinking					....	.796	.830
Knowledge						....	.869
Composite							....

N = 96

TABLE XCVI

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY STUDENTS TO ASSISTANT OPERATIONS OFFICERS IN THE STRATEGIC PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.686	.588	.854	.706	.615	.837
Organizing Ability		....	.652	.578	.703	.657	.853
Cooperation			....	.607	.648	.608	.826
Initiative				....	.618	.576	.794
Thinking					....	.715	.873
Knowledge						....	.829
Composite							....

N = 192

TABLE XCVII

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY INSTRUCTORS TO ASSISTANT SUPPLY OFFICERS IN THE STRATEGIC PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.570	.264	.559	.244	.345	.643
Organizing Ability		....	.545	.657	.542	.565	.831
Cooperation			....	.546	.551	.500	.746
Initiative				....	.509	.542	.834
Thinking					....	.736	.774
Knowledge						....	.790
Composite							....

N = 86

TABLE XCVIII

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY STUDENTS TO ASSISTANT SUPPLY OFFICERS IN THE STRATEGIC PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.729	.620	.685	.704	.630	.834
Organizing Ability		....	.714	.684	.705	.730	.895
Cooperation			....	.685	.632	.636	.837
Initiative				....	.698	.626	.852
Thinking					....	.782	.884
Knowledge						....	.846
Composite							....

N = 104

TABLE XCIX

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY INSTRUCTORS TO COMMUNICATIONS OFFICERS IN THE STRATEGIC PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.454	.359	.464	.298	.258	.644
Organizing Ability		....	.501	.599	.585	.421	.814
Cooperation			....	.430	.541	.410	.729
Initiative				....	.479	.372	.758
Thinking					....	.578	.791
Knowledge						....	.679
Composite							....

N = 98

TABLE C

INTERCORRELATIONS BETWEEN RATINGS GIVEN BY STUDENTS TO COMMUNICATIONS OFFICERS IN THE STRATEGIC PROBLEM

	Expression	Organizing Ability	Cooperation	Initiative	Thinking	Knowledge	Composite
Expression	....	.613	.451	.618	.513	.576	.782
Organizing Ability		....	.652	.617	.655	.568	.845
Cooperation			....	.536	.590	.571	.805
Initiative				....	.569	.555	.806
Thinking					....	.673	.827
Knowledge						....	.804
Composite							....

N = 168