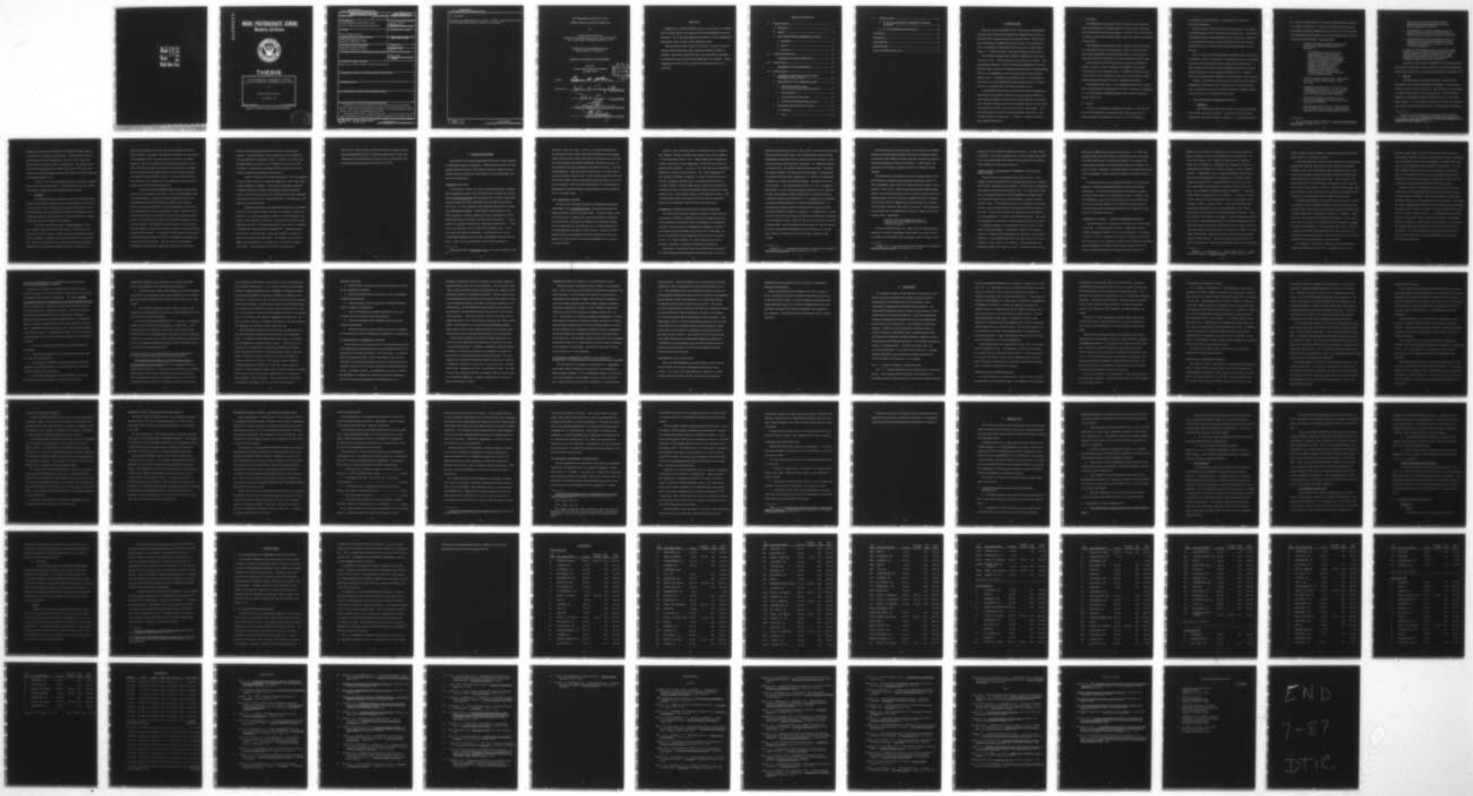
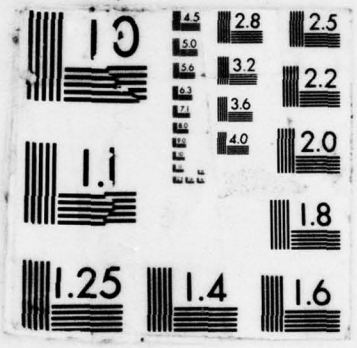
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NAVAL POSTGRADUATE SCHOOL
Monterey, California



THESIS

THE MANAGEMENT ASSESSMENT CENTER:
A STATUS UPDATE AND PROPOSED APPLICATION

by

Dennis Michael McGann

December 1976

Thesis Advisor: J. W. Creighton

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The Management Assessment Center:

A Status Update and Proposed Application

by

Dennis Michael McGann
Lieutenant, Medical Service Corps, United States Navy
B.S., The George Washington University, 1975

Submitted in partial fulfillment of the
requirements for the degree of

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I. INTRODUCTION

Each year the Navy Medical Service Corps selects approximately 50 percent of its input into the Health Care Administration section of the Corps from among the ranks of the Hospital Corps. The raw numbers concerned are changeable from year to year, but in the past six years, the number so selected has been at least 30, and has been as high as 97. Within that period, the annual average has been over 50.

The selection mechanism has similarly changed over time, often from year to year. Some consistency has carried over, however. The examination designed to evaluate professional knowledge has survived the test of time, as have the Command Interview Board, the Commanding Officer's recommendation, and the inservice procurement selection board process. Considering the change that occurs in the makeup of the process and in the membership of the selection board, it is amazing to this writer that there can be any consistency at all.

An informal attitude survey conducted among selected members of past inservice procurement selection boards and among a small non-representative sample of Medical Service Corps officers demonstrated that, although a feeling persists that the present selection system is the best there has ever been, there may be room for improvement. The pervading attitude among the non-board members interviewed is that the main weakness of the present -- and past -- selection systems is their relative subjectivity.

A. PURPOSE

The Management Assessment Center concept has been chosen for study and evaluation as a possible addition to the process of selecting inservice Medical Service Corps officers, in order to add to the breadth of selection criteria and thereby possibly reduce the inherent subjectivity of that process.

The Management Assessment Center concept has been the subject of a great deal of study in the recent past. Even a cursory review of the current management and psychological literature cannot help but expose the reader to a discussion of at least some facet of the concept.

Much research has been conducted and reported concerning the origins, function, structure, application, reliability, and validity of the process and its component parts. In addition, theses have been written [1, 29], which in whole or in part, have concentrated on reporting the generalized results of a mass of published information.

The purpose of this effort is not to duplicate that which has already been so painstakingly accomplished, but rather to attempt to complement it -- to build upon the foundation already constructed by bringing the research up to date.

B. SCOPE

In order to accomplish the purpose of this thesis, a brief description of the Management Assessment Center will be presented first. That presentation will define the concept, trace its development --

particularly in the United States, and describe it in terms of its structural dimensions.

Next, in order to bring previous efforts up to date, a brief review of selected literature will be conducted and reported upon. This portion of the thesis will be concerned primarily with a search for consistency or a lack thereof between the content and conclusions of the selected literature and those of that literature previously described and summarized.

Then, to ensure that the information presented herein is as current as possible, a series of interviews with individuals active in operational assessment center programs will be conducted and reported upon. A list of potential interviewees has been prepared from the list of major existing assessment center programs maintained by Dr. Joseph L. Moses for the International Congress on the Assessment Center Method.

Finally, if the literature review and the interviews indicate that the Management Assessment Center continues to be a valuable selection tool, an application to aid in the inservice selection of Medical Service Corps officers will be suggested and described.

C. THE MANAGEMENT ASSESSMENT CENTER

1. Definition

The Management Assessment Center is an activity embodying the multiple assessment technique. Descriptions of that technique range from Voss' and McConnell's simplistic: "a multiple assessment

by a team of trained observers of a group of individuals participating in a variety of exercises,"[1] to the list of minimum requirements for assessment techniques established by the Task Force on Development of Assessment Center Standards for the International Congress on the Assessment Center Method. This list follows:

"1. Multiple assessment techniques must be used. At least one of these techniques must be a simulation.

> A simulation is an exercise or technique designed to elicit behaviors related to dimensions of performance on the job by requiring the participant to respond behaviorally to situational stimuli. The stimuli present in a simulation parallel or resemble stimuli in the work situation. Examples of simulations include group exercises, in-basket exercises and fact finding exercises.

2. Multiple assessors must be used. These assessors must receive training prior to partic in a center.

3. Judgements resulting in an outcome (i.e., recommendation for promotion, specific training or development) must be based on pooling information from assessors and techniques.

4. An overall evaluation of behavior must be made by the assessors at a separate time from observation of behavior.

5. Simulation exercises are used. These exercises are developed to tap a variety of predetermined behaviors and have been pretested prior to use to

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[1] The Assessment Center Technique," S.A.M. Advanced Management Journal 38 (October 1973), p. 26.

insure that the techniques provide reliable, objective and relevant behavioral information for the organization in question.

6. The dimensions, attributes, characteristics or qualities evaluated by the assessment center are determined by an analysis of relevant job behaviors.

7. The techniques used in the assessment center are designed to provide information which is used in evaluating the dimensions, attributes or qualities previously determined.

In summary, an assessment center consists of a standardized evaluation of behavior based on multiple inputs. Multiple trained observers and techniques are used. Judgements about behavior are made, in part, from specially developed assessment simulations."[1]

Regardless of the relative complexity of the chosen definition, the purpose of assessment center activities is to evaluate management performance potential in an essentially noncompetitive atmosphere. [3]

2. History

The Management Assessment Center is a relatively new phenomenon in the field of management development. Its first large-scale use centers around World War II. The Germans used the method for officer selection prior to and during the war. Then the British adopted it, and finally the Office of Strategic Services of the United States applied it. In the business environment, however, the technique was largely ignored until the late 1950's, at which time a Bell System

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[1] Task Force on Development of Assessment Center Standards (J. L. Moses, Chairman), Standards and Ethical Considerations for Assessment Center Operations (Quebec: International Congress on the Assessment Center Method, 1975), p. 2.

Company of the American Telephone and Telegraph Company began to do research on its potential contributions. Eventually that research effort became a practical application, but by 1967 there were still only thirteen assessment centers in operation [2]. The application of the concept was gaining favor, however and by mid-1970, there were at least 100 additional companies which had centers in either the planning or development phases. [9].

To date, over 70,000 individuals have been evaluated in assessment centers in the United States. The trend seems to indicate continued growth and expansion of the application of the concept.

3. Structure

As with definitions of assessment centers, descriptions of the structure of a typical assessment center abound (notably [1-19-29-31]). It can be noted, however, that the structure may be described in several dimensions, such as the physical facilities and equipment used to conduct the program, the personnel who conduct the program, and the techniques used in the conduct of the program.

The term "assessment center" originally applied to a full-time program conducted at a specific location, but the term is now used to describe any situation in which consistent assessment methodology is employed, regardless of the physical location of the program [3]. There is also some diversity evident concerning the equipment employed in the assessment programs which are currently active.

Some of the programs rely rather heavily on training aids such as motion pictures, television, and audio and video tape, but the majority of the programs tend to rely more heavily on a direct involvement approach, using such sophisticated training aids sparingly, if at all. Thus, the physical facility and equipment requirements are flexible, and not an apparent determinant of the end results of the programs. One significant characteristic, however, is the fact that the assessment exercises are conducted in an area physically remote from the assessee's own work environment [3], [9].

There are several predominant characteristics evident with regard to the assessment center staff. First, the staff members tend to be line managers, usually selected from positions which are two organizational levels above the position sought by the assessees. Second, the staff is augmented by trained psychologists, and the program administrator is often a psychologist. Third, assessors rotate in their observation of the candidates during the assessment process. Fourth, the assessors are trained in the techniques necessary to conduct the program. The importance of the last factor can be inferred from the importance placed upon assessor training in the more successful operational programs. For example, small companies traditionally would experience the greatest difficulty in designing and implementing an assessor training program. For that reason the Multimedia Department of the American Management Association developed an

assessor training program specifically intended to aid the small company. The attractiveness of that program lies in its adaptability to the organization's management needs, its ability to be conducted by the organization's personnel, and its relative brevity [3], [9], [28]. In addition, a system of pre-training and post-training tests was developed to measure the assessor's performance.

Finally, although each individual assessment center is designed to fit the specific needs of its corporate application, most centers have several techniques in common. Thirty-four organizations responded to Bender's [3] survey concerning the makeup of their assessment centers, and the results of the survey indicated that the most commonly used evaluation devices were in-basket exercises, business games, and leaderless group discussions.

Detailed descriptions of the assessment exercises are available [22], [35], but a typical in-basket exercise, for example, requires the assessee to turn down the promotion request of a valued employee, appease an irate customer, and answer a criticism of his staff by another department head [36]. Business games may be described as resembling a sophisticated, high-level form of Monopoly™. Leaderless group discussions, on the other hand, assign the candidates to positions of advocacy which they must then defend. For example, the candidates might represent members of a school board, each with an assigned "pet project." The sum total cost of all of the pet projects is

$850,000.00, and the budget constrains the board to maximum expenditures totalling $600,000.00. Byham and Pentecost [11] report the widespread use of psychological testing as well, and projective tests have been extensively discussed (see also [21], [33]).

II. LITERATURE REVIEW

The literature concerning Management Assessment Centers displays a considerable amount of redundancy. Rather than present item by item support from the literature, this thesis will present capsule reviews of several references which have been judged to be most applicable to the objectives of this effort.

ASSESSMENT OF MEN

In this writer's opinion, any review of published thought on Management Assessment Centers or any discussion of the concept must at least mention Assessment of Men, the chronicle of the systematic assessment conducted within the Office of Strategic Services (OSS) during World War II [31]. It is very likely the most detailed description of an assessment methodology available. Unfortunately for the purposes of this effort, however, it serves as little more than a descriptive narrative. By the admission of its authors, the book's principal defect "... is the absence of a reliable estimate of its comparative effectiveness."[1] This is not to say that there were no indications of effectiveness -- there were some very positive indications -- but only that there were no scientifically validated cause and effect relationships demonstrated and prove. Again, by its own admission, the book was intended as a

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[1] Assessment Staff, Assessment of Men, (New York: Rinehart, 1948) p. 6.

narrative, and not as a text. As such, it succeeded magnificently. The narrative is well-written and richly descriptive from the opening detail concerning the need for some method of evaluation and a description of the general assessment methodology, through the specifics of the situational techniques employed at the different stations. The most glaring weakness, from this writer's point of view, is the fact that no strong conclusions could be drawn. The overall strength lies in the fact that the book exists, with its descriptions of an alternative set of criteria for selection. Had it not been for this book, it is doubtful that the Management Assessment Center concept would have grown to find the favor it currently enjoys.

THE ASSESSMENT CENTER

Because of the continuing evaluation of management assessment methodology, after Assessment of Men, the literature becomes primarily periodical rather than book oriented. In the mid-1950's, under the direction of Dr. Douglas Bray, personnel director of Manpower Action Programs, the American Telephone and Telegraph Company (AT&T) began what was and continues to be an intensive application of the Management Assessment Center concept. Because of AT&T's pioneering role using multiple assessment techniques in American industry, the first article to be discussed emanates from a segment of the Bell System.

Edwin B. Jelks, State Personnel Training Supervisor for Southern Bell, Atlanta, Georgia, describes the program in use in his company in "The Assessment Center." [25]. Without falling into a detailed description of the step-by-step methodology, he describes the function of Southern Bell's program -- to assist in the evaluation of the management potential of craftsman-level employees. Mr. Jelks emphasizes that this program is designed to augment, not replace traditional selection criteria, providing a broader base for evaluation than that which is currently available. His description then continues as he outlines the assessment process in terms of the people involved (supervisor's role, assessors, etc.), the program content, and the appraisal criteria. The article concludes with a description of the end result of assessment -- feedback to all assessees, both strong and weak performers.

ASSESSMENT CENTERS FOR SPOTTING FUTURE MANAGERS

The next article chosen for specific attention was chosen because of the status of William C. Byham as one of the foremost proponents of the Management Assessment Center methodology for management selection. He was director of Management Development Program of the Graduate School of Business of the University of Pittsburgh, and he was responsible for the development of the assessment programs for the J. C. Penney Company, for whom he had been manager of Selection, Appraisal, and General Management Development.

The article, "Assessment Centers for Spotting Future Managers," [9] briefly examines the Management Assessment Center concept and

details the pioneering work of Dr. Bay at AT&T, then looks at the present (from the vantage point of mid-1970), detailing the growing use of the Management Assessment Center concept in American industry, and the varied structure of the programs in operation. Dr. Byham then addresses the key issue: the validity of the assessment process. He details four types of studies, from the purely research effort, through predictive ability and before-after comparisons, to a follow-up on personnel promoted as a result of assessment findings. In general, his answer to the question: "Are the assessments valid?" is: "Yes, they can be."[1] Specifically, he cites a study of predictive ability which was conducted by Bray and Campbell [6] which demonstrates a correlation between assessment ratings and performance of .51, compared to no significant correlation between supervisor's ratings and performance [9]. In examining the validity of the third and fourth study types, he defers from firm evaluative comment by means of a -- probably valid -- claim that the results of the correlation are biased by management's knowledge of the assessment results, which was not the case for either of the first two study types. In further defense of the concept, he cites the inherent fairness of assessment methodology as a factor equal to or stronger than statistical correlation in causing the rapid acceptance of the concept.

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[1] Byham, W.C., "Assessment Centers for Spotting Future Managers," Harvard Business Review (July-August 1970), p. 153.

His last position in terms of advocacy is that there are secondary benefits to an assessment program in that the line managers trained as assessors enjoy spillover benefits from that training which apply to their own performance in their own positions. In other words, the experience of serving as an assessor makes an individual a better manager.

The middle part of the Byham article is concerned with the cookbook approach to designing the appropriate assessment center for a given organization, after which Dr. Byham addresses another critical question -- that of cost. Some of the estimates which might be applicable to an assessment program which is certain to involve travel and lodging expenses are that of $500 per candidate for AT&T's program, and $5,000 per twelve candidates (plus staff salaries) for an International Business Machines (IBM) division's program. Most importantly in discussing cost, he emphasizes the concept of relative rather than absolute costs. Specifically:

> "While the costs may appear high, they are probably quite small compared with the cost of executive failure."[1]

From that analytical point, Dr. Byham moves through some suggestions for smaller organizations which might not be able to afford to consider the assessment center technique, to his conclusion, which

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[1] Byham, W.C., Assessment Center for Spotting Future Managers," Harvard Business Review (July-August 1970), p. 160.

consists of a brief summary statement of advocacy. An added "bonus" is included -- a five page Appendix which outlines a typical assessment cycle, and which includes descriptions of the profiles of one typically weak candidate and one typical strong one.

A HARD LOOK AT MANAGEMENT ASSESSMENT CENTERS AND THEIR FUTURE

The next article to be examined was written by Allen I. Kraut, Manager of Personnel Research for the International Business Machine World Trade Corporation, and is entitled: "A Hard Look at Management Assessment Centers and Their Future." [26] Dr. Kraut wastes little time in reviewing the history of the Management Assessment Center concept before he gets to the first key question: whether or not the method is valid. To answer the question in its most basic connotation, he cites several studies which have demonstrated that the method is in fact valid. He then delves further into other aspects of the question such as acceptability -- defined as face validity; morality -- described by the openness and objectivity of the promotion process; value added -- a question of whether or not assessment returns at least its cost; impact on the organization -- specifically, impact on the selection system as it existed before assessment was instituted; characteristics measured -- their appropriateness and relevance; impact on careers -- creation of "crown princes" and "klutzes," with the attendant self-fulfilling prophesy; and, impact of stress -- deleterious effects of the

short-term, highly-stressed period of assessment. Dr. Kraut then examines some of the (then) newly-recognized beneficial externalities and newly-added facets of assessment programs, and concludes the article with an insistence that the questions posed must continue to be posed, but that, in addition, the broader effects of assessment programs must be examined, in terms not only of absolute but relative values as well.

By examining some of the pertinent side effects of an assessment program -- both those potentially beneficial and those potentially deleterious -- Dr. Kraut addressed many of the unspoken concerns about the overall effects of an assessment program. Needless to say, his willingness to look at both sides of the issue of externalities and his call for continued vigilance in the evaluation of the assessment center and other selection techniques only serve to enhance his credibility as an objective observers.

ASSESSMENT CENTERS -- FURTHER ASSESSMENT NEEDED?

The next article to be considered in this effort is one whose initial impression, as demonstrated by its title, "Assessment Centers -- Further Assessment Needed?" [37] is one of skepticism. The authors are John E. Wilson, an Associate Professor of Business at California State University, with an extensive background in personnel and management development, and Walter Ashton Tatge, Medical Director for Pacific Telephone Company and Associate Clinical Professor of

Medicine at the University of California, Davis, School of Medicine, whose credentials in the field of management are not described. As the article proceeds, Drs. Wilson and Tatge do little to dispel the initial sense of skepticism, beginning with an allegorical reference to management's willingness to try almost anything in order to simplify selection: "Historically, efforts to make management selection decisions demonstrate management's willingness to try almost anything including endurance tests, assessment based on the contours of the skull, psychologist's interpretation of what the candidate sees in ink blots, and even physical combat between the candidates."[1] They then briefly detail the experiences of Dr. Byham at J. C. Penney, the work at AT&T and other large and prestigious users of assessment center techniques, adding -- quite correctly -- that continued growth of the Management Assessment Center concept will follow if for no other reason than their prestige and our societal lemming tendencies. Next, they pose the critical question of whether or not the Management Assessment Center concept adds significantly to the data available from more traditional means of evaluation, followed by several corollary questions concerning characteristics measured, correlation and validity, and cost-benefit relationships. Moving to specifics, they ask what assessment centers actually measure. From that question they develop answers from two perspectives: that of the professional, who cites interpersonal

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[1] Wilson, J.E. and Tatge, W.A., "Assessment Centers -- Further Assessment Needed?" Personnel Journal 52 (March 1973), p. 172.

skills, and that of the line manager, who agrees but feels that assessment centers are "personality contests."

At that point the authors present a point biserial correlation matrix purporting to show the relationship between California Personality Inventory (CPI) scales and ratings in three assessment centers, from which they developed a statistical equation (unstated) with which they predicted success in the assessment center. The end result, when their predictions were matched against assessment center selections, was an 82 per cent accuracy. Even Drs. Wilson and Tatge admit, however, that this is only one indication of particular interpersonal skills measured by the assessment center by paper and pencil tests.

In addressing comparative predictive power of assessment centers as compared to more traditional methods, they state the opinion that the assessment center may be quite valuable in the early identification of those with limited or nonexistent job history as a manager. Others may wish to argue the point of effectiveness further, but this writer is quite willing to accept it as an admission that the technique is <u>at least</u> of value at that initial level. The remainder of the article consists of a series of conclusions aimed directly at the usual conclusions of a typical positively-oriented article, almost as if to discount any and all imputed values of the assessment center approach.

It is difficult for this writer to maintain an objective outlook in reading the Wilson and Tatge article. Although every author is a

partisan to some extent, seldom is the partisan attitude so obvious. For example, throughout the article one encounters repeated references to the assessment center's apparent emphasis on interpersonal skills, with a tone that implies that such emphasis is undesirable. Yet, outside of specific specialty areas such as accounting or engineering, what else is management but an exercise in interpersonal relations? Proponents of the assessment center concept make no excuses for the concentration upon interpersonal skills for that very reason.

Another objection, at least from the point of view of this writer, is the use of a very weak and difficult to interpret statistical method, the point biserial correlation. That objection extends to the fact that the authors impute to that correlation a level of significance, when there is in fact no significance level directly associated with the point biserial correlation (see [17] [32]). In general, the major complaint about this article is not the conclusions, per se -- the admission about the effectiveness of assessment centers in early identification of management potential is adequate to support this writer's hypothesis -- but some of the methods apparently used to reach and subsequently justify those conclusions. It is also interesting to note that this article was the only one encountered in the entire bibliography which was negative in its overall perspective.

MULTIPLE ASSESSMENT PROCEDURES IN IDENTIFYING AND DEVELOPING MANAGERIAL TALENT

The next bit of literature to be examined is a technical report produced in August of 1970 for the Office of Naval Research, by Marvin D. Dunnette of the University of Minnesota. The report, Multiple Assessment Procedures in Identifying and Developing Managerial Talent [16] is, if nothing else, an indication of the Navy's interest in the concept of assessment for management selection. Initially, the report is typically directed toward the history of assessment, followed by a general description of the techniques employed therein. Dunnette then begins an outline and analysis of the results of the extensive research done on multiple assessment programs, which is the essential purpose of the technical report -- to summarize the major results of the various research efforts. The overall conclusions reached can be summarized as follows:

1. A variety of behavioral dimensions are observable during assessment.

2. Behavioral observations during assessment can be recorded and rated with high reliability.

3. All elements of multiple assessment procedures contribute important but differential aspects to overall judgements and behavior ratings developed during assessment.

4. Both overall judgements and specific behavior ratings have shown reasonably high validities for predicting not only later

organizational status but also the patterns of managerial behavior shown by participants in their later managerial positions.

5. Limited evidence suggests that multiple assessment programs run solely by non-professionals may yield evaluations of lower validity than those programs administered solely by professionals or by a mix of both.

6. The evidence is impressive that procedures unique to the multiple assessment approach do contribute valid information not available from more traditional methods.

The evidence amassed and analyzed by Dr. Dunnette, a recognized authority in the field of personnel selection, is impressive. As has the vast majority of literature on the subject, this technical report reaffirms the value of the Management Assessment Center concept and, in this case, is of added value in that it clearly demonstrates the Navy's interest in multiple assessment techniques and their predictive ability in the realm of management selection.

AN EVALUATION OF THE USEFULNESS OF THE ASSESSMENT CENTER IN PERSONNEL SELECTION AND PROMOTION

An Evaluation of the Usefulness of the Assessment Center in Personnel Selection and Promotion [29], is an unpublished thesis by William Blake McCowan Jr. for the School of Government and Business Administration of the George Washington University, which begins with an examination of the current thought which serves to indict the traditional system of selection. Among the catchwords which serve

to call attention to weaknesses in that system are the "Peter Principle," and "Executive Obsolescence." Mr. McCowan presents an interesting graphical comparison between the two seemingly overlapping concepts. In examining the methods of treating or avoiding incompetence or obsolescence, he leads directly into a look at the procedures for personnel selection and promotion. He describes the more traditional approaches to the selection and promotion processes, from the purely intuitive "gut feel" to the relatively recently espoused method of selection by objectives, which is a corollary to the concept of management by objectives. He saves until last, however, the method of simulation, into which category the Management Assessment Center concept must fall.

After the obligatory history and growth of the concept and description of the techniques and processes which comprise an assessment center, he addresses the principal element of the thesis: the validity of the Management Assessment Center concept. In that section, Mr. McCowan cites Douglas Bray concerning the Management Progress Study within the Bell system, in which assessment centers were used solely to predict the success or failure of a group of management selectees (see [4], [5], [7], [8]). He continues, citing a similarly uncontaminated study of salesmen by AT&T and a later, follow-up study [6]. He then examines studies from a variety of sources, including Union Carbide's Oak Ridge Gaseous Diffusion Plant, the Tennessee Valley Authority, IBM, and others. The results of all of the studies are similarly encouraging, and Mr. McCowan has reached the

following conclusions:

1. That the Peter Principle and executive obsolescence do exist and are management problems.

2. That the personnel selection process is a key to minimizing managerial incompetence.

3. That the validity of many of the more traditional personnel selection methods is questionable.

4. That a well designed and utilized assessment center is an acceptable and valid method of personnel selection.

5. That the assessment center application includes several beneficial externalities.

6. That the assessment center technique can allow an organization to minimize the level of managerial incompetence or obsolescence.

AN ASSESSMENT OF ASSESSMENT CENTERS

From among the very recent articles, this writer has chosen three which demonstrate the questioning and evaluation which typify the continuing study of assessment centers. The first of these, "An Assessment of Assessment Centers," [23] by Ann Howard, describes the components of the typical assessment center and reviews the current evaluative research as is consistent with most articles addressing the subject. In addition, however, she examines the question of validity. Her approach is to compare the results of assessment methodology with three more traditional methods of management selection:

manpower inventories by private consultants, performance appraisal, and psychometric tests and scored inventories. Her conclusion in that regard is that assessment centers show promise when compared to the alternative methods for management selection. She also makes note of the externalities associated with an assessment center program, including such beneficial aspects as the effect of assessor training on a functional manager, the developmental training effects of the process on the assessees, and the positive effects of the process on the attitudes of the assessees. Conversely, however, she also describes such undesirable aspects as the "crown prince or princess" and "kiss of death" effects, which illustrate the concept of the self-fulfilling prophesy. Other negative factors noted include the effects of the inherent stress of the process on the assessees and the overall cost of assessment.

Miss Howard concludes her article by summarizing that the research has shown that clinical interpretation of projective exercises -- clinical measurement -- can make a contribution, and that clinical combination of data into an overall success predictor can work, but that neither has been demonstrated to be the best method. She then suggests that assessment methodology might be improved by means of a mechanical combination of data from a variety of sources, including clinical tests, simulation exercises, and subjective ratings. She also stresses that, despite the specific assessment center structure chosen for an individual application, continuous monitoring is necessary to ensure intertemporal validity.

ASSESSMENT CENTER VALIDITY: A LONGITUDINAL STUDY

Mitchel's article, "Assessment Center Validity: A Longitudinal Study," [30] is the essence of his doctoral dissertation at Bowling Green State University. In it he reports the results of an examination of assessment center predictive validity over time and a comparison of assessor ratings with other predictors within a sample of managers assessed by Standard Oil Company of Ohio's (SOHIO) program (see Finkle and Jones [19] for program description) between 1966 and 1972. Using salary as a criterion of managerial performance, Mitchel shows that the assessment variables were able to predict the criterion, demonstrating increasing accuracy with increasing validity over time. Security measures were designed to minimize criterion contamination, but Mitchel admits that no method exists whereby its potential effect can be measured. The assessors' rating of one aspect of the assessees' potential was found to be a valid predictor and the strongest component of the assessees' overall rating. The overall rating itself, however, was not found to be a strong predictor.

MANAGEMENT ASSESSMENT CENTER EVALUATIONS AND SUBSEQUENT JOB PERFORMANCE OF WHITE AND BLACK FEMALES

The last article to be examined, Huck and Bray's, "Management Assessment Center Evaluations and Subsequent Job Performance of White and Black Females," [24] is specifically intended as an examination of the assessment center method in terms of cultural or racial bias, which has been a strong factor in opposition to traditional paper

and pencil tests. The study sample was an interracial mix of women employed by AT&T and assessed during the period between 1966 and 1971. The assessment center was intended as a tool for selection of nonmanagement employees to the first level of supervisory management. Six job-specific criteria were identified, and correlations between assessment results and the criteria were calculated. The results served to reiterate those of previous research: that assessment results are good predictors of later performance, and more so of potential for future advancement than is performance on the current job. More importantly, however, the study demonstrated that there was no significant difference in correlations between overall assessment ratings with overall job performance or potential for advancement between the black and white subjects. The conclusion is thus that the assessment center method does not demonstrate differential validity and, in affirmative action programs such as accelerated advancement for minority groups and women, increases the probability that those advanced will do well on the job.

COMMENTS ON THE LITERATURE

This writer has attempted to present synopses of some selected current thought concerning the Management Assessment Center concept. In so doing, it has been noted that a consensus is evident in both opinion and research results, indicating that assessment

techniques do have significant value as predictors of subsequent managerial performance.

Since any printed literature available, even that currently in press, represents the results of research conducted some time ago, it may not be truly current. In order to determine the present state of the assessment center art, a series of telephone interviews with individuals responsible for specific assessment center operations was conducted. The following section describes the results of those interviews.

III. INTERVIEWS

In an attempt to update the data reported in the literature, this writer conducted semi-structured telephone interviews with ten organizational representatives who are instrumental in their organizations' Management Assessment Center programs. The organizations themselves tend to be large, and the majority of them conduct their own assessment programs. One of the organizations provides a management development service on a consulting basis, as well as for its own internal use, which includes an assessment program. Another is concerned primarily with the provision of services relating to assessment centers, ranging from providing test and exercise materials, through designing a company's assessment program and training its assessors, to conducting an assessment center on a consulting basis. The others all conduct their own assessment operations. The results of those interviews, beginning with the organizations whose assessment centers have been previously described in the literature, are as follows.

THE J. C. PENNEY COMPANY, INCORPORATED

The J. C. Penney assessment center operation has an interesting history. That operation should be familiar to the student of the assessment center technique because it was begun and amply described

from several different perspectives by William C. Byham (see [9], [10], [11], [12]). Dr. Byham has not been associated with Penney's for about five years, however, and it is noteworthy that after his departure, Penney's assessment center program gradually died. In discussing the reasons for that demise, Mr. Harvey Fox, present head of Management Development for Penney's, ascribes the death of the program to a number of factors, including the loss of Dr. Byham's dynamic leadership in the area and a concurrent austere funding situation. He noted that the program had begun again, in response to a specific need. Openings in a particular area illustrated that need, and the assessment center operation was resurrected to fill it. For the new program, Mr. Fox trained the assessment center administrator, and together they trained the assessors. Much of the material used previously was evaluated and adapted for use in the new application.

Actual assessment was to begin again in August 1976, but was then delayed until mid-October. It is expected to continue from that point, on a small scale, for at least the next few years. Projections beyond a few years are difficult, and Mr. Fox commented that he foresaw a point in the not too distant future at which saturation would be reached, with no candidates remaining to be assessed.

INTERNATIONAL BUSINESS MACHINES

Dr. Henry Schwartz, an associate of Dr. Allen I. Kraut, provided the information about the IBM program. He highlighted the background

of assessment centers within IBM (see also [26], [27]), citing their introduction into selected locations in 1965 as a result of rapid growth which precipitated an intense demand for management skills. Since that time, the assessment operation has grown to include three domestic programs: the office products division, selected manufacturing locations, and the corporate finance function. Overseas, assessment centers are in operation in West Germany, the United Kingdom, and Canada.

The impact of IBM's assessment program became particularly evident to this writer when he learned that, as a rule, IBM does not hire directly to line management, but rather tends to promote from within.

The general assessment procedure at IBM begins with a recommendation from the immediate supervisor, which notes the recognition of management potential. The nominee then receives an advance package of descriptive materials referring to the assessment process, and the nominee is given the choice of attending the assessment center or not. If the nominee does decide to participate, he undergoes a two-day program which is comparable to that previously described. The assessment observers are specifically trained and oriented managers from the same professional area as the candidates.

A new study of validity, to complement Dr. Kraut's earlier work is presently being conducted. Results from that study will not be available for some time, however.

STANDARD OIL COMPANY OF OHIO

R. F. Rhoads, representing Dr. Thomas Standing, the director of Standard Oil of Ohio's (SOHIO) assessment center operation, describes that operation as continuous without significant change since its inception 13 years ago. The program itself is described in detail by Finkle and Jones [18]. SOHIO's program is designed to measure general managerial potential at other than entry level positions. Candidates are chosen as a result of demonstrated potential and ability, but participation in the assessment center is not voluntary -- a candidate chosen to participate must do so. Approximately 80 candidates are assessed per year, and rated on 12 dimensions by the assessment center staff. In addition, reports of the projective Thematic Apperception Test and sentence completion test are prepared, and a peer rating is conducted. In the latter, each candidate is asked to nominate those candidates he considers to be the top three of his assessment group.

The most recent validity study conducted has been reported by Mitchel [30], noted previously herein.

PACIFIC BELL TELEPHONE COMPANY

Don Robinson, who is instrumental in the management development efforts of Pacific Bell, provided a brief overview of the application of the Management Assessment Center concept within the Bell system and AT&T (see also [4], [5], [6], [7], [8], [20]). He was associated with Dr. Douglas Bray in the early efforts in the field, and notes that the

assessment center was originally conceived only as a research tool. From that originally-intended application it evolved into a selection tool. Robinson's contention is that it is an extremely powerful tool which is not currently being fully exploited in most applications. Because of the belief, he has altered Pacific Bell's assessment center operation somewhat, so that it no longer reflects that which might be considered typical of Bell-AT&T assessment operations. The principal difference is that the Pacific Bell program has integrated the assessment center with overall management development efforts.

Mr. Robinson feels that many of the attributes measured by assessment centers represent a habit pattern, and cannot be changed in later life. For this reason he advocates -- and has instituted within Pacific Bell -- a system in which abbreviated assessment takes place early in an individual's career. The results of that abbreviated assessment are then used to counsel the individual and to assign him. Assignments are made with a dual purpose: first, to utilize the strengths identified by the abbreviated assessment and, second, to facilitate growth and development in those areas identified as weaknesses.

The payoff manifests itself later in the individual's career, by his demonstrated growth. Local Pacific Bell studies have shown that in the regular assessment for promotion, alumni of the early abbreviated assessment have fared significantly better than their non-alumni peers. Improvements in those areas previously evaluated as weak were the most notable difference.

FORD MOTOR COMPANY

Ford's Manufacturing Supervisors Selection System is an assessment center type of operation intended to aid in the selection of foremen. Although at first glance this application might seem to be atypical in terms of position for which assessed, Doug Young, who is instrumental in the program, asserts that within Ford's management structure the foreman, as first level supervisor, is considered to be a part of management.

The techniques used by Ford are typical of assessment centers in general, adapted to specific facets of the automobile production industry. They include the in-basket, production scheduling problems, and exercises related to interpersonal relations such as supervisor-employee relations.

Ford's program is new, having been partially implemented in November of 1975 and expanded to company-wide operation in February of 1976. Mr. Young projects a continuing effort resulting in the assessment of 1500 candidates per year for approximately 8000 positions.

Since the Ford operation is new and has not been reported in the journals, the question of validity studies was broached. No uncontaminated study was conducted, but one examining the ongoing assessment program is currently in progress. In view of the extreme newness of the Ford program, results from that study are not anticipated in the near future.

ATLANTIC-RICHFIELD COMPANY

Atlantic-Richfield (ARCO) has been noted as having an operational assessment center, but this writer's investigation revealed that none presently exists at the corporate level. A proposal to implement such an operation is now pending, but approval is not assured. Should approval be granted, implementation may be two years away.

The aforementioned investigation did reveal, however, the existence of an assessment program within an ARCO production division in Dallas, Texas. Dr. Paul Berlfein, who administers that program, describes it as a small-scale approach intended to evaluate candidates for supervisory positions within the finance and accounting department of the production division. The program is only about a year old, and fewer than 100 candidates have been assessed to date.

Dr. Berlfein describes the methodology as more-or-less typical, utilizing several standard types of exercises. Included among the exercises are a leaderless group discussion of the "Who shall we send to a special training program" type, an in-basket, and a financial case designed to demonstrate analytical ability as well as written communications. Also included are paper and pencil tests, including the Wesman learning ability test.

No specific validity studies are presently contemplated because of the limited size and scope of the current program.

MINNESOTA MINING AND MANUFACTURING COMPANY

Minnesota Mining and Manufacturing's (3-M) assessment program was first begun in 1967 on an experimental basis. In 1969 it became operational, and it continues to operate to the present, on a relatively small scale.

Dr. Paul Weinimont, 3-M's program director, identifies the traditional goal of early identification of managerial capability. Participants are nominated by their immediate supervisors, and subsequently attend a rather typical two-day program which is composed of the standard interviews, simulation exercises, and paper and pencil measures.

The question of validity studies was met with an unexpected and previously unseen response. Dr. Weinimont commented that all such programs in industry were undertaken only with appropriate validity studies. The impression to this writer was that he (quite appropriately) questioned this writer's qualifications to question him about validity. Further pursuit of the question, however, revealed that no prior, uncontaminated study was conducted. When the aspect of criterion contamination in the validity measurement of ongoing programs was broached, he admitted that the problem existed, but asserted that adequate (unspecified) controls were present in 3-M's study (see also [8], [9], [19], [23], [27], [35] concerning criterion contamination).

SQUADRON OFFICER'S SCHOOL, MAXWELL AIR FORCE BASE

Major Edward Barber, United States Air Force, Executive Officer of the Squadron Officer's School, Maxwell Air Force Base, Montgomery, Alabama, described the assessment program in progress at the school. That program, begun in 1974 as a limited effort assessing 24 students, is sponsored and funded by the Commander of the Air University. The initial effort involved eight assessors, who contributed 1100 man-hours to assess those 24 students.

The program was subsequently evaluated and revised so that participating students would be assessed in a two-day operation prior to the beginning of Squadron Officer's School. Following the revision, Air Force Headquarters was asked to order 52 students in early for school, and 49 arrived in time to participate. The second group produced 91 assessees, and the latest, 240. Approximately half of each group assessed were given feedback on their performance, and the rest were not. Because of the newness of the program, the only indication evident to date is that those assessed performed better in Squadron Officer's School than those who were not.

Another factor in the revised program is the inclusion of an optional development program used to specifically apply the assessment results. Of the most recently assessed group of 240, 95 per cent entered the optional development program. Once again, the age of the program precludes determination of definitive results at this time. In addition, no specific validity studies were noted.

SYNTEX CORPORATION

Syntex Corporation is a pharmaceutical manufacturer whose subsidiaries include Syntex Laboratories, Incorporated, which is located in the Stanford Industrial Park, Palo Alto, California.

The assessment center conducted by Syntex Laboratories as a part of its Career Development Center (CDC) was described by Mr. Dale Miller, Syntex Laboratories' Director of Organization Development. He characterized the assessment operation as an integral factor in the overall career development efforts of the CDC.

Because the CDC is based upon the techniques of the Management Assessment Center, yet extends beyond those techniques, a brief sketch of the CDC program breakdown might be enlightening. The program lasts 40 hours, with time distributed as follows (see also [14]):

1. Individual Work, including in-basket and other simulation exercises, as well as paper and pencil tests ---------- 9 hours

2. Development Activities, such as lectures, discussions and simulations ---------- 10 hours

3. Group Discussions, including presentations and decision making, and conflict resolution exercises ---------- 6 hours

4. Staff/Participant Interviews---------- 3 hours.

5. Group/Individual Feedback and Career Planning, including critiques, feedback, development action, and planning ---------- 12 hours.

As is readily apparent to the student of assessment center techniques, there is no essential disparity between the activities of a typical

assessment program and the CDC program. The principal difference lies in the amount of participant's time involved and the altered emphasis, particularly on the Group/Individual Feedback and Career Planning phase. Those differences reflect the stated goals of the CDC program at Syntex, which is to: "Put promising young professionals and current managers in the driver's seat in planning their future and to help guide them to a chosen career route -- whether it's management or towards increased job satisfaction at the operating level."[1]

Syntex Laboratories' CDC program, although fulfilling an internal need, is also available for participation by external organizations. Among the extensive list of companies participating in the CDC are Abbott Laboratories, Bank of America, Control Data Corporation, Merrill Lynch, Pierce, Fenner and Smith, Schering Corporation, TRW Systems, and Syntex Laboratories' parent and several of the other subsidiaries.

Mr. Miller described the CDC program as successful, referring to the results of the latest in a series of Program Evaluation Questionnaires sent to participants, their nominating seniors, and assessment staff members [15]. Among the more notable reactions by the participants were that the CDC report was very accurate (47 per cent) or reasonably accurate (50 percent) in relation to their perception of their

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[1] The Career Development Center: A Basic Overview (Palo Alto, CA: Syntex, 1975), p. 1.

own on-the-job behavior and ability. Also, based on their own experience, they would be more apt (86 per cent) to recommend the CDC program to their peers or future subordinates.[1] The same two subject areas on the nominating managers' views produced strikingly similar responses (44, 47, and 88 percent, respectively),[2] as they did when presented to reflect the opinions of the assessment staff members (48, 50, and 80 percent respectively).[3] Mr. Miller commented that the impressions thus noted represent an improvement over those projected by the last survey, and reflect the benefit derived from changes in the program content since that time.

DEVELOPMENT DIMENSIONS, INCORPORATED

The last organization to be described in this section, Development Dimensions, Incorporated (DDI), was founded by William C. Byham after he left J. C. Penney's. According to Dr. Byham, after instituting and developing the Penney assessment center over a period of time, he encountered a feeling of personal stagnation which he ascribes to the limited horizons for the concept within that organization.[4] He then

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[1] The Career Development Center: Program Evaluation, January 1973 through June 1974 (Palo Alto, CA: 1974), Encl 1, pp. 4-6.

[2] Ibid., Encl 2, pp. 3-4.

[3] Ibid., Encl 3, pp. 3-5.

[4] Dr. Byham's comments tend to support the previously noted impressions of Mr. Harvey Fox, Penney's present Head of Management Development, concerning the history of Penney's assessment center efforts.

founded DDI, which was and is intended to provide consultant support at a variety of levels for organizations using the assessment center method.

DDI can provide standard assessment exercise materials, such as in-baskets, business games, leaderless group discussions, analysis, fact-finding and decision-making, and interview simulation. It also offers custom-made written and oral presentation exercises, interview materials, and procedural manuals for each of the staff levels of an assessment center. The ultimate service is the provision of complete, pre-packaged assessment center materials for a variety of specific purposes and scopes. DDI services are intended to span the breadth of need from nonmanagement positions through all levels of management, including top management [13].

Among the new services offered by DDI are a variety of programs, conducted by the DDI staff on a consulting basis. These programs have application in organizations which are too small to be able to support a full-time internal assessment center, or in organizations which wish to assess candidates on an extremely high organizational level. The newest program offered, Interaction Management,^{TM} is a supervisory skills system which uses interaction modeling to enable first- and second-level supervisors to satisfactorily manage critical interaction situations with subordinates.

Thus DDI offers a broad spectrum of assessment- and development-related services to fit nearly every level of organizational need.

Among their clients they number American Airlines, Chevrolet Motor Division, General Electric, Mallinckrodt Chemicals, Shell Oil Company, Upjohn Company, and at least six major agencies of the federal government.

Because of the consultant nature of DDI's services, they do not become involved in studies of the validity of their clients' programs.

COMMENTS ON THE INTERVIEWS

Although not particularly germane to the analysis, it is worthy of note that the people interviewed were universally pleasant, agreeable, and eager to assist.

The actual results of the interviews disclosed some trends which are of interest:

1. Contrary to Captain Allen's speculation,[1] the number of programs is not small. Only the number of large, well-reported programs is small.

2. The number of programs has continued to grow despite some warnings of the end of the "honeymoon" for assessment centers.

3. A distinct trend has begun to develop toward the concept of assessment as an integral part of individual/management development, rather than strictly assessment for promotion.

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[1] Allen, G. B., The Personnel Assessment Center: A Review and Suggested Application, unpublished thesis (Monterey, CA: The Naval Postgraduate School, 1974), p. 137.

Research in the area of assessment center techniques continues. It appears that usefulness of assessment techniques for management selection and individual/organizational development is recognized.

IV. APPLICATION

This section will address the proposed application of the Management Assessment Center method to the process of selecting Medical Service Corps officers from among the ranks of the Hospital Corps of the United States Navy.

Although the Navy senior petty officer has been referred to as a "middle manager," his responsibilities are at a peak. Selection for commissioning may not immediately entail the assignment of drastically increased responsibilities, but it establishes an early plateau of responsibility, from which upward growth can proceed. For these reasons, the Medical Service Corps selection process is considered to be analogous to civilian programs designed to promote personnel from non-management to management positions.

This chapter describes how assessment center concepts might apply to the process.

A. CONSIDERATIONS PERTAINING TO THE PROPOSED APPLICATION

1. The Medical Service Corps inservice procurement selection board would retain its present selection and rank-ordering responsibilities.

2. Candidates for assessment would consist of applicants for commission under the current directives who had successfully

completed all phases of the application process short of actual selection board evaluation, and who had not been assessed within the previous two years.

3. The assessment staff would be drawn from a "pool" of trained Medical Service Corps officer personnel stationed in the Washington, D.C. geographic area. The potential assessor pool numbers approximately 200, when officers of the rank of Lieutenant Commander and above are considered.

4. Adequate facilities and equipment necessary to accomplish the assessment exist at the Naval School of Health Care Administration, National Naval Medical Center, Bethesda, Maryland.

5. The primary use of the assessment results would be as additional information for consideration, to be made available to the selection board in their deliberations.

6. The secondary use of the assessment results would be for developmental feedback to the candidate, from the candidate's perspective as both an already effective Petty Officer and as a potential fledgling commissioned officer.

7. That data collected as a result of the assessment process would be privileged and available only for the two specified uses.

B. DISCUSSION OF THE CONSIDERATION

1. <u>The Medical Service Corps Inservice Procurement Selection Board</u>.

The number of individuals selected for commissioning each year is governed by manpower needs, and in the past the Medical Service Corps inservice procurement selection board has been unaware of those exact needs at the time of their deliberations. The board's actual function, therefore, has been twofold:

a. To "select out" those candidates who are felt to lack the minimum qualifications for commissioning.

b. To rank-order the remaining candidates.

Selection, per se, is actually accomplished at a later date and at a higher echelon, when the number of available positions is applied to the rank-order list of eligible candidates.

2. The Candidates.

If an assessment program were instituted, in the first year all candidates who survived the screening instruments would be assessed. In subsequent years, a candidate who had been assessed within the previous two years but not selected would be evaluated on the basis of his latest assessment, along with the other factors of his application. If, in the third year since his last assessment, a candidate so desired and was otherwise qualified, he could participate in another assessment cycle, the results of which would supercede those of his previous assessment(s). The candidate would also have the option of waiving a new assessment, leaving his most recent assessment report as the selection board's input from that area of his application, without prejudice.

As was noted in the requirements section, the secondary use of the assessment center program would be the candidate's development. Thus, the benefits of an assessment program would be three-fold over time.

First, by providing additional input concerning the candidates and their abilities, assessment would assist the selection board in its deliberations to determine which candidates are acceptable and what is their appropriate rank-order. Second, by providing feedback to the candidates who are subsequently selected, assessment would begin the process of molding, guiding, and directing the newly-commissioned officer toward the direction and career pattern best for him and the Navy. Third, by providing feedback to the candidates who fail selection, assessment would point out the direction of improvement, by noting weaknesses which need correction and strengths which may be further developed and emphasized. The anticipated long-run result of an assessment center program would be continued high quality selectees and increasingly high quality applicants.

3. The Assessment Center Staff.

As previously noted, there are approximately 200 Medical Service Corps officers of the rank of Lieutenant Commander or above serving in the Washington, D.C. geographic area. Most of them will serve at least a three to five year tour of duty in that area. The selection of assessors from among that group would be an appropriate

reflection of Navy Medical Department policy as indicated by the traditional membership of the Medical Service Corps inservice procurement selection board. The stability inherent in senior officer tour lengths would justify the investment in their training as assessors. In addition, that training would have its own advantages:

a. It would allow flexible scheduling, to preclude a staff member from assessing a candidate of whom he has personal knowledge, thus facilitating objectivity. [11].

b. Most of each assessor's training would be in some way applicable to his own position, thereby enhancing his personal effectiveness as a manager [9].

4. Facility and Equipment Requirements.

As noted in the section concerned with the definition, history, and structure of the Management Assessment Center, facility and equipment requirements for an assessment program are very flexible. The Naval School of Health Care Administration could physically support an assessment program in terms of both operating spaces and the variety of training aids already in use at that institution or readily available nearby.

C. PROGRAM OBJECTIVES AND COSTS

1. Objectives.

a. Primary.

The primary objective of the proposed Management

Assessment Center application would be to make additional valid information concerning the candidates' performance and potential for increased responsibility available to the Medical Service Corps in-service procurement selection board.

b. Secondary.

The secondary objective of the proposed Management Assessment Center application would be to provide developmental feedback to the candidates. Such feedback would be useful to the successful candidates in their development of both their career objectives and the strategies necessary to attain those objectives. The feedback would be similarly valuable to the unsuccessful candidate in a program of self-improvement intended to improve their qualifications for selection in the future and to enhance their value to the Navy as senior Petty Officers.

2. Costs.

Estimates of the cost of an assessment center vary widely, from that of an initial outlay of $5000.00 to set up a program which will provide for five assessors and twelve candidates [36], to that of a continuing cost of $600.00 per candidate, presented as a conservative estimate [37]. Nearly all estimates available reflect a candidate pool which is located at or near the site of the assessment center. Thus, the additional factors of travel, temporary lodging, and meal expenses come to bear on the proposed application.

By utilizing an existing assessment center format tailored to the specific needs of the proposed application, the variable cost would be less than $27.00 per candidate, with one-time fixed costs of $940.00, which would allow the assessment of 24 candidates at any one time (involving 12 assessors).[1] Assessor training would cost approximately $3000.00 plus $100.00 per trainee for 12 to 25 assessor trainees, plus travel and per diem costs for the training staff. Alternatively, a total DDI program including program planning, job analysis, exercises tailored to the needs of the proposed application, assessor training, and simultaneous conduct of the first assessment program would cost $12,000 plus the same expenses.

Using the information presented in Appendix A, which is based on the geographic dispersion of the selectees from year groups 1973 through 1976, the approximate average cost to the Navy, in travel and per diem payments, approaches $600.00 per selectee for a five day assessment and development program similar to that conducted by the Career Development Center.[2] Combined with the individual cost of assessment, the total variable cost per candidate would average less than $625.00, exclusive of assessors' salaries.

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[1] Catalog of Assessment and Development Exercises (Pittsburgh, PA: Development Dimensions, 1975), p. 28.

See [2] The Career Development Center: A Brief Overview (Palo Alto, CA: Syntex, 1975), and previous reference herein for description of program content.

V. JUSTIFICATION

A. OF THE MANAGEMENT ASSESSMENT CENTER CONCEPT

The literature available to date, describing as it does a number of rigorous contamination-controlled studies, provides a strong case in favor of the Management Assessment Center concept as an adjunct or addition to traditional selection tools. In addition, the recent trend toward incorporation of assessment centers into individual/organizational development programs illustrates the additional value of the technique. Certainly neither the recent literature nor the results of the interviews conducted by this writer have shown any indications that the Management Assessment Center concept is anything less than the effective selection tool Bray [5] and others have found it to be.

B. OF THE PROPOSED APPLICATION

Consider the case of one inappropriate selection. As the promotion system is presently structured, with the Medical Service Corps tied to the Line Navy, 100 per cent promotion opportunity has existed through the rank of Lieutenant Commander for quite some time. An ineffective individual may easily progress to that rank by simply managing to stay out of serious trouble along the way. The first obvious cost involved in such a situation is the individual's base pay and allowances. Second, consider the educational opportunities

available to every Medical Service Corps officer: part-time tuition assistance and attendance at the Naval School of Health Care Administration. Third, consider what is believed by some (see [9], [37]) to be the greatest cost -- the hidden cost of substandard performance, such as a poorly-managed division or service.

To evaluate pay and allowances alone, according to current pay scales, consider an unqualified individual commissioned today with ten years of active service. Assuming that he is married, and assuming the normal progression to Lieutenant Commander, he will have received gross pay and allowances of $198,488.40 as an officer between ten and twenty years of service.

In comparison, if the same individual had remained an enlisted man, had attained the rate of Chief Petty Officer in his tenth year of service, and had advanced to the rate of Master Chief Petty Officer -- a feat which can hardly be considered automatic -- he would have earned $144,770.40 in the same length of time. The raw difference in the two figures would defray the cost of assessing 60 candidates and training 36 assessors in three groups (computed at $5,000.00 total cost per 12 assessors trained). Even adjusted for present values as shown in Appendix B, the savings could pay for the assessment of 41 candidates and the training of 12 assessors.

Thus, if a Management Assessment Center could screen out even one unqualified candidate per year, it would pay for its own continuing

variable costs in its assessment function, without even considering the possible benefits of the development function.

APPENDIX A

Year Group 1973

ID Code	Duty Station/POE	Travel	Outconus Travel	Per Diem	Total Cost
A	SFRAN (Yokosuka)	$565.60	$526.00	$350	$1441.60
B	CAMLEJ, NC	69.60		245	314.60
C	ALAMEDA, CA	562.40		245	807.40
D	SAN DIEGO, CA	533.80		245	778.80
E	BREMERTON, WA	541.00		245	786.00
F	CECIL FLD, FL	150.40		245	395.40
G	SAN DIEGO, CA	533.80		245	778.80
H	FT BELEVOIR, VA	5.20		245	250.20
I	PHILA, PA (Rota)	28.00	374.00	350	752.00
J	NORVA	40.80		245	285.80
K	CAMPEN, CA	533.60		245	778.60
L	JAX, FL	149.60		245	394.60
M	PORTSVA	40.80		245	285.80
N	SFRAN, CA (Taiwan)	565.60	654.00	350	1569.60
O	PENSACOLA, FL	192.00		245	437.00
P	LAFAYETTE, LA	240.60		245	485.60
Q	CORPUS CHRISTI, TX	328.40		245	573.40
R	GLAKES, IL	142.40		245	387.40
S	CORPUS CHRISTI, TX	328.40		245	573.40
T	ORLANDO, FL	175.80		245	420.80

ID Code	Duty Station/POE	Travel	Outconus Travel	Per Diem	Total Cost
U	SAN DIEGO, CA	533.80		245	778.80
V	NORVA (Keflavik)	40.80	262.00	350	652.80
W	CHARLESTON, SC	104.20		245	349.20
X	CAMPEN, CA	533.60		245	778.60
Y	BETHESDA, MD				00.00
Z	JAX, FL	149.60		245	394.60
AA	LG BEACH, CA	533.80		245	778.80
BB	SFRAN, CA (Guam)	565.60	590.00	350	1505.60
CC	CECIL FLD, FL	150.40		245	395.40
DD	WASHINGTON, DC	2.60			2.60
EE	GROTON, CN	70.20		245	315.20
FF	BEEVILLE, TX	320.40		245	565.40
GG	PHILA, PA (Sigonella)	28.00	426.00	350	804.00
HH	PORTSVA	40.80		245	285.80
II	LG BEACH, CA	533.80		245	778.80
JJ	PHILA, PA (Roos. Rds.)	28.00	132.00	350	510.00
KK	NORVA	40.80		245	285.80
LL	CAMPEN, CA	533.60		245	778.60
MM	GLAKES, IL	142.40		245	387.40
NN	SAN DIEGO, CA	533.80		245	778.80
OO	SFRAN, CA (Guam)	565.60	590.00	350	1505.60
PP	GLAKES, IL	142.40		245	387.40

ID Code	Duty Station/POE	Travel	Outconus Travel	Per Diem	Total Cost
QQ	OAKLAND, CA	562.00		245	807.00
RR	ORLANDO, FL	175.80		245	420.80
SS	NORVA (GTMO Bay)	40.80	96.00	350	486.80
TT	BEAUFORT, SC	113.40		245	358.40
UU	CAMPEN, CA	533.60		245	778.60
VV	GROTON, CN	70.20		245	315.20
WW	SAN DIEGO, CA	533.80		245	778.80
XX	NORVA	40.80		245	285.80
YY	WASHINGTON, DC(Greece)	2.60	629.86	350	982.46
ZZ	CAMPEN, CA	533.60		245	778.60
AAA	SFRAN, CA (Hawaii)	565.60	232.00	350	1147.60
BBB	WHIDBEY IS, WA	550.20		245	795.20
CCC	NORVA (Keflavik)	40.80	262.00	350	652.80
DDD	QUONSET PT, RI	79.20		245	324.20
EEE	SAN DIEGO, CA	533.80		245	778.80
FFF	PHILA, PA (Naples)	28.00	426.00	350	804.00
GGG	CHERRY PT, NC	69.60		245	314.60
HHH	OAKLAND, CA	562.00		245	807.00
III	ORLANDO, FL	175.80		245	420.80
JJJ	SFRAN, CA (Okinawa)	565.60	616.00	350	1531.60
KKK	NEWPORT, RI	79.20		245	324.20
LLL	CAMLEJ, NC	69.60		245	314.60
MMM	CHERRY PT, NC	69.60		245	314.60

ID Code	Duty Station/POE	Travel	Outconus Travel	Per Diem	Total Cost
NNN	NORVA	40.80		245	285.80
OOO	SAN DIEGO, CA	533.80		245	778.80
PPP	CAMPEN, CA	533.60		245	778.60
QQQ	NORVA	40.80		245	285.80
RRR	JAX, FL	149.60		245	394.60
SSS	CHARLESTON, SC	104.20		245	349.20
TTT	CAMPEN, CA	533.60		245	778.60
UUU	SAN DIEGO, CA	533.80		245	778.80
VVV	PENSACOLA, FL	192.00		245	437.00
WWW	PHILA, PA	28.00		245	273.00
XXX	SFRAN, CA (Hawaii)	565.60	232.00	350	1147.60
YYY	SFRAN, CA (Okinawa)	565.60	616.00	350	1531.60
ZZZ	SBERN, CA (Iwakuni)	521.80	572.00	350	1443.80
AAAA	BETHESDA, MD				00.00
BBBB	SAN DIEGO, CA	533.80		245	778.80
CCCC	SFRAN, CA (Guam)	565.60	590.00	350	1505.60
DDDD	NORVA	40.80		245	285.80
EEEE	GROTON, CN	70.20		245	315.20
FFFF	CAMLEJ, NC	69.60		245	314.60
GGGG	RALEIGH, NC	54.60		245	299.60
HHHH	SAN DIEGO, CA	533.80		245	778.80
IIII	SFRAN, CA (Hawaii)	565.60	232.00	350	1147.60

ID Code	Duty Station/POE	Travel	Outconus Travel	Per Diem	Total Cost
JJJJ	CAMLEJ, NC	69.60		245	314.60
KKKK	WASHINGTON, DC	2.60			2.60
LLLL	SFRAN, CA (Hawaii)	565.60	232.00	350	1147.60
MMMM	WASHINGTON, DC (Bermuda)	2.60	111.40	350	464.00
NNNN	PHILA, PA (Morocco)	28.00	374.00	350	752.00
OOOO	CHERRY PT, NC	69.60		245	314.60

$\bar{x}_3 = \$633.29$; $s_3 = 392.94$

Year Group 1974

A	LG BEACH, CA	533.80		245	778.80
B	NORVA	40.80		245	285.80
C	OAKLAND, CA	562.00		245	807.00
D	SAN DIEGO, CA	533.80		245	778.80
E	NASNI, SAN DIEGO, CA	535.40		245	780.40
F	WASHINGTON, DC	2.60			2.60
G	SFRAN, CA (Guam)	565.60	590.00	350	1505.60
H	BEAUFORT, SC	113.40		245	358.40
I	EL TORO, CA	530.80		245	775.80
J	PORTSVA	40.80		245	285.80
K	SAN DIEGO, CA	533.80		245	778.80
L	PORTSVA	40.80		245	285.80
M	SFRAN, CA (Guam)	565.60	590.00	350	1505.60

ID Code	Duty Station/POE	Travel	Outconus Travel	Per Diem	Total Cost
N	SFRAN, CA (Guam)	565.60	590.00	350	1505.60
O	WASHINGTON, DC	2.60			2.60
P	BETHESDA, MD				00.00
Q	SAN DIEGO, CA	533.80		245	778.80
R	PORTSVA	40.80		245	285.80
S	PORTSVA	40.80		245	285.80
T	SAN DIEGO, CA	533.80		245	778.80
U	SAN DIEGO, CA	533.80		245	778.80
V	PORTSVA	40.80		245	285.80
W	BETHESDA, MD				00.00
X	NEW LONDON, CN	70.20		245	315.20
Y	PENSACOLA, FL	192.00		245	437.00
Z	SAN DIEGO, CA	533.80		245	778.80
AA	MARE IS, CA	565.60		245	810.60
BB	PORTSVA	40.80		245	285.80
CC	CORPUS CHRISTI, TX	328.40		245	573.40
DD	NORVA	40.80		245	285.80
EE	SFRAN, CA (Taiwan)	565.60	654.00	350	1569.60
FF	SAN DIEGO, CA	533.80		245	778.80
GG	PORTLAND, ME	108.60		245	353.60
HH	CAMLEJ, NC	69.60		245	314.60
II	SAN DIEGO, CA	533.80		245	778.80

ID Code	Duty Station/POE	Travel	Outconus Travel	Per Diem	Total Cost
JJ	SAN DIEGO, CA	533.80		245	778.80
KK	CORPUS CHRISTI, TX	328.40		245	573.40
LL	NORVA	40.80		245	285.80
MM	PORTLAND, ME	108.60		245	353.60
NN	PORTSVA	40.80		245	285.80
OO	PENSACOLA, FL	192.00		245	437.00
PP	CAMPEN, CA	533.60		245	778.60
QQ	BAINBRIDGE, MD	16.00		245	261.00
RR	PORTSVA	40.80		245	285.80
SS	SAN DIEGO, CA	533.80		245	778.80
TT	OAKLAND, CA	562.00		245	807.00
UU	MOFFETT FLD, CA	570.00		245	815.00
VV	YUMA, AZ	498.20		245	743.20
WW	SAN DIEGO, CA	533.80		245	778.80
XX	WASHINGTON, DC (Cyprus)	2.60	639.26	350	491.86

$\bar{x}_4 = 587.36$; $s_4 = 380.97$

Year Group 1975

A	GLAKES, IL	142.40		245	387.40
B	WASHINGTON, DC	2.60			2.60
C	SAN DIEGO, CA	533.80		245	778.80

ID Code	Duty Station/POE	Travel	Outconus Travel	Per Diem	Total Cost
D	ANNAPOLIS, MD	8.00		245	253.00
E	SKAGGS IS, CA	558.60		245	803.60
F	WASHINGTON, DC	2.60			2.60
G	SAN DIEGO, CA	533.80		245	778.80
H	NORVA (Keflavik)	40.80	262.00	350	652.80
I	LG BEACH, CA	534.20		245	779.20
J	LCREEK, VA	39.60		245	284.60
K	PHILA, PA	28.00		245	273.00
L	WILLIAMSBURG, VA	40.80		245	285.80
M	SFRAN, CA (Guam)	565.60	590.00	350	1505.60
N	FT BELEVOIR, VA	5.20		245	250.20
O	SAN DIEGO, CA	533.80		245	778.80
P	KIRTLAND, NM	373.60		245	628.60
Q	OAKLAND, CA	562.00		245	807.00
R	BEAUFORT, SC	113.40		245	358.40
S	NORVA (GTMO Bay)	40.80	96.00	350	486.80
T	SAN DIEGO, CA	533.80		245	778.80
U	NORVA	40.80		245	285.80
V	WASHINGTON, DC	2.60			2.60
W	SAN DIEGO, CA	533.80		245	778.80
X	BETHESDA, MD				00.00
Y	LG BEACH, CA	534.20		245	779.20

ID Code	Duty Station/POE	Travel	Outconus Travel	Per Diem	Total Cost
Z	PORTSVA	40.80		245	285.80
AA	PORTSVA	40.80		245	285.80
BB	WASHINGTON, DC	2.60			2.60
CC	ROANOKE, VA	45.80		245	290.80

$\bar{x}_5 = 716.48$; $s_5 = 1443.63$

Year Group 1976

A	GLAKES, IL	142.00		245	387.40
B	NORVA	40.80		245	285.80
C	CAMLEJ, NC	69.60		245	314.60
D	PHILA, PA (Roos. Rds.)	28.00	132.00	350	510.00
E	CHARLESTON, SC	104.20		245	349.20
F	NEWPORT, RI	81.20		245	326.20
G	CAMLEJ, NC	69.60		245	314.60
H	ORLANDO, FL	175.80		245	420.80
I	NORVA	40.80		245	285.80
J	PENSACOLA, FL	192.40		245	437.40
K	SFRAN, CA (Okinawa)	565.60	616.00	350	1531.60
L	MOFFETT FLD, CA	570.00		245	815.00
M	NORVA	40.80		245	285.80
N	WASHINGTON, DC	2.60			2.60
O	CLEVELAND, OH	71.20		245	316.20

ID Code	Duty Station/POE	Travel	Outconus Travel	Per Diem	Total Cost
P	HOUSTON, TX	283.60		245	528.60
Q	LG BEACH, CA	534.20		245	779.20
R	SFRAN, CA (Hawaii)	565.60	232.00	350	1147.60
S	NORVA (Keflavik)	40.80	262.00	350	652.80
T	SAN. DIEGO, CA	533.80		245	778.80
U	SFRAN, CA (Guam)	565.60	590.00	350	1505.60
V	SAN DIEGO, CA	533.80		245	778.80

$\bar{x}_{total} = 593.28$; $s_{total} = 386.43$; $\bar{x}_{\bar{x}} = 629.07$; $s_{\bar{x}} = 62.96$

APPENDIX B

GRADE	BP	BAQ	BAS	SUB TOTAL	PV	NET TOTAL
E-7 0/10	9,460.80	+ 2,379.60	+ 954 =	12,794.40	x 1.0	= 12,794.40
E-7 0/10	9,460.80	+ 2,379.60	+ 954 =	12,794.40	x .9091	= 11,631.39
E-7 0/12	9,759.60	+ 2,379.60	+ 954 =	13,093.20	x .8264	= 10,820.22
E-7 0/12	9,759.60	+ 2,379.60	+ 954 =	13,093.20	x .7513	= 9,836.92
E-8 0/14	11,509.20	+ 2,548.80	+ 954 =	15,012.00	x .6830	= 10,253.20
E-8 0/14	11,509.20	+ 2,548.80	+ 954 =	15,012.00	x .6209	= 9,320.95
E-8 0/16	11,808.00	+ 2,548.80	+ 954 =	15,310.80	x .5645	= 8,642.95
E-8 0/16	11,808.00	+ 2,548.80	+ 954 =	15,310.80	x .5132	= 7,857.50
E-9 0/18	13,849.20	+ 2,743.20	+ 954 =	17,546.40	x .4665	= 8,159.08
E-9 0/18	13,849.20	+ 2,743.20	+ 954 =	17,546.40	x .4241	= 7,441.43
NET PRESENT VALUE:						96,758.04
0-1E 0/10	11,959.20	+ 2,091.60	+ 667.32 =	14,718.12	x 1.0	= 14,718.12
0-1E 0/10	11,959.20	+ 2,091.60	+ 667.32 =	14,718.12	x .9091	= 13,380.24
0-2E 0/12	14,886.00	+ 2,602.80	+ 667.32 =	18,156.12	x .8264	= 15,004.22
0-2E 0/12	14,886.00	+ 2,602.80	+ 667.32 =	18,156.12	x .7513	= 13,640.69
0-3E 0/14	18,072.00	+ 2,912.40	+ 667.32 =	21,651.72	x .6830	= 14,788.12
0-3E 0/14	18,072.00	+ 2,912.40	+ 667.32 =	21,651.72	x .6209	= 13,443.55
0-3E 0/14	18,072.00	+ 2,912.40	+ 667.32 =	21,651.72	x .5645	= 12,222.40
0-3E 0/14	18,072.00	+ 2,912.40	+ 667.32 =	21,651.72	x .5132	= 11,111.66
0-3E 0/14	18,072.00	+ 2,912.40	+ 667.32 =	21,651.72	x .4665	= 10,100.53
0-4 0/18	20,584.80	+ 3,229.20	+ 667.32 =	24,481.32	x .4241	= 10,382.53
NET PRESENT VALUE:						128,792.06

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