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ABSTRACT

This is a report of a 5-day research training session held in New York City from January 30 to February 3, 1971 under the sponsorship of the American Educational Research Association (AERA) with support from the U.S. Office of Education. The purpose of the training session was to develop and improve research competencies of individuals engaged in counseling, counselor education, and related research. The program purpose was implemented in two primary aims: developing the participants' understanding of systems research principles and concepts, and helping participants acquire proficiency in systems research skills and techniques. Twenty-two trainees were selected to participate in the training session. Program activities included didactic instruction, individualized and group activities, and supervised practice. Immediate evaluation using internal criterion measures revealed attainment of program objective at or near performance level. Follow-up will be conducted to assess long-range results. Program evaluation indicated satisfaction with all aspects of organization and administration of the training session, with the exception of allocation of time and physical facilities toward which the participants did not show consensus as to satisfaction. Appendixes include related program material. (Author)

FINAL REPORT

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1971 AERA Research Training Program

AMERICAN EDUCATIONAL RESEARCH ASSOCIATION

May, 1972

U.S. Department of

Health, Education and Welfare

Office of Education

FINAL REPORT

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1971 AERA RESEARCH TRAINING SESSIONS

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for the

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May 1972

The research reported herein was performed pursuant to a grant with the Office of Education, U.S. Department of Health, Education, and Welfare. Contractors undertaking such projects under government sponsorship are encouraged to express freely their professional judgement in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official Office of Education position or policy.

U. S. DEPARTMENT OF
HEALTH, EDUCATION AND WELFARE

Office of Education

ACKNOWLEDGEMENTS

A training program centered on increasing the research competencies of highly trained educators requires the concentrated efforts of many concerned individuals especially when the training is to add to the skills already possessed by the participating students. As in past years, AERA was again able to recruit the services of an exceptionally able staff of directors and instructors. The author of this report wishes to acknowledge the efforts of the numerous individuals who made possible the conduct of the 1971 AERA Research Training Sessions. Prominent among these, of course, were the directors and the staff members of the training sessions. These individuals devoted far beyond the required energy in order to insure high quality of the training programs. The names of these individuals are cited in the report.

Another group which must be commended is the 1971 AERA Presessions Committee. These scholars exercised their responsibilities to make policy decisions and select top caliber training programs. The subsequent evaluations of the training sessions by participants suggest that the committee performed its selection task with considerable skill.

Finally, the central staff of the American Educational Research Association, led by Richard A. Dershimer should receive special acknowledgement. Without the constant guidance and support of Gary E. Hanna and Michael J. McCormick, the excellent outcomes of the individual presessions could not have been attained. In many respects it is not possible to indicate how much Mr. Hanna contributed of his time and ability to make the presessions successful. Both of these men worked diligently to insure that the training sessions were supported properly, both administratively and financially, at all times.

I wish now to give special recognition to the work of Miss Donna Durgin of the AERA central staff. Miss Durgin's careful and thoughtful attention to the myriad of planning details prior to and during the presessions had a significant and beneficial effect on the entire activity. Subsequent to the presessions she has generously contributed to the organization preparation of this final report. I am deeply indebted to her.

Joe L. Byers
December 14, 1971
East Lansing, Michigan

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FINAL REPORT

AERA 1971 Research Training Sessions

This is a final report of the AERA 1971 Research Training Sessions. This report includes the following sections: 1) background of training session activity, 2) overview of 1971 training session activity, 3) director's report and evaluation of each session, 4) the final fiscal report, and 5) long term evaluation.

The training sessions were scheduled in conjunction with the Annual Meeting of the American Educational Research Association in New York. Eight five-day intensive training sessions were staged prior to the February 4-7, 1971 Annual Meeting.* Six of the training sessions were held in the New Yorker Hotel in New York City, one was held at the Greyston House, Columbia University and one was held at the Educational Testing Service, Princeton, New Jersey. All of the sessions were scheduled concurrently from January 30-February 3, 1971 under the supervision of Dr. Joe L. Byers, Director of the Research Training Program, 1971.

Objectives The training sessions are designed to improve the substantive knowledge and research skills of experienced educational researchers. Many of the research training programs funded by the Office of Education to date have been directed toward the training of new researchers. Few of these programs are suited to the needs of individuals who have completed their formal professional training and who, in turn, are training new researchers. Recent advances in methodological and substantive issues in educational

*The original proposal requested partial support for ten sessions. Two of those session directors declined to hold the sessions when notified that the sessions would be partially self-sustaining.

research necessitate that every educational researcher continue to receive research training. The AERA Research Training Sessions are designed to meet this need. The objectives of the AERA Research Training Program are best expressed in the following statement issued by the 1968 Presessions Committee and reaffirmed by the 1971 Program Committee:

> "Supervised training in the technical skills used by the educational researcher is generally available to him only at considerable expense and inconvenience once he has completed his graduate education and has assumed full professional responsibilities. Often he must leave his work for an extended period of time and travel to find those competent to instruct him. Much of the expense and inconvenience can be spared him if instruction in research skills is condensed into short training sessions held either before or after the Annual Meeting of AERA."

> "The purpose of the AERA Research Training Session Program is to train educational researchers in fundamental research skills, e.g., experimental design, statistical analysis, survey techniques, measurement theory and techniques, electronic data processing, the functions of the computer in research and research management. The Research Training Sessions are intended to be instructional or <u>disseminative</u> of established research techniques as opposed to <u>generative</u> of new substantive problems or directions for research in some particular area. The latter function is considered to be the purpose of symposia and conferences and hence, it falls within the scope of the Annual Meeting of AERA and the activities of other professional organizations."

> "Preference for participation in any Research Training Sessions will be given to researchers who hold a doctorate. This decision was made on the assumption that persons not holding a doctorate still have ample opportunities to improve their research skills while pursuing an advanced degree. On the other hand, the character of graduate education makes it relatively inaccessible to persons holding a doctorate who have assumed full professional responsibilities."

The 1971 AERA Research Training Sessions can trace their origins to informal meetings of one or two days duration involving a relative number of selected researchers prior to the 1964 and 1965 Annual Meetings. These sessions were not widely publicized and did not have the training of researchers as their primary mission. In 1966 the prototypical "presession" was held as one of a group of three meetings in the tradition of the previous preconvention meetings. The 1966 presession which set the precedent for future research training sessions, under the direction of Richard E. Schutz, dealt with the subject of experimental design. It was the first five-day presession sponsored by AERA and was, in addition, the first formal research training program completed under Title IV of the Elementary and Secondary Education Act of 1965.

Because of the success and acceptance of the 1966 presession, coupled with a growing interest of AERA members in the possibility of expanding and formalizing other presession meetings, AERA sponsored a program of six courses in the 1967 presessions program. The 1967 presession program was supported in part by a grant from the U.S. Office of Education under Title IV of ESEA, 1965. Approximately 500 researchers applied for the program and somewhat more than 300 researchers actually participated.

The highly positive response to the 1967 presession program led to greatly expanded programs of eleven presessions in 1968; twelve sessions in 1969; and ten in 1970. All were supported in part by grants from the U.S. Office of Education under Title IV of ESEA, 1965. The number of participants increased from 300 in 1966 to 550 in 1967 and 1968 and over 400 in 1970. Approximately seventy-five percent of the applicants were employed in college or university positions. Sixty-five percent of the applicants possessed doctorate degrees and thirty-two percent held the master's degree. Information on research productivity revealed that the applicants had an average of 3.8 published articles in scholarly journals, and had directed an average of one funded research project.

During the five years in which AERA has conducted Research Training Sessions the response to these sessions has been consistently high. Applicant response reflects the need felt by educational researchers for the kind of re-training provided by the research training program. Due to the cutbacks in federal funding for general educational research, development and training programs, it is essential that programs such as the AERA research training sessions be continued.

In the winter of 1970 AERA President Dr. R. M. Gagné appointed the Research Training Presession Committee. Its members were drawn from each of the divisions of the Association. The individuals selected were Dr. Donald Willower, Pennsylvania State University; Dr. John S. Mann, John Hopkins University; Dr. Thomas J. Shuell, State University of New York, Buffalo; Dr. Calvin Dyer, University of Michigan; Dr. Ray E. Hosford, University of California, Santa Barbara; Dr. Timothy Smith, John Hopkins University; Dr. Elizabeth Cohen, Stanford University; and Dr. Joe L. Byers, Michigan State University, Chairman.

The committee decided to follow the procedures of previous years and publish a "call" for presession training proposals in the Association's newsletter. Accordingly, a notice was placed in the March 1970 issue of the Educational Researcher inviting interested individuals to submit proposals. In addition, various members of the committee whose research competence was outstanding urged colleagues to submit proposals. As a result of these efforts, the committee received twenty-eight proposals to evaluate.

As proposals were received they were screened by the chairman and sent to a Divisional representative for detailed review. He in turn obtained

additional evaluations from trusted colleagues. Each proposal was rated by the following ten criteria:

1. The general capability and experience of the director and his staff.
2. The adequacy of the staff in terms of size and distribution of skills demanded by the objectived set forth in the training proposal.
3. The importance or need for additional training on the topic.
4. The appropriateness of the topic and goals to the presession training format.
5. The clarity and specificity of the objectives.
6. The relevance of the objectives to general goals.
7. The appropriateness of the objectives for the expected audience.
8. The clarity and extent of instructional planning and its relevance to the objectives.
9. The adequacy of the evaluation procedures proposed.
10. The general value of the topic to educational research.

The divisional representative took the comments of his advisors along with his own judgments on each proposal and brought them with him to the meeting of the committee held in July 1970 in Chicago.

When the committee met each proposal was presented by the divisional representative who had evaluated it. It was then discussed by the committee as a whole. Each proposal was then rated on its merits for tentative support or rejection. Following this first round in which proposals lacking substantive merit were eliminated a ranking of the remaining proposals was made. Factors contributing to this final ranking were 1) newness of the topic and 2) breadth of divisional and/or topic representation. The committee believed that presessions which had been sponsored several times in the past should not be ranked as high as those involving a new topic or methodology. Also the committee tried to provide a program of presession topics covering a broad spectrum of divisional interests. With these criteria in mind, the committee

selected the eight proposals for AERA sponsorship.

The titles and names of the directors of the eight sessions held this year are as follows:

1. Systems Research for Counseling and Educational Environments
   T. Antoinette Ryan, University of Hawaii

2. Educational Objectives; Formulation, Appraisal and Assessment
   W. James Popham and Eva L. Baker, UCLA

3. The Psychology of Written Instruction
   Ernst Rothkopf and Lawrence Fräse, Bell Telephone Labs.

4. Nonparametric Methods and Related Post Hoc Procedures
   Maryellen McSweeney and Andrew C. Porter, Michigan State

5. Operations Analysis Techniques in Educational Planning and Administration
   George S. Tracz, OISE and James E. Bruno, UCLA

6. Individual Differences, Learning and Instruction
   Frank H. Farley, University of Wisconsin

7. Multivariate Statistical Analysis in Educational Research
   Charles E. Woodson, University of California, Berkeley

8. The Research Component of Black Studies
   LaMar P. Miller, New York University

Evaluation Similar training sessions have been held, with USOE financial assistance, for five years. This year's training sessions were the Association's first attempt at self-sustaining research training programs. A $50.00 registration fee was assessed of participants in the 1971 training sessions, and a proposal for partial funding to cover the remaining costs was submitted to both the USOE and the NSF. Despite the $50.00 registration fee the attendance rate for this year's sessions was neither more or less than previous years. The average drop-out rate (cancellations included) for the 1971 sessions was 11%. 365 of the 413 accepted applicants actually attended the sessions. (Comparative statistics on the drop-out rate of previous years are not available). Attached is a chart of the sources of the registration fee. Three categories of payment sources are indicated. Because not all

participants had paid by the date of this analysis, the total number of payments does not equal the total number of participants.

In addition to the immediate post session evaluation conducted by each presession director and described in his report, the Association conducted a long term follow-up evaluation of the participants. This evaluation, conducted by mail, attempted to determine the long term (nine-month) consequences of the presession experience on the scholarly activities of its participants. This evaluation is included in the report.

FINAL REPORT

AMERICAN EDUCATIONAL RESEARCH ASSOCIATION 1971 PRESESSION

SYSTEMS RESEARCH FOR COUNSELING AND EDUCATIONAL ENVIRONMENTS

T. A. Ryan

University of Hawaii

March, 1971

The research reported herein was performed pursuant to a subcontract with the American Educational Research Association. Points of view or opinions stated do not, therefore, necessarily represent official American Educational Research Association position or policy.

SUMMARY

This is a report of a five-day research training session, held in New York City, New York from January 30 to February 3, 1971 under sponsorship of the American Educational Research Association with support from U. S. Office of Education. The purpose of the training session was to develop and improve research competencies of individuals engaged in counseling, counselor education, and related research. The program purpose was implemented in two primary aims: (1) developing participants' understanding of systems research principles and concepts, and (2) helping participants acquire proficiency in systems research skills and techniques.

Twenty-two trainees were selected to participate in the training session. Program activities included didactic instruction, individualized and group activities, and supervised practice.

Immediate evaluation using internal criterion measures revealed attainment of program objective at or near performance level. Follow-up will be conducted to assess long-range results. Program evaluation indicated satisfaction with all aspects of organization and administration of the training session, with the exception of allocation of time and physical facilities towards which the participants did not show consensus as to satisfaction.

I. Introduction

A. Problem

This is a report of a five-day research training session conducted in New York City, New York from January 30 to February 3, 1971. The session was one of eight research training programs sponsored in 1971 by American Educational Research Association with support from U. S. Office of Education for the purpose of achieving improvement in education through research. The presessions were designed to meet the needs of individuals whose full-time professional responsibilities preclude possibility of long-term training in specialized and advanced research techniques. The presession in systems research was designed to meet research needs of counseling personnel, counselor educators, educational psychologists and researchers in related areas.

B. Statement of Need

The need for improvement and innovation in counseling, counselor education and related areas has intensified as social, political and economic factors have created new problems and greater challenges for the educational community (McDaniels, 1967; Riccio and Walz, 1967; Stoughton, 1965; Wolfbein, 1967). With the adoption of standards for counselors and counselor educators the need for research skills was intensified (American School Counselor Association, 1965; Association for Counselor Education and Supervision, 1965). The standards carry an implicit mandate to the profession to make a searching analysis of goals and study of the ways in which to achieve goals most effectively. The research training session was designed to equip selected personnel with the research skills needed to implement needed innovations and improvement in the field.

C. Rationale

Counseling, counselor education, and related educational programs can be conceptualized as systems. Therefore, it can be assumed that improvement in counseling, counselor education, and related educational programs can be achieved through application of techniques of systems research to these areas of educational endeavors.

In counseling, counselor education, and related areas these are needs to investigate problems and to arrive at best possible solutions to these problems. The systems research techniques of analysis, synthesis, modeling, and simulation can be employed to meet these needs.

The acquisition of proficiency in using systems techniques can be accomplished in a short-term training session.

D. Purpose and Objectives

The purpose of the presession was to improve counseling, counselor education, supervision, and related areas through research. The program is designed to train selected participants in use of systems approach for planning and evaluating counseling, counselor education, supervision, and related areas.

Two primary aims implemented the program purpose:

(1) development of participants' knowledge and understanding of systems research concepts and principles.

(2) development of participants' proficiency in using systems techniques for planning and evaluating counseling and counselor education.

Objectives implementing the presession were:

(1) given a multiple choice objective test, participants would demonstrate understanding of systems research concepts by being able to select from alternative endings to one ending which best completed the statement of definition or illustration of basic systems concepts such as system, analysis, synthesis, simulation, model, anasynthesis, flowchart, synergism, logistics, and fidelity, with an acceptable performance level set at 80 percent correct responses in a given time period.

(2) given a multiple choice objective test, participants would demonstrate understanding of principles of systems research by selecting from among alternatives the one ending which best completed statements of principles or illustrates principles such as the rules for coding, lettering, and signal paths, with acceptable performance level set at 80 percent correct responses in a given time period.

(3) given a narrative description of a problem situation the participant would be able to convert this word description into a flowchart model with correct element identification, use of symbols, descriptors, signal paths, blocks, coding and lettering, with acceptable performance level in a given time limit set at 80 percent agreement with problem solution.

(4) Given a flowchart model of a problem situation, the participant would be able to convert this model into a narrative description, with acceptable performance level in a given time period set at 80 percent agreement with problem solution.

(5) given criteria for defining behavioral objectives, and a set of objectives, participants would be able to determine which objectives were stated in behavioral terms and the extent to which criteria for defining objectives behaviorally were satisfied.

II. Method

A. Design

The training program was designed to provide an integrated sequence of learning experiences. It was assumed that achievement of program objectives would be related to (1) participant selection; (2) information presented; and (3) practice provided.

Selection of participants was made to obtain a highly homogeneous group. Amount of kind of information presented to participants were controlled through use of assigned readings, media, staff presentations, and instructional materials. The amount and kind of practice were controlled through the schedule and sequence of practice sessions, use of graduated practice exercises, and staff supervision of individualized and group problem-solving activities.

The research training program was five days in length, from January 30 to February 3, 1971. Daily sessions were held from 8:00 A.M. to 5:00 P.M. Staff were available to provide individualized instruction or consultative services in the evenings.

B. Participants

There were numerous applicants for the presession on systems research in counseling, counselor education and related areas. The maximum number of enrollees which could be accepted was twenty-two, since training packets were utilized in the program and only twenty-two packets were available.

Applications were evaluated on the basis of the following criteria:

(1) Capability for implementing systems research techniques in counseling, counselor education, or related areas.

(2) Potential for developing understanding of systems concepts, and proficiency in using systems techniques.

(3) Interest in acquiring information about and skills of systems research.

Method of Selection

Notice of the eight presessions sponsored by the American Educational Research Association was printed in the December, 1970 issue of Educational Researcher, the official AERA Newsletter. Letters of invitation to participate in the presession on systems research in counseling, counselor education and related areas were mailed by the presession director to a selected list of potential candidates whose background of education and experience satisfied criteria for research training. Respondents

accepting the invitation to participate were pre-enrolled. Applications submitted in response to the public announcement of the presession were evaluated individually as received on the basis of selection criteria. In selecting participants, there was no discrimination on account of sex, race, color, or national origin. Participant roster and ongoing projects are presented in Appendix A.

Each applicant was notified of the action taken on his application. Participants selected for the training session were required to file an Enrollment Form.

Participant Characteristics

Participants came from thirteen states and Canada, included 19 males and 3 females and represented higher education, local school districts, private schools, and government agencies. Out of twenty-two participants, thirteen held the doctoral degree. Distribution of participants by sex, highest educational degree, place and nature of employment is given in Appendix B.

C. Staff

It was assumed that staff competencies and qualifications should be sufficient to allow for effectively (1) presenting information on systems resesarch concepts and principles; (2) showing the relevance of systems research to counseling and counselor education, and related problem areas; and (3) providing supervision and consultative services to individuals and groups engaged in learning activities on systems research.

Presession staff included the director, who implemented project management and instructional functions, and five instructors (See Appendix C).

D. Training Program

The training program designed to achieve presession objectives was five days in length, with daily sessions from 8:00 A.M. to 12:00 NOON, and 1:00 P.M. to 5:00 P.M.

Prior to the start of the presession, training was initiated. Upon receipt of his Enrollment Form, a materials packet was sent to each participant, including seven references for required pre-conference reading, syllabus, reference list and staff directory. The syllabus is given in Appendix D, and the reference list in Appendix E.

The presession opened with an orientation to the program. This was followed by a pretest to determine extent to which terminal objectives might already have been achieved by participants. After completion of the pretest the program included seven major elements (1) presentation of concepts and principles to reinforce pre-conference reading and clarify misunderstandings; (2) initial instruction in skill development; (3) advanced

instruction in skill development; (4) practice in application of systems techniques; (5) post assessment to determine extent to which objectives had been achieved and provide bases for necessary individualized instruction; (6) application of systems techniques to solve a real-life problem; and (7) presentation of models implementing principles and techniques of systems research. The daily schedule is shown in Appendix F.

Activities designed to achieve Aim 1, development of understanding of systems concepts and principles included assigned reading, lectures, slide-tape, and filmstrip-tape presentations, films, individualized activities using programmed materials, and supervised practice on workbook exercises.

Activities designed to achieve Aim 2, acquisition of proficiency in applying systems research techniques included supervised practice on individual and group problems, and supervised practice with advanced exercises.

III. Results

A. Evaluation of Participant Performance

Two measures were taken to evaluate participant performance against program aims: an objective pre- posttest, and self evaluation by participants.

Evaluation of the presession in terms of participant achievement of training objectives was accomplished by comparing pre- and post-instructional performance on a test intended to sample behaviors implementing program aims. The same instrument, which was administered for pre- and post-instruction testing, contained three subjects, all of which were intended to sample behaviors relating to Aim 1, understanding of concepts and principles of systems research. Subtest 1 was concerned with basic concepts and principles of systems theory and research. Subtest 2 was concerned with developing a flowchart model. Subtest 3 was concerned with interpreting another flowchart model.

Table 1 (Appendix G) shows the group profile for mean scores on the pre- and posttest by objective component. The mean scores on all three subjects for the posttest administration showed positive gains as compared to the pre-test mean scores, as indicated by the increase from 15-94 to 17-75 on Subtest 1, 6-67 to 12-06 on Subtest 2, and 13-81 to 15-31 on Subtest 3.

Acceptable performance criteria were defined for Aim 1, developing understanding of systems concepts and principles, this criteria relating to the objectives of the presession where 80 percent agreement with the correct answer in each subset constituted the desired end result. The degree to which the criteria is satisfied is presented in Appendix G, Table 2. Inspection of Table 2 reveals that, for the group as a whole, the performance criteria were met for all three subtests, where the percentages of agreement with the correct answers were 89 percent, 80 percent, and 90 percent respectively. These are significant gains compared to the level of agreement with the correct answers during the pretest in which the percentages were 30 percent, 45 percent, and 82 percent respectively.

No immediate objective test was taken to sample behaviors relating to Aim 2, participant proficiency in applying systems techniques. A follow-up is planned to evaluate the program against this objective.

Self-evaluations against Aims 1 and 2 were taken by eliciting from participants responses to indicate how participants felt about progress they made toward training objectives. Table 3, Appendix G, reports percent of participants who felt a significant gain in knowledge or increase in skill proficiency resulted from participation in the training program.

Inspection of Table 3 indicates 94 percent of participants felt the program resulted in their acquisition of knowledge about systems research, and 88 percent felt the program increased proficiency in using systems techniques.

B. Evaluation of Program Organization and Administration

A program evaluation was made to determine extent to which program components contributed to effectiveness of the presession. Data were gathered to evaluate learning activities, instructional materials, program content, and program organization.

Participants rated program learning activities on a four-point scale to indicate degree to which the activity contributed to achievement of program effectiveness. Mean ratings are reported in Appendix H, Table 4. Examination of the data reported in Table 4 reveals that all activities were rated above the mean expected by chance. The activity deemed most worthwhile was the individual problems, followed closely by individual conferences with staff. Audio-visual presentations were rated lowest.

Evaluation of instructional materials was made by participant rating on a four-point scale of six references which were required for the program. Mean ratings are reported in Appendix H, Table 5. Examination of Table 5 reveals that all references were rated above the chance mean. The reference rated as most worthwhile was Systems techniques for programs of counseling and counselor education by T. A. Ryan, with the next highest rating for Systems design in the development of counseling and guidance programs by R. E. Hosford and T. A. Ryan.

Program content was evaluated by participant rating on a four-point scale of each program unit in terms of contribution to program aims. Mean ratings are reported in Appendix H, Table 6. Inspection of Table 6 reveals that units considered most valuable were Problem: From Real Life Environment, Illustrations of systems research in counseling, testing, school negotiations, counselor education, and Model for producing a systems model. The unit rated lowest was the Nonsense problems. All units were rated above the chance mean.

Program management was evaluated by participant ratings of aspects of program organization and management relating to information, meals and lodging, staff qualifications, time utlization, and climate for learning. Participant ratings of program management are reported in Appendix H, Table 7. Results in Table 7 indicate general satisfaction with program information, living accomodations, staff competencies, and learning climate. There was no consensus regarding facilities and time allocation and utlization, although more regarded the facilities or time factor as satisfactory than unsatisfactory.

IV. Discussion

A. Purpose

The primary purpose of the American Educational Research Association presession on systems research for counseling, counselor education, and related areas was to develop and improve research competencies of counseling specialists, counselor educators, supervisors, educational psychologists, and researchers engaged in research in counseling, counselor education and related areas. The program purposes were implemented in two primary aims: (1) development of participants' knowledge and understanding of systems research concepts and principles; and (2) development of participants' proficiency in using systems techniques for planning and evaluating counseling and counselor education.

B. Results

Analysis of results from criterion tests indicates that the first aim, developing participants' knowledge and understanding of systems principles and techniques was achieved.

Comparison of pre- and posttest scores indicates that participant understanding of concepts and principles increased significantly as a function of the presession training on all three subtests. When performance on the criterion tests is compared against a standard of acceptable performance (Appendix G, Table 2), it is noted that the standard was met for all three subtests for the group as a whole, whereas the level of agreement with the correct answers was only marginal before the presession. No test was administered to assess understanding of behavioral objectives. This is based on the rationale that the nature of the program assumed an initial understanding of these concepts[1] and therefore included only a minimum of learning activities aimed at developing or increasing understanding of behavioral.

No direct measure was taken to assess participant progress toward attainment of Aim 2, developing proficiency in using skills and techniques

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[1] The program of instruction in the presession assumes a prior understanding of certain basic concepts and principles, and ability to perform certain activities with ease and competence. In order to derive maximum benefit from the training program, participants must have a thorough understanding of the language of systems research, and must be able to operationalize mission goals and to define behavioral objectives. It is assumed that before the presession begins participants will be capable of defining problems, stating objectives in behavioral terms, and identifying alternatives to implement the objectives. The references listed are intended to provide a means by which participants can acquire the prerequisite knowledge and skills which are assumed for this program. Reference annotations are provided to assist in directing reading activities so that optimum use can be made of participants' reading time prior to the start of the presession. Quoted from page 1, Selected References, AERA-024, February 16, 1970.

of systems research. Evaluating participants against this objective calls for performance testing, which was not attempted in the training session. A follow-up will be conducted to attempt to get an index of participant proficiency in terms of quality and quantity of skill implementation in the real life environment. An indirect measure was taken to give an immediate indication of the extent to which this aim may have been achieved. This was done through participant self-evaluation against the criterion and staff rating. The self evaluations by participants revealed that 88 percent felt they had acquired a significant amount of proficiency in using systems skills and techniques. This impression was confirmed by staff observation.

The evaluation of program management suggests that all learning activities were meaningful and contributed to achieving program goals. The participant rating of reading materials suggests that the selection of references for the course was viable as well as worthwhile. All ratings were above the chance mean. Participants liked working on Individual Problems best and found as most valuable reading Systems techniques for programs of counseling and counselor education by T. A. Ryan. In terms of program unit, the Problem: From Real Life Environment was most preferred.

Responses to the program management evaluation generally reflect a desire for more time, especially in respect to individualized activities and to meeting with staff. This suggests the possibility of offering a seven-day training session, which might be given at a time other than immediately preceding the annual meeting. It is suggested that the desire on the part of participants for more time reflects a desire for more training, rather than management weakness.

There was some dissatisfaction with the physical facilities. This reflects the reaction to unscheduled moves, lack of facilities for effective use of audio-visual equipment, poor ventilation, inadequate lighting, overcrowding, high noise interference, and related inconvenience and obstacles to learning. Aside from the negative physical facilites, the climate for learning appeared to be conducive to reaching program goals.

The participant comments to an outside evaluation (Appendix I) suggest that insufficient time was spent on individualized instruction and problems and perhaps too much time on group activities and certain basic concepts. Preference was also stated for more feedback from the staff. The staff assistance problem was largely a function of bad physical setup, and could be overcome with ease given more adequate facilities. Many participants also deemed the presession stimulating and worthwhile.

In general the evidence suggests that the program was viable and attainment of the long range goals, improvement of education through research, should be realized.

APPENDICES

APPENDIX A

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EDUCATION RESEARCH AND DEVELOPMENT CENTER — 1776 University Avenue

AMERICAN EDUCATIONAL RESEARCH ASSOCIATION 1971 PRESESSION
SYSTEMS RESEARCH FOR COUNSELING AND EDUCATIONAL ENVIRONMENTS

January 30 - February 3, 1971
New Yorker Hotel, New York

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The Ontario Institute for Studies in Education
10 S. Algoma Street
Thunder Bay, Ontario, Canada

10. Dr. Halas L. Jackim
Professor of Education
State University of New York
Oswego, New York 13126

11. Dr. Robert Morgan
Director of Counseling Services
Bedford School System
Bedford, Massachusetts 07130

12. Dr. P. Kenneth Morse
Associate Professor of Dental Education
Medical College of Georgia
Augusta, Georgia 30904

13. Dr. Dennis E. Nelson
Assistant Professor of Education
Prarie View A & M College
5303 Lookout Mountain Drive
Houston, Texas 77040

14. Dr. Ralph E. Packard
Director, Counseling Center
University of Utah
Salt Lake City, Utah 84112

APPENDIX B

PARTICIPANT CHARACTERISTICS

Sex	Number
Male	19
Female	3

Education	Number
Ph. D.	13
Other	9

Place of Residence

Region	State	Number
East		
	New York	6
	New Jersey	1
	Massachusetts	1
	Connecticut	1
Southwest		
	Texas	3
Southeast		
	Georgia	1
	Florida	1
Midwest		
	Illinois	2
	Indiana	1
	Wisconsin	1
	Ohio	1
	Kansas	1
West		
	Utah	1
Canada		
	Ontario	1
		22

Nature of Employment

Employer	Position	Number
Higher Education		
	Professor	3
	Assoc. Professor	2
	Asst. Professor	3
	Director	5
	Coordinator	1
	Chairman	1
	Counselor	1
Public School		
	Director	3
	Coordinator	1
	Associate	2
		22

APPENDIX C

UNIVERSITY OF HAWAII — Honolulu, Hawaii 96822
EDUCATION RESEARCH & DEVELOPMENT CENTER — 1776 University Avenue

AMERICAN EDUCATIONAL RESEARCH ASSOCIATION 1971 PRESESSION
SYSTEMS RESEARCH FOR COUNSELING AND EDUCATIONAL ENVIRONMENTS

January 30 - February 3, 1971
New Yorker Hotel, New York

STAFF DIRECTORY

Director

T. A. Ryan, Researcher/Professor, Education Research and Development Center, University of Hawaii, Honolulu, Hawaii 96822

Staff

Donald G. Hays, Director, Pupil Personnel Services, Fullerton Union High School District, District Education Center, 211 West Commonwealth Avenue, Fullerton, California 92632

Ray E. Hosford, Associate Professor of Education, University of California, Santa Barbara, California 93106

Leonard C. Silvern, President, Education and Training Consultants Company, 12121 Wilshire Boulevard, Los Angeles, California 90025

Norman R. Stewart, Professor, College of Education, Department of Counseling, Personnel Services and Educational Psychology, 448 Erickson Hall, Michigan State University, East Lansing, Michigan 48823

Bob B. Winborn, Professor, College of Education, Department of Counseling, Personnel Services and Educational Psychology, 436 Erickson Hall, Michigan State University, East Lansing, Michigan 48823

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APPENDIX D

UNIVERSITY OF HAWAII — Honolulu, Hawaii 96822
EDUCATION RESEARCH AND DEVELOPMENT CENTER — 1776 University Avenue

AMERICAN EDUCATIONAL RESEARCH ASSOCIATION 1971 PRESESSION
SYSTEMS RESEARCH FOR COUNSELING AND EDUCATIONAL ENVIRONMENTS

January 30 - February 3, 1971
New Yorker Hotel, New York

SYLLABUS

I. Nature of Presession

A. Description

1. This presession in systems research is one of eight research training sessions offered in 1971 by American Educational Research Association. The 1971 Presessions are self-supporting. There is a $50 enrollment fee for each participant.

2. This training session is designed as an advanced program focusing on the use of systems research for planning and evaluating counseling, counselor education, supervision and related programs.

3. The program has been planned to equip counseling specialists, counselor educators or supervisors, educational psychologists, and researchers performing substantive research in counseling, counselor education, supervision or related areas with practical skills and theoretical knowledge essential for implementing systems research at local district, state department or university levels.

4. The course of study deals with conceptualization of systems research, application of systems research, techniques of systems research, and practical uses of systems research.

B. Staff

1. Director: T. A. Ryan, University of Hawaii

2. Instructors: Donald G. Hays, Union High School District, California
Ray E. Hosford, University of California, Santa Barbara
Leonard C. Silvern, Education and Training Consultants, Company, Los Angeles
Norman R. Stewart, Michigan State University
Bob B. Wilborn, Michigan State University

C. Participants

The session will be open to individuals in public schools, state departments of education, and colleges and universities who satisfy the following criteria:

1. Employment as counseling specialists, counselor educators or supervisors educational psychologists, or researchers with responsibilities for performing substantive research in counseling, counselor education, supervision or related areas.

AERA-019
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2. Education and experience background to give evidence of ability to profit from instructional program.

D. Purpose and Objectives

1. ARRA rationale for conducting presessions is based on assumptions that

   a. significant benefits accrue from improved and expanded educational research and

   b. short, intensive in-service training is effective for equipping those in professional roles with advanced knowledge and specialized research skills.

2. Purpose of the presession on systems research is to improve counseling, counselor education, supervision, and related areas through research. This program is designed to train selected participants in use of systems approach for planning and evaluating counseling, counselor education, supervision, and related areas.

3. Primary aims of the presession are:

   a. to develop participants' knowledge and understanding of systems research concepts and principles.

   b. to develop participants' proficiency in using systems techniques for planning and evaluating counseling and counselor education.

4. Objectives implementing the presession aims are:

   a. Given a multiple choice objective test, participants will demonstrate understanding of systems research concepts by being able to select from alternative endings the one ending which best completes the statement of definition or illustration of basic systems concepts such as system, analysis, synthesis, simulation, model, anasynthesis, flowchart, synergism, logistics, and fidelity, with an acceptable performance level set at 80% correct responses in a given time period.

   b. Given a multiple choice objective test, participants will demonstrate understanding of principles of systems research by selecting from among alternatives the one ending which best completes statements of principles or illustrates principles such as the rules for coding, lettering, and signal paths, with acceptable performance level set at 80% correct responses in a given time period.

   c. Given a narrative description of a problem situation, the participant will be able to convert this word description into a flowchart model with correct element identification,

use of symbols, descriptors, signal paths, blocks, coding and lettering, with acceptable performance level in a given time limit set at 80% agreement with problem solution.

d. Given a flowchart model of a problem situation, the participant will be able to convert this model into a narrative description, with acceptable performance level in a given time period set at 80% agreement with problem solution.

e. Given criteria for defining behavioral objectives, and a set of objectives, participants will be able to determine which objectives are stated in behavioral terms and the extent to which criteria for defining objectives behaviorally are satisfied.

II. Program Outline and Activites

A. Outline

1. Systems research

a. concepts and principles
b. definitions
c. background

2. Techniques of systems research

a. analysis
b. synthesis
c. modeling
d. simulation

3. Practice in using systems research

a. general problems
b. counselor education and counseling problems, simple and complex

4. Application of systems research to real-life problem

a. situations identified by participants
b. systems techniques applied to real life situations

B. Activities

1. Program will be intensive and demanding, involving five full workdays in addition to independent study and informal group sessions during evening hours.

2. Activities will include lecture, discussion, demonstration, and task groups.

3. Supervised practice in use of systems research will occupy major part of program, with participants working individually and in groups on prepared problems.

III. Requirements

A. Participation

1. Participants will be required to attend and to participate in daily lecture-discussion periods.

2. Participants will be required to participate in task groups.

B. Reading

1. Reading requirements will be determined according to needs of individual participants. This training program assumes a starting background of prior knowledge and skill proficiency on the part of participants. The reading list has been prepared with this in mind and is intended to serve the purpose of directing participants to sources of information for use in overcoming specific knowledge or skill deficiencies.

2. It is recommended that participants study the references in the Materials Packet. An individualized program of in-depth study should be undertaken by each participant according to individual needs for background knowledge and skill development, so all participants will be starting the program with prerequisite knowledge and skill capabilities needed to benefit from training.

IV. Evaluation

A. Participant evaluation will be based on

1. pre- and posttest of use of basic-principles of systems research covered in the training sessions; and

2. self-evaluation by participants.

B. Program evaluation will be made through participant opinions concerning materials, staff and organization.

APPENDIX E

UNIVERSITY OF HAWAII — Honolulu, Hawaii 96822
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SELECTED REFERENCES*

The program of instruction in the presession assumes a prior understanding of certain basic concepts and principles, and ability to perform certain activities with ease and competence. In order to derive maximum benefit from the training program, participants must have a thorough understanding of the language of systems research, and must be able to operationalize mission goals and to define behavioral objectives. It is assumed that before the presession begins participants will be capable to defining problems, stating objectives in behavioral terms, and identifying alternatives to implement the objectives. The references listed are intended to provide a means by which participants can acquire the prerequisite knowledge and skills which are assumed for this program. Reference annotations are provided to assist in directing reading activities so that optimum use can be made of participants' reading time prior to the start of the presession.

*Banathy, B. Instructional systems. Palo Alto, California: Fearon, 1968.
A good overview of systems approach. Easy reading. Should be studied by everyone to insure thorough understanding of the nature of systems research. The appendix is particularly good.

Boguslaw, R. The new utopians: A study of system design and social change. Englewood Cliffs, N.J.: Prentice-Hall, 1965
An overview of systems approach. Intermediate reading level.

Buckley, W. (Ed.) Modern systems research for behavioral scientists. Chicago: Aldine Publishing Co., 1968.
A collection of articles dealing with systems theory. Advanced reading.

Carter, L. F. Systems approach to education: Mystique or reality. Educational Technology, 1969, 9, 22-31.
Gives an overview of the systems approach, with discussion of pros and cons from using the systems techniques.

Churchman, C. W. The systems approach. New York: Delacorte Press, 1968.
This brief discussion of systems approach gives an excellent overview of the total systems concept, which involves problem identification, objectives definition, alternatives, identification and evaluation. This reference helps to point up the way in which flowchart modeling and simulation techniques implements the systems concept. Should be studied by all participants.

*Items marked with asterisks are included in participants Materials Packet.

Cooley, W. W. and Hummel, R. C. Systems approaches in guidance. Review of Educational Research, 1969, 39, 351-362.
Relates systems techniques to guidance. Easy reading.

Educational Technology, 1969, 9, No. 3, 1-77.
This special issue of Educational Technology is devoted to counseling technology.

Eraut, M. R. An instructional systems approach to course development. AV Communication Review, 1967, 15, 92-101.
Relates the techniques of systems research to course development.

Gagne, R. M. Educational objectives and human performance. In Krumboltz, J. D. (Ed.) Learning and the educational process. Chicago: Rand McNally, 1965. Pp. 1-24.
Discusses definition of objectives. Easy reading.

*Hosford, R. E., and Ryan, T. A. Systems design in the development of counseling and guidance programs. Personnel and Guidance Journal, 1970, 49(3), pp. 221-230.

*Mager, R. F. Preparing instructional objectives. Palo Alto, California: Fearon, 1962.
This book tells how to prepare behavioral objectives. It is mandatory that each participant be able to define objectives in behavioral terms. The principles discussed in this reference must be thoroughly understood by each participant. Each participant must be able to demonstrate proficiency in defining objectives behaviorally. This can be accomplished by concentrated study of this reference, and practice in preparing behavioral objectives. Should be studied carefully by all participants.

* Ryan, T. A. Systems techniques for programs of counseling and counselor education. In Silvern, L. C. (Ed.), Applying systems engineering techniques to education and training. Educational Technology, 1969, 9, 1-17.
This article describes the application of systems techniques in counseling and counselor education. It provides a frame of reference for the presession. Easy reading. Excellent bibliography on systems research. Should be read by all participants. The other articles in this issue of Educational Technology are relevant to the presession topic. Casual reading is recommended.

*Silvern, L. C. Systems engineering of education I: The evolution of systems thinking in education. Los Angeles: Education and Training Consultants, 1968.
This is the basic text for the course. Pages 111-129 should be studied carefully by all participants. The program ssumes that participants will have read this material and have a thorough understanding of the concepts presented in these pages.

*Items marked with asterisks are included in participants' Materials Packet.

*Silvern, L. C. LOGOS: A system language for flowchart modeling. In Silvern, L. C. (Ed.), Applying systems engineering techniques to education and training. Educational Technology, 1969, 9, 18-23.

Contains basic vocabulary for flowchart modeling. Should be studied by all participants.

Thoresen, C. E. The systems approach and counselor education: Basic features and implications. Counselor Education and Supervision 1969.
Discusses the application of systems techniques to counselor education.

von Bertalanffy, L. Modern systems theory. New York: George Braziller, Inc., 1968.
Deals with systems theory. Advanced reading.

Wierner, N. Cybernetics. Cambridge, Mass.: Massachusetts Institute of Technology Press, 1961.
Deals with cybernetics aspect of systems research. Advanced reading.

Wierner, N. Human use of human beings. New York: Doubleday, 1954.
Deals with cybernetics in relation to systems research. Advanced reading.

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SYSTEMS RESEARCH FOR COUNSELING AND EDUCATIONAL ENVIRONMENTS

January 30 - February 3, 1971
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COURSE OUTLINE
(Saturday, January 30, 1971)

Morning

8:00-8:10	Opening	T. A. Ryan
8:10-8:50	Pre-Assessment	T. A. Ryan
8:50-9:05	Introductions	
9:05-9:25	Program Overview: Purposes and Procedures	T. A. Ryan
9:25-10:00	The Systems Approach: Concepts and Principles	T. A. Ryan
10:00-10:20	Recess	
10:20-11:00	Use of Systems Approach in Counseling and Educational Environments	R. E. Hosford
11:00-11:05	Question and Answer Period	
11:05-11:15	Model for Producing a System	Slide Tape
11:15-11:20	Question and Answer Period	
11:20-12:00	Defining System Goals and Objectives	D. G. Hays

Afternoon

1:00-1:40	Behavioral Objectives for Counseling Environments	B. B. Winborn
1:40-1:45	Question and Answer Period	
1:45-2:25	Analysis as a Process	Slide Tape
2:25-2:30	Question and Answer Period	
2:30-3:00	Model for Producing a Model	T. A. Ryan
3:00-3:20	Recess	
3:20-4:30	LOGOS Language for Flowchart Modeling - individualized activity	Slide Tape
4:30-4:50	Question and Answer Period	
4:50-5:00	Closing	

Evening

Assignment: Exercises 1,2,3,4

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12/15/70
Rev: 1/23/71

COURSE OUTLINE

(Monday, February 1, 1971)

Morning

8:00-8:10	Opening	T. A. Ryan
8:10-8:40	Evaluate Solution to Problem B	Staff
8:40-8:45	Task Group Assignment: Problem C, Satellite	T. A. Ryan
8:45-10:00	Task Group Activity	
10:00-10:20	Recess	
10:20-11:00	Task Group Activity	
11:00-11:55	Evaluate Solutions to Problem C: Satellite	L. C. Silvern
11:55-12:00	Closing	

Afternoon

1:00-1:10	Opening	T. A. Ryan
1:10-1:30	Systems Using Synthesis and CAI	L. C. Silvern
1:30-1:45	Question and Answer Period	
1:45-2:15	Reading and Interpreting Flowchart Models. Complex System Level 1: ABEC	L. C. Silvern
2:15-2:30	Question and Answer Period	
2:30-3:00	Reading and Interpreting Flowchart Models. Complex System Level 2: Boeing	L. C. Silvern
3:00-3:20	Recess	
3:20-3:25	Task Group Assignment: Design a Model for Specific Setting	
3:25-4:55	Task Group Activity	
4:55-5:00	Closing	T. A. Ryan

COURSE OUTLINE

(Tuesday, February 2, 1971)

Morning

8:00-8:10	Opening	T. A. Ryan
8:10-8:30	Progress Reports	
8:30-10:00	Task Group Activity	
10:00-10:20	Recess	
10:20-11:50	Task Group Activity	
11:50-12:00	Closing	T. A. Ryan

Afternoon

1:00-1:10	Opening	T. A. Ryan
1:10-3:00	Task Group Activity	
3:00-3:20	Recess	
3:20-4:50	Evaluate Task Group Models	Staff
4:50-5:00	Closing	T. A. Ryan

COURSE OUTLINE

(Wednesday, February 3, 1971)

8:00-8:10	Opening	T. A. Ryan
8:10-9:20	Evaluate Task Group Models	Staff
9:20-10:00	Post Assessment	T. A. Ryan
10:00-10:20	Recess	
10:20-10:40	Program Evaluation	T. A. Ryan
10:40-11:30	Panel: Implications of Systems Approach for Counseling, Guidance Counselor Education and Supervision	D. G. Hays R. E. Hosford N. R. Stewart B. B. Winborn L. C. Silvern, Chairman
11:30-11:45	Open Discussion	
11:45-12:00	Closing Remarks	T. A. Ryan

APPENDIX G

RESULTS OF PARTICIPANT EVALUATION

Table 1

Group Profile of Mean Scores for Pre- and Posttest
By Objective Component

Objective Component	Mean Scores	
	Pretest	Posttest
Systems concepts and principles	15.94	17.75
Develop nonsense flowchart	6.67	12.06
Interpret nonsense flowchart	13.81	15.31
TOTAL	36.42	45.12

Table 2

Performance Criterion Levels for Training Objectives and
Level of Agreement with the Correct Answer by Objective Component

Objective Component	Percent of Agreement with Correct Answer.		
	Criterion Level	Pretest	Posttest
Systems concepts and principles	80	80	89
Develop nonsense flowchart	80	45	80
Interpret nonsense flowchart	80	82	90
MEAN	80	69	86

APPENDIX G

RESULTS OF PARTICIPANT EVALUATION

Table 3

Participant Self Evaluation Describing Perceived Attainment Level for Two Program Aims

Program Aim	Percent of Participants Reaching Four Levels of Attainment of Aims Based on Self Evaluation				
	None	Very Little	Quite a lot	Very Great Amount	No Response
Acquisition of new knowledge about systems research	0	6	59	35	0
Development of proficiency in using systems techniques	0	6	70	18	6

APPENDIX H

EVALUATION OF PROGRAM ORGANIZATION AND ADMINISTRATION

Table 4

Mean Rating of Training Program Learning Activities

	Mean Rating (Md = 3.28)
Lectures	3.18
Individual problems	3.89
Programmed instruction	3.06
Task group assignments	3.24
General discussion	3.29
Readings	3.18
Individual conferences with staff	3.82
Audio-visual presentations	2.59

Table 5

Mean Rating of Training Program Instructional Materials

References	Mean Rating (Md = 3.15)
Banathy, B. Instructional Systems.	3.00
Hosford, R.E. and Ryan, T.A. Systems design in the development of counseling and guidance programs.	3.31
Mager, R.F. Preparing instructional objectives.	2.81
Ryan, T.A. Systems techniques for programs of counseling and counselor education.	3.38
Silvern, L.C. Systems engineering of education I: The evolution of systems thinking in education.	3.18
Silvern, L.C. LOGOS: A system language of flowchart modeling.	3.24

APPENDIX H

EVALUATION OF PROGRAM ORGANIZATION AND ADMINISTRATION

Table 6

Mean Rating of Program Units

Program Unit	Mean Rating (Md = 3.30)
Conceptualization of system in model form	3.29
Model for producing a systems model	3.44
Systems using feedback	3.31
Conceptual analysis and synthesis	3.26
Rules and symbols for flowchart modeling	3.31
Closed loop instructional system	3.20
Problem: Satellite Communication	3.12
LOGOS workbook	3.06
Nonsense problems	2.94
Problem: From Real Life Environment	3.88
Illustrations of systems research in counseling, testing, school negotiations, counselor education	3.50

APPENDIX H

EVALUATION OF PROGRAM ORGANIZATION AND ADMINISTRATION

Table 7

Frequency of Responses on Rating of Program Management

Management Component	Item No.	Description	Frequency of Response on Four Levels of Agreement: Strongly Disagree	Dis-Agree	Agree	Strongly Agree	No Response
Program Information	1.	Pre-program information was adequate for my use in deciding whether or not to apply.	0	2	8	7	5
	2.	Pre-program information accurately described the program offered.	0	3	9	4	6
Living Accommodations	3.	Arrangements for meals and living accommodations were satisfactory.	1	2	12	2	5
Staff Competencies	4.	Qualifications and competencies of staff were satisfactory.	0	0	7	10	5
Time Allocation and Utilization	5.	The balance between formal and informal activities was satisfactory.	0	4	9	4	5
	6.	There was sufficient time for individualized activities.	0	6	6	5	5
	7.	There was sufficient time for group activities.	0	1	9	7	5
	8.	There was sufficient time for meeting informally with other participants.	1	3	9	4	5
	9.	There was sufficient time for meeting with staff.	0	6	6	5	5
Learning Climate	10.	The daily schedule of activities was satisfactory (8:00-5:00).	0	2	11	3	6
	11.	There was opportunity for each participant to express his ideas and views.	0	3	9	5	5
	12.	New acquaintances were made or renewed which will be helpful in future professional work.	0	0	12	4	6
	13.	A presession on this topic should be offered next year.	0	0	5	10	7
	14.	The scope and sequence of learning experiences were satisfactory.	0	1	9	6	6
Facilities	15.	Physical arrangements (room, equipment, lighting) were satisfactory.	1	4	11	0	6
General	16.	The program met my expectations.	0	2	4	10	6

APPENDIX J

References

American School Counselors Association. Statement of policy. In Loughary, J. W., Stripling, R. O., and Fitzgerald, P. W. Counseling, A growing profession. Washington: American Personnel and Guidance Association, 1965. Pp. 93-104.

Association for Counselor Education and Supervision. Standards for counselor education. In Loughary, J. W., Stripling, R. O., and Fitzgerald, P. W. Counseling, A growing profession. Washington: American Personnel and Guidance Association, 1965. Pp. 83-92.

Herr, E. L. Impact of recent student protests and student movements. Counselor Education and Supervision, 1967, 6, 236-247.

Loughary, J. W. New challenges for counselors. In Loughary, J. W., Stripling, R. O., and Fitzgerald, P. W. Counseling, A growing profession. Washington: American Personnel and Guidance Association, 1965. Pp. 43-52.

McDaniels, C. Impact of federal aid on counselor education. Counselor Education and Supervision, 1967, 6, 263-274.

Riccio, A. C., and Walz, G. R. (Eds.) Forces for change in counselor education and supervision. Counselor Education and Supervision, 1967, 6 (Special Issue).

Stoughton, R. W. AGPA and counselor professionalization. In Loughary, J. W., Stripling, R. O., and Fitzgerald, P. W. (Eds.) Counseling, A growing profession. Washington: American Personnel and Guidance Association, 1965. Pp. 1-18.

Wolfbein, S. L. Impact of social and economic change. Counselor Education and Supervision, 1967, 6, 230-235.

Wrenn, C. G. Counselor in a changing world. Washington: American Personnel and Guidance Association, 1962.

Wrenn, C. G. A second look. In Loughary, J. W., Stripling, R. O., and Fitzgerald, P. W. (Eds.) Counseling, A growing profession. Washington: American Personnel and Guidance Association, 1965. Pp. 53-66.

Research Training Session

Educational Objectives:

Formulation, Appraisal and Assessment

W. James Popham & Eva L. Baker, UCLA

FINAL REPORT

1971 AERA PRESESSION NUMBER FIVE; EDUCATIONAL OBJECTIVES: FORMULATION, APPRAISAL AND ASSESSMENT

GENERAL GOALS

THIS PRESESSION WAS PLANNED TO DEVELOP SKILLS IN SELECTING, FORMULATING, AND APPRAISING THE OBJECTIVES OF SCHOOL PROGRAMS. IN ADDITION, RELATED ISSUES, SUCH AS NATIONAL ASSESSMENT, PERFORMANCE CONTRACTING, AND TEACHER ACCOUNTABILITY WERE CONSIDERED.

FACULTY

DIRECTORS: EVA L. BAKER, UNIVERSITY OF CALIFORNIA, LOS ANGELES;
W. JAMES POPHAM, UNIVERSITY OF CALIFORNIA, LOS ANGELES.

STAFF: JOHN D. MCNEIL, UNIVERSITY OF CALIFORNIA, LOS ANGELES;
ROBERT E. STAKE, UNIVERSITY OF ILLINOIS, URBANA;
C. MAURITZ LINDVALL, UNIVERSITY OF PITTSBURGH.

GRADUATE ASSISTANT: ARLENE GROSS FINK, UNIVERSITY OF CALIFORNIA, LOS ANGELES.

OBJECTIVES:

1. PARTICIPANTS WILL BE ABLE TO DISTINGUISH BETWEEN INSTRUCTIONAL OBJECTIVES WITH RESPECT TO WHETHER THEY DO OR DO NOT POSSESS THE FOLLOWING CHARACTERISTICS:

   A. MEASURABILITY
   B. STUDENT MINIMAL LEVEL
   C. CLASS MINIMAL LEVEL
   D. AFFECTIVE, PSYCHOMOTOR, OR COGNITIVE (LOWEST LEVEL OR HIGHER THAN LOWEST LEVEL) BEHAVIOR
   E. CONTENT GENERALITY

2. GIVEN DESCRIPTIONS OR AFFECTIVE MEASURES, PARTICIPANTS WILL BE ABLE TO LABEL THEM CORRECTLY AS (A) DIRECT SELF-REPORT, (B) INFERENTIAL SELF-REPORT, OR (C) OBSERVATIONAL INDICATORS.

3. PARTICIPANTS WILL BE ABLE TO DISTINGUISH BETWEEN PROCEDURES WHICH COULD OR COULD NOT BE USED AS A MEASURE OF AN INSTRUCTIONAL OBJECTIVE'S ATTAINMENT. FOR THOSE WHICH COULD SERVE AS CRITERION MEASURES, THE PARTICIPANT WILL BE ABLE TO CLASSIFY EACH ACCORDING TO A FOUR CATEGORY SCHEME INVOLVING THE FOLLOWING TWO DIMENSIONS: (1) LEARNER BEHAVIOR VERSUS PRODUCT AND (2) NATURAL VERSUS MANIPULATED CONDITIONS.

4. PARTICIPANTS WILL BE ABLE TO IDENTIFY WHETHER GIVEN INSTRUCTIONAL SITUATIONS, TESTS, OR MEASUREMENT PROCEDURES ARE MORE SUITED FOR CRITERION-REFERENCED THAN FOR NORM-REFERENCED MEASUREMENT.

5. PARTICIPANTS WILL BE ABLE TO INDICATE WHETHER CERTAIN OPERATIONS CONCEIVABLY USABLE IN NEEDS ASSESSMENT PROCEDURES ARE ASSOCIATED WITH THE NEEDS ASSESSMENT SCHEMES RECOMMENDED BY (A) STAKE, (B) BAKER-POPHAM, (C) BOTH, (D) NEITHER.

6. PARTICIPANTS WILL BE ABLE TO IDENTIFY, FROM MULTIPLE-CHOICE ALTERNATIVES, SITUATIONS AND/OR OPERATIONS SUITABLE FOR ITEM/PERSON (MATRIX) SAMPLING MEASUREMENT PROCEDURES.

7. PARTICIPANTS WILL DISPLAY AT LEAST MINIMAL KNOWLEDGE OF THE SPECIAL TOPICS (E.G., PERFORMANCE CONTRACTING, TEACHER COMPETENCE ASSESSMENT, AND BEHAVIOR ANALYSIS) TREATED DURING THE PRESESSION BY CORRECTLY ANSWERING MULTIPLE-CHOICE QUESTIONS DEALING WITH THE KEY ASPECTS OF THESE TOPICS.

8. PARTICIPANTS WILL BE ABLE TO ALTER GIVEN OBJECTIVES SO THAT THEY POSSESS ANY OF THE CHARACTERISTICS (A THROUGH E) DESIGNATED IN OBJECTIVE 1 ABOVE.

9. GIVEN GENERAL INSTRUCTIONAL GOALS, BOTH COGNITIVE AND NONCOGNITIVE, PARTICIPANTS WILL BE ABLE TO GENERATE A WIDE VARIETY OF MEASURABLE INSTRUCTIONAL OBJECTIVES WHICH MIGHT BE EMPLOYED TO OPERATIONALIZE SUCH GOALS.

10. PARTICIPANTS WILL BE ABLE TO DEVELOP A SIMPLE BEHAVIOR ANALYSIS GIVEN A DESIRED TERMINAL LEARNER BEHAVIOR.

11. GIVEN FICTITIOUS DESCRIPTIONS OF EDUCATIONAL PERSONNEL ENGAGED IN THE FORMULATION, APPRAISAL, AND/OR ASSESSMENT OF INSTRUCTIONAL OBJECTIVES, PARTICIPANTS WILL BE ABLE TO IDENTIFY SPECIFIC PRACTICES NOT CONSONANT WITH PROCEDURES RECOMMENDED DURING THE PRESESSION.

12. PARTICIPANTS WILL BE ABLE TO PREPARE DRAFTS OF ITEM FORMS WHICH INCLUDE THE FOLLOWING ATTRIBUTES: TASK DEFINITION, CONTENT LIMITS, ITEM FORMAT, CRITERIA, AND SAMPLE ITEMS.

PROCEDURE:

PRIOR TO THE PRESESSION, THE PARTICIPANTS RECEIVED A STATEMENT OF GENERAL AND SPECIFIC GOALS AS WELL AS A SCHEDULE INCLUDING TOPICS AND INSTRUCTORS.

MATERIALS:

MAJOR MATERIALS DISTRIBUTED:

A) SAMPLES OF THE INSTRUCTIONAL OBJECTIVES EXCHANGE COLLECTIONS, E.G. ATTITUDE TOWARD LEARNING, MEASURES OF SELF-CONCEPT.
THESE COLLECTIONS INCLUDE INSTRUCTIONAL OBJECTIVES AND RELEVANT TEST ITEMS.

B) WRITTEN PRACTICE EXERCISES

C) SIMULATION EXERCISES

D) SELECTED BIBLIOGRAPHY

E) REPRINTS OF DATA OBTAINED WHILE WORKING WITH INSTRUCTIONAL OBJECTIVES

F) REPRINTS OF JOURNAL ARTICLES

PARTICIPANTS:

OF THE NINETY-ONE PARTICIPANTS, APPROXIMATELY 50% HAD UNIVERSITY-AFFILIATED POSITIONS, 30% WERE RESEARCH CONSULTANTS OR CO-ORDINATORS, AND THE REMAINDER WERE DEANS, PRINCIPALS OR SUPERVISORS IN PUBLIC AND PRIVATE SCHOOLS.

Schedule

Saturday, January 30:

The morning was devoted to pretesting and to discussion of the historical evolution of objectives and a review of basic concepts. Participants' tests were immediately scored, results discussed and modifications in the schedule were made.

In the afternoon, affective goals and non-reactive measures were analyzed.

The evening session was an optional informal discussion session. While practice sessions were planned for the evening, the high pretest performance suggested that an open discussion would be more appropriate.

Sunday, January 31:

In the morning, criterion-referenced measurement, item forms and item/person sampling were treated.

The afternoon session was devoted to simulation sessions in which participants devised objectives and measures, and had their products reviewed.

The evening topic was concerned with the role of objectives in teacher competence assessment and instructonal supervision.

Monday, February 1:

Educational needs assessment and the establishment of priorities among competing objectives constituted the bulk of the morning discussions.

The afternoon session involved an analysis of objectives and the means by which they can be sequenced to optimize individually prescribed instruction.

The afternoon session culminated in a cocktail party, sponsored by the Instructonal Objectives Exchange, and which included presession participants, staff, as well as staff from other presessions.

In the evening, national assessment was discussed and analyzed.

Tuesday, February 2:

The role of objectives in contemporary evaluation models and the use of

OBJECTIVES IN FORMATIVE AND SUMMATIVE EVALUATION WERE DISCUSSED IN THE MORNING.

THE USE OF OBJECTIVES IN DEVELOPING LESSON MATERIALS WAS DISCUSSED IN THE AFTERNOON SESSION.

LACK OF ROOM AVAILABILITY PRECLUDED AN EVENING SESSION.

WEDNESDAY, FEBRUARY 3:

THE MORNING WAS DEVOTED TO A DISCUSSION OF NEEDED RESEARCH. THE PRESESSION WAS SUMMARIZED, AND THE PARTICIPANTS RECEIVED THE POSTTEST.

THE POSTTEST RESULTS WERE RETURNED IN THE AFTERNOON.

EVALUATIONS

1) THE PARTICIPANTS RECEIVED A PRETEST AND A POSTTEST. THE RESULTS BY OBJECTIVE WERE:

OBJECTIVE	PRETEST	POSTTEST
1A	80%	91%
1B	75	92
1C	70	73
1D	83	94
1E	70	79
2	74	75
3	63	63
4	69	87
5	26	42
6	27	67
7	39	66

OBJECTIVES 8 THROUGH 12 WERE EVALUATED AS FOLLOWS: AN IDENTICAL ITEM FOR EACH OBJECTIVE WAS USED IN THE PRETEST AND POSTTEST, SINCE ALL ITEMS REFLECTED CONSTRUCTED RATHER THAN SELECTED RESPONSES. PARTICIPANTS WERE ASKED TO IDENTIFY THEIR TESTS BY USING THEIR MOTHER'S MAIDEN NAME. A SMALL SAMPLE OF TEST PAPERS WERE THEN RANDOMLY SELECTED AND PAIRED SO THAT A PRETEST AND POSTTEST WAS AVAILABLE FOR EACH OF 5-10 PARTICIPANTS. THESE FORMS WERE CODED ("PRETEST OR POSTTEST") BY THE PRESESSION GRADUATE ASSISTANT, THEN GIVEN TO THE STAFF MEMBER RESPONSIBLE FOR EACH OBJECTIVE WHO, WITHOUT KNOWING WHICH WAS PRETEST OR POSTTEST, SCORED ONE PAPER IN

EACH PAIR AS SUPERIOR. FOR ALL FIVE OBJECTIVES, 80% OR BETTER OF THE POSTTEST RESPONSES WERE SCORED AS SUPERIOR.

2) THE EVALUATION FORM COMPLETED BY THE PARTICIPANTS WAS THE OFFICIAL FORM GIVEN TO ALL 1971 PRESESSIONS.

THE RESULTS WERE SUMMARIZED AS FOLLOWS---

AERA 1971 Research Training Sessions

Evaluation by Participants

NAME OF SESSION: OBJECTIVES

DIRECTOR: POPHAM

****

1A. To what extent did the relative availability or unavailability of books and journals interfere with or promote your attempts to master the content of this session?

NONE 54% LITTLE 29% SOME 17%

1B. To what extant did reproduced materials given to you by the staff improve matters?

HELPFUL 62% VERY HELPFUL 38%

2A. Did you feel that you lacked a "place to work", either alone or in small groups?

YES 41% NO 51% No COMMENT 8%

2B. Was your room satisfactory?

YES 46% NO 46% No COMMENT 8%

3A. Which features of the meeting rooms were inadequate or not conducive to learning?

BLACKBOARDS _____ LACK OF OVERHEAD PROJECTOR _____

SIZE _____ FURNISHINGS _____

LIGHT _____ MISCELLANEOUS. _____

AIR ✓ (cold)

3B. Which features were especially facilitative in the same regard?

LIGHT _____ AIR _____

SOUND _____ FURNISHINGS _____

CONVENIENCE ✓ No COMMENT _____

4A. Was five days too long a period to leave your work at home for the purpose of attending this session?

YES 32% NO 68%

4B. Was five days too short a period in which to learn much of the content of this session?

YES 2% NO 98%

5A. Were you allowed enough time in which to pursue activities of your own choosing?

YES 59% NO 27% No COMMENT 14%

5B. Would you have preferred not to meet in the evening after dinner?

YES 22% NO 43% No COMMENT 35%

5C. Would you have preferred more of fewer meetings per day than there actually were or was the number of meetings per day agreeable to you?

FEWER 3% ENOUGH 90% MORE 7%

6A. Were the individual lectures too long to sit and listen or take notes?

YES 7% NO 93%

6B. Were the lectures scheduled in an appropriate sequence?

YES 65% NO 35%

7. Did you have sufficient opportunities to interact with other participants?

YES 71% NO 29%

8A. Were the instructors too inaccessible or unapproachable so that you did not get the individual attention that you desired?

YES 7.5% NO 87.5% No COMMENT 5%

8B. Was it helpful to have graduate student assistants present?

YES 57% NO 5% No COMMENT 38%

16. Do you feel that AERA is making an important contribution to education by sponsoring sessions such as this one?

YES 100% NO

17. Do you feel that anything has happened during these five days to make it more likely that you will leave your present position of employment?

YES 71% NO 93%

18. Is it likely that you will collaborate in research with someone else attending this session (other than those you already were likely to collaborate with)?

YES 32% NO 68%

19. Do you think that the staff should feel that it has accomplished its objectives during this five-day session?

YES 91% NO 9%

NOTE: THE PARTICIPANTS FELT THAT THE ROOM WAS TOO COLD AND POORLY VENTILATED.

(ITEMS 3A AND 3B)

DIRECTOR'S EVALUATION:

THE PRESESSION WAS GENERALLY SUCCESSFUL IN TERMS OF ITS STATED OBJECTIVES. HOWEVER, AS EXPECTED IN A LARGE GROUP THE VARIABILITY IN PARTICIPANTS' EXPERIENCE WITH THE TOPIC CAUSED THE STAFF SOME PROBLEMS. SMALL GROUP SESSIONS APPEARED TO BE A PARTIAL SOLUTION AND IN ADDITION ENABLED THE PARTICIPANTS TO BECOME VERY WELL ACQUAINTED. CERTAINLY THE SOPHISTICATION OF INSTRUCTIONAL PROCEDURES EMPLOYED WOULD HAVE BEEN INCREASED HAD THERE BEEN OPPORTUNITY FOR STAFF PLANNING MEETINGS.

YET THE SESSION DID NOT CONSIST, IN ANY MAJOR WAY, OF PRESESTATIONS OF PREVIOUS RESEARCH WORK CONDUCTED BY THE STAFF. THERE WAS A CLEAR INTENTION TO MAKE THE SESSION A TRAINING ENTERPRISE WHERE SOME TANGIBLE SKILLS WERE TRANSMITTED IN ADDITION TO FREE TRANSFER OF IDEAS ABOUT THE TOPIC.

THE PRESESSION SEEMED TO BE CHARACTERIZED BY A SPIRIT OF GOODWILL AND OPEN EXCHANGE AMONG STAFF AND PARTICIPANTS. THERE WAS RARELY UNANIMITY BY STAFF OF OPINION ON ANY BUT THE MOST MUNDANE CONCERNS. THE STAFF PROFITED A GREAT DEAL FROM THE INTENSE INTERACTION REQUIRED IN A SHORT COURSE. EACH OF US HAS RECEIVED LETTERS FROM THE PARTICIPANTS PURSUING POINTS RAISED DURING THE PRESESSION.

AMERICAN EDUCATIONAL RESEARCH ASSOCIATION

1971 Research Training Session

Educational Objectives: Formulation, Appraisal & Assessment

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Research Training Session

The Psychology of Written Instruction

Ernst Rothkopf and Lawrence Frase

Bell Telephone Laboratory

PRESESSION VII

1. Title: The Psychology of Written Instruction

2. Staff:

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Lawrence T. Frase (Codirector)	Bell Laboratories Murray Hill, New Jersey
Barbara Musgrave	Smith College Northampton, Massachusetts
Paul Johnson	University of Minnesota Minneapolis, Minnesota
J. Douglas Carroll	Bell Laboratories Murray Hill, New Jersey
Edward Crothers	University of Colorado Boulder, Colorado
George Klare	Ohio University Athens, Ohio
Wells Hively, III	University of Minnesota Minneapolis, Minnesota
Robert Calfee	Stanford University Stanford, California

3. General Description:

The stimulus for this presession was the recent growth of interest and research in prose learning. This is an especially important topic in the study of

instructional processes from both a theoretical and practical standpoint. The issues involved in written instruction are related to verbal problem solving and thinking in general and especially to problems in the rational improvement of documentary instructional systems.

Our intention was to bring together a small number of researchers for an intensive five days of lectures, each followed by small-group discussions of the topics covered in the lectures. Participants also were asked to bring some problem or research plan of their own, which provided another focal point for the small-group discussions.

It was clear from the outset that a great deal of content and discussion would have to be contained within the five days alloted to the presession. Three decisions greatly facilitated accomplishing this task. First, we selected Columbia University's Greyston House (in the Riverdale section of the Bronx) as a relatively secluded retreat. All but a few of the participants thus remained aboard for meals and discussions that sometimes lasted into the early morning hours. Second, articles suggested by the guest speakers were mailed to participants before the presession. Thus, more time could be devoted to discussion, participants were pre-

pared in advance for specific topics, and the coverage of our own in-house library could be increased. A third decision that increased the effectiveness of the presession in terms of individual attention, was our decision to limit the number of participants to somewhere around twenty. In this way, we were able to cover, in depth, the research plans generated by each participant.

Planning, preparation of materials, contacting speakers, arranging accommodations, etc., involved about 50 hours of labor. Another 16 hours of preparation for all speakers brings this total to 66 hours of planning activities.

4. Objectives:

We felt that a presession on this topic could accomplish a variety of objectives, among which were the following. First, to provide a framework within which participants could conceptualize major problems in this relatively new area of research. The presession announcement, published in the Educational Researcher, described the presession in terms of this framework which divided the psychology of written instruction into four topical areas; (1) analysis of content, (2) textual representation of content, (3) models of the reading process, and (4) measurement of learning outcomes. Our

decisions concerning this framework resulted from several brief meetings culminating in this conceptual analysis of the field. Decisions about selecting the staff were easily made once this framework had been established.

A second objective was to provide participants with theoretical perspectives in each of these topical areas. A third objective was to provide participants with usable techniques related to these theoretical ideas. A fourth objective was to give participants an opportunity to discuss theoretical ideas with their proponents, and to use associated techniques in some realistic way. Our decision to invite several guest speakers arose, not only from our concern for adequate coverage, but from the excessive demands that we anticipated if only two or three people were to conduct such a session.

5. Schedule:

First Day: Morning:

Introductory comments, general concepts (Rothkopf, Frase, Musgrave).

Afternoon:

Analysis of instructional content; multi-dimensional scaling (Carroll and Johnson).

Practicum (Staff).

Second Day: Morning:

Analysis of instructional content; associative structure and digraph analysis (Johnson and Frase).

Afternoon:

Textual representation and problems in psycholinguistics (Crothers). Practicum (Staff)

Third Day: Morning:

Textual representation and information theory (Musgrave).

Afternoon:

Readability (Klare). Practicum (Staff).

Fourth Day: Morning:

Experimental control of study activities (Rothkopf, Frase).

Afternoon:

Models of the reading process (Calfee). Practicum in research techniques (Staff).

Fifth Day: Morning:

Measurement of learning outcomes (Hively).

Afternoon:

Practicum in the design of experiments on written instruction, evaluation questionnaires, summary of presession (Rothkopf, Frase, Musgrave

6. Participants:

From a total of 38 applications, 25 participants were selected on the basis of the information contained on the presession application. We felt that this information was inadequate and that some provision should be made to increase the flexibility of the application forms, perhaps by including a number of queries that could be optional for different presessions. The relevance of these items could be stated briefly in the announcement of each presession. Evidently, our criteria for selection, which consisted of membership in certain professional associations, amount of time devoted to research, and relevance of the presession to the participants' work, were fairly effective. On a questionnaire administered after the presession, 94% of the respondents indicated that in their opinion, participants had been selected appropriately. With a small number of additional application questions we feel that this number could be 100%.

Of the total number of 22 participants who finally attended, 64% were male and 36% female. Mean age was 35.2 years. The average year of highest degree was between 1967-1968 (whether a mean, median or mode is used as an average). Eighty-six percent of the participants held the Ph.D. degree, which was in line

with our presession announcement. Participants devoted a mean of 58.1% of their time to research, with a mean number of 4.59 publications. Favorable participant response to the presession suggests that this group composition was appropriate for our purposes.

Participants came from all over the U.S.A. and from Canada. About 70% came from the east coast and the midwest. The remainder came from the southwest southeast, and ~~east~~ west coast.

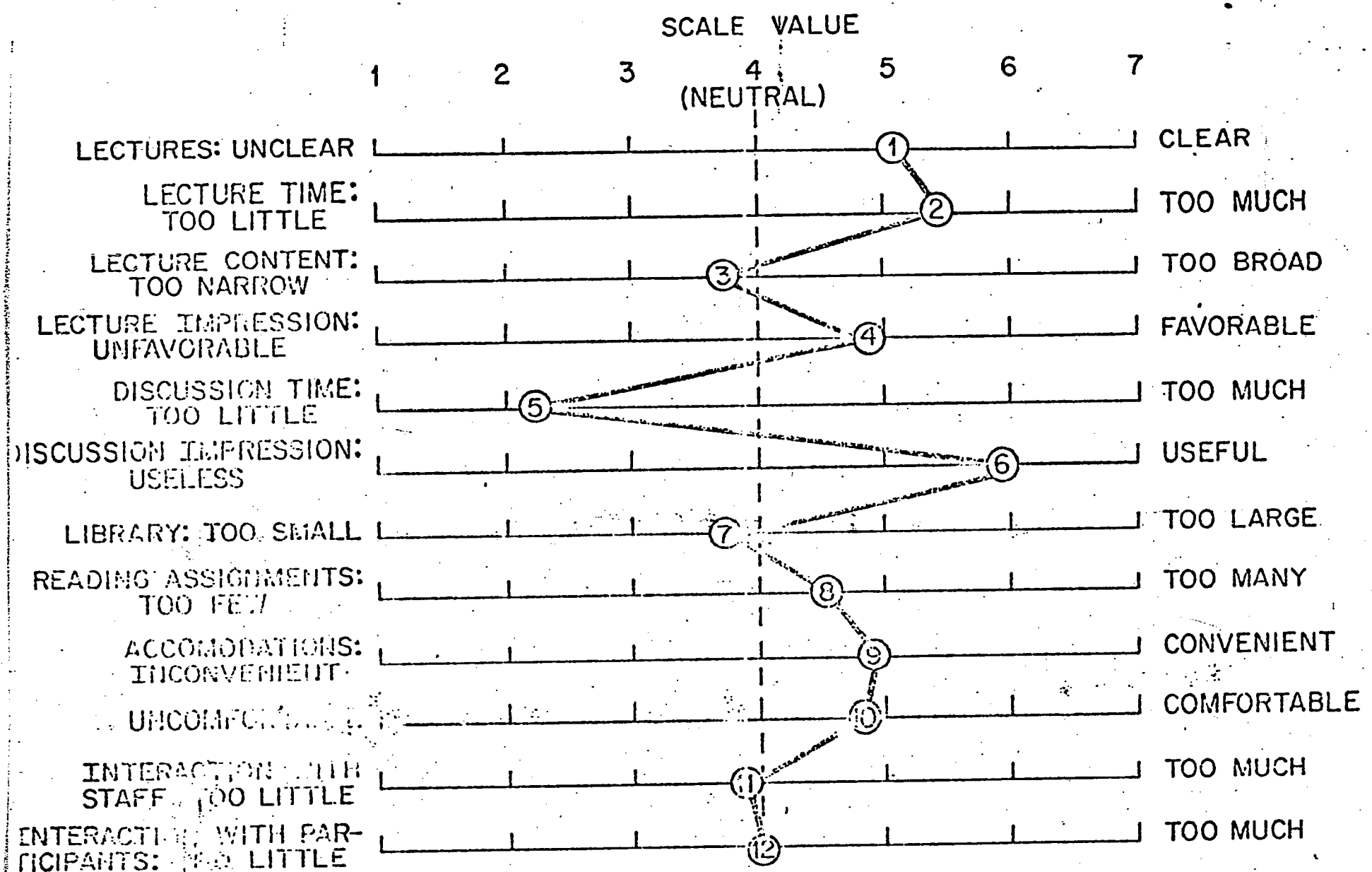
7. Instructional Material:

Readings were suggested by the staff before the presession began. The most critical articles were mailed to participants before the presession. Books and secondary articles (about 10 books and thirty articles) provided the content for our in-house library. In addition, exemplary experimental materials were kept in the library. Reproduction facilities were also available on the premises in case participants needed them.

8. Evaluation:

On the last day of the presession, participants filled out two questionnaires; one supplied by AERA and another of our own design. Our own questionnaire included essay, multiple choice and semantic differential items.

Accommodations.-- Figure 1, on the next page, summarizes the semantic differential data. Eighteen of



PRESESSION PROFILE

(SCORES ARE MEANS OF PARTICIPANTS' RATINGS)

the questionnaires were usable. On our questionnaire, 88% of the respondents indicated that the accommodations were adequate, which agrees with the average ratings of items 9 and 10 in Fig. 1. In an essay question asking for the most favorable characteristic of the presession, the most frequent response was the interpersonal interaction that evolved during the five days. Participants attributed this to the fact that the lodgings were isolated from the busy downtown area. Since the staff remained at Greyston, it is not surprising that 93% of the respondents disagreed with the statement that the staff was too inaccessible. The cloistered arrangement seems optimal for our purposes; 81% of the respondents said that they anticipated maintaining some contact with the staff, and 82% felt that they had sufficient opportunity to interact with other participants. The few exceptions were those who, for one reason or another, commuted from the New York area and thus missed evening discussions. Twenty-nine percent of the respondents would have preferred not to meet in the evening.

Fifty-Dollar Fee.-- About 35% of the respondents indicated that the $50 fee was a financial burden. For others, this fee was paid by their home institution.

Lecture-Discussion.-- Items 2, 4, 5 and 6 in Fig. 1 indicate that the respondents felt that more time

should have been devoted to small-group discussion. During the day, there were lectures each morning and afternoon. Although 71% of the respondents felt that the lectures were not too long to sit through (they were broken by coffee breaks), the pace was quite demanding. In the future, it might be well to hold small-group discussions during the day and to make speakers available to participants on a less formal basis. Small-group discussions were seen as extremely useful (Figure 1). It is precisely these discussions that were missed by commuters. Hence, discussions should be conducted during the day, or all participants should be required to attend evening sessions.

Aside from interpersonal interaction, the respondents saw theoretical models and research ideas as an important outcome from the presession (essay data). The most useful techniques acquired included theoretical perspectives, readability and scaling methodology. All respondents (100%) said that they had acquired some useful techniques or research ideas from the presession, although only 53% said that the content was what they had expected. Perhaps there is a need for a more complete description of presession contents in The Educational Researcher.

General Comments.-- About 81% of the respondents disagreed with the statement that the presession was too

long; 88% disagreed with the statement that it was too short. The duration appeared to be about right. All respondents (100%) felt that the timing of the presession (immediately before the annual AERA meeting) was appropriate. In addition, 94% of the respondents felt that AERA was making an important contribution by sponsoring these sessions. The same percentage felt that the staff should feel that it had accomplished its objectives. Eighty-two percent felt that another presession on the psychology of written instruction should be held next year.

9. Directors' Evaluation:

Responses of participants, comments gathered at the Annual AERA Meeting, and our impressions suggest that the presession accomplished its objectives. Participants came away from the presession with usable research techniques and specific experimental ideas, as well as a broad view of the problems and prospects for research in this area.

In particular, we suggest that a retreat-like atmosphere makes it possible to accomplish a great deal in five days. Evening special-interest small-group discussions might be effective if they begin the second day of the session, although we waited until the third day when participants' interests had become firmly established to formalize these meetings.

A good deal of planning and preparation time was expended. Much time (and materials) was contributed by the home institutions of the speakers and codirectors, and was not represented in our financial report. In particular, we felt that additional money should be provided for speakers and graduate assistants.

AERA 1971 Research Training Session

The Psychology of Written Instruction

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Research Training Session

Nonparametric Methods and Related Post Hoc Procedures

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Michigan State University

I. Presession Objectives

Our purpose in teaching this five day presession was to present the most current and potentially most useful nonparametric statistical procedures that could be applied in educational research. It was our hope that the researchers who attended this session would be able to put these techniques to use in their own research and could guide others in the application of the techniques. Since nonparametric methods are increasing in number and in versatility of application, it is essential that active educators and behavioral researchers be aware of the advances in this important area of research methodology.

A printed statement of the objectives of the presession was made available to prospective participants in the November 1970 announcement of the AERA Research Training Programs which appeared in the Educational Researcher. The specific announcement read as follows:

> Content and Objectives: The purpose of this presession will be to increase the competency of the behavioral scientist in the design and analysis of experiments employing qualitative and quantitative variables. The presession will have a dual emphasis:
>
> 1. the extension of contingency table techniques to complex design, testing, and estimation problems in educational research.
> 2. the introduction of powerful statistical procedures which are less restrictive in their assumptions than are classical procedures and whicch (sic) are applicable to a wide variety of problems in data analysis.
>
> It is hoped that exposure to these procedures will aid the participant in solving problems dealing with experimental design, hypothesis testing, and estimation commonly found in educational research.
>
> The content of the course will be divided into three parts: rank procedures to test for location, contingency table procedures for qualitative data, and techniques for measuring association. To emphasize the parametric-nonparametric analogies, we plan to begin instruction with the rank procedures.

Anticipated Audience: This session will be open to holders of a doctorate or doctoral candidiates in education and allied fields whose academic responsibilities include or will include the design of educational research studies and analysis of research data. The course is intended for educational researchers whose primary commitment is to substantive areas other than statistics and measurement. Participants will be expected to have a basic knowledge of inferential statistics. Generallly, this will imply a familiarity with the basic elementary statistical techniques usually presented in a two quarter or two semester course in statistics.

Our intent was to plan each session so that there would be adequate time to cover the topic at hand with a minimum of stress on the participants. This was handled by scheduling three ninety minute sessions each day with a sixty minute informal discussion period at the conclusion of the day's lectures. We restricted ourselves to those nonparametric techniques which we believed to be potentially the most important and useful to researchers in education and the behavioral sciences. We realized that researchers, no matter how diligent, could not achieve complete mastery of these techniques within the limited time period of the presession. Therefore we tried to introduce our participants to a wide variety of techniques during the presession and to provide them with extensive supporting materials to enable them to continue their independent study in nonparametric methods when the presession was completed. Our previous experience with the presession participants of 1968, 1969, and 1970 gave us reason to believe that the participants would continue their study of the topics and their use of the presession materials long after the conclusion of the presession.

In all cases the discussion and the use of tests and confidence intervals focused on applications. The mathematical development and proving of theorems and related results were not covered as a part of the formal lecture periods. These theoretical developments appeared as separate sections in the handout

materials distributed to the presession participants.

Although this presession was primarily concerned with nonparametric statistical techniques for the analysis of qualitative and quantitative variables, it was recognized that experimental design considerations would affect the participants' ability:

(a) to provide interpretable estimates of treatment effects;

(b) to employ precise statistical techniques in data analysis.

For this reason, the informal discussion periods were used for more extensive consideration of the design problems associated with the statistical techniques presented. To stimulate discussion of research design considerations and of nonparametric analysis procedures, many detailed examples of studies requiring a nonparametric analysis were presented as separate handouts.

It was hoped that exposure to these procedures would aid the participant in solving problems dealing with experimental design, hypothesis testing, and estimation commonly found in educational research. Specifically, it was our expectation that, as a result of participation in the presession and subsequent independent study of the presession materials, the participants would be able to:

(a) Explain the rationale behind the test procedures presented.

(b) Perform these tests on data from educational research.

(c) Apply and extend the techniques learned to specific problems in educational research.

(d) Distinguish between experimental designs in which variables are confounded and designs which provide interpretable estimates of treatment effects.

(e) Employ "precision" as one criterion in selecting an appropriate experimental design and the "best" statistical test for a specific situation.

(f) Read current literature involving methods described in this presession.

(g) Direct other researchers in the use of these statistical techniques.

The content of the course was divided into three parts: rank procedures to test for location, contingency table procedures for qualitative data, and techniques for measuring association. In previous years, the presession on nonparametric methods has started with a consideration of the techniques appropriate for the analysis of qualitative data. While this approach has had the advantage of linking the nonparametric methods closely to their probabilistic models, it has meant that instruction has begun with the technique which is probably least obvious to the participants and that initial instruction has not made use of the participants' familiarity with parametric statistics. To avoid these difficulties and to emphasize the parametric-nonparametric analogues, we began instruction with the rank procedures.

Part I: The initial lecture reviewed basic probabilistic concepts and simple analysis of variance designs. A rationale for the use of nonparametric tests was presented. Tests and interval estimation procedures based on ranks were introduced and were compared with their parametric analogues. These included the one-sample Wilcoxon Matched-pairs test, the Mann-Whitney test, the Kruskal-Wallis test, the Friedman test and the corresponding confidence interval procedures. Extensions of the rank and normal scores procedures to more complex design problems were considered.

Part II: The lectures of this section dealt with tests and interval estimation procedures designed to handle qualitative variables. These included the Irwin-Fisher Exact test, the Median test, and the Chi-square test of Homogeneity. The familiar chi-square tests of association and equality of proportions were extended to handle the multi-variable problems that commonly occur in survey research. Post hoc procedures using the chi-square distribution were also introduced.

Part III: The last part of the course dealt with measures of association for both qualitative and quantitative variables, e.g., the Chi-square test of Independence, the mean-square contingency coefficient, tests for monotonicity based on Kendall's tau, Kendall's coefficient of concordance and Spearman's rho and Kendall's tau.

II. Staff

The staff consisted of two co-directors, two instructors, and one graduate assistant. Illness prevented the attendance of one of the instructors; however, he contributed substantially to the preparation of materials for the presession. Staff members were:

Co-directors:

Maryellen McSweeney
Associate Professor of Education
464 Erickson Hall
Michigan State University
East Lansing, Michigan

Andrew C. Porter
Associate Professor of Education
201 D Erickson Hall
Michigan State University
East Lansing, Michigan

Instructors:

Leonard A. Marascuilo
Associate Professor of Education
4511 Tolman Hall
University of California, Berkeley

David J. Wright
National Assessment of Educational Progress
Ann Arbor, Michigan

Graduate Assistant:

James Maas
Office of Research Consultation
Michigan State University

All individuals on the staff have a deep interest in the area of non-parametric statistics. They are proven teachers equipped with a thorough knowledge of distribution free statistical methods and research design.

Despite the geographic separation of the staff, members of the instructional staff shared similar interests in and knowledge of nonparametric statistics and had collaborated on the planning and coordination of the presession. Extensive work on the preparation of presession materials involved all of the staff members prior to the actual session. During the presession the staff members were available to the participants on an informal basis to discuss individual research projects, answer questions and just generally "talk shop." The staff members worked exceedingly hard and were well-rewarded by the positive responses of the participants.

III. Selection and Notification of the Participants

The eligibility of each of the applicants was jointly assessed by the co-directors. A few applicants were rejected on the basis of their inadequate preparation in parametric statistical techniques (Entry skills at the level of sophistication of a two-quarter course in inferential statistics were required). Later the over-subscription of the presession forced us to reject additional applicants. All persons whose applications were received prior to January 27, 1971 were notified immediately of their acceptance or rejection.

A form letter of acceptance was sent to the intended participants, together with an outline of the objectives and content of the presession and a summary of probabilistic concepts to be used in the presession. Additional materials pertaining to hotel registration and AERA reimbursement were also enclosed.

IV. Description of the Participants

A total of 54 individuals were accepted for this presession, but 5 notified us of their inability to attend prior to the presession, 3 did not notify and did not attend, and 1 attended without having applied to the co-directors. Thus, a total of 47 participants were in attendance for this presession.

The 47 participants are listed and described below in a summary of the biographical information given on their application forms:

Sami J. Alam
509 Stanton
Port Huron, Michigan

Linda Bilsky
Box 89
Teachers College
Columbia University
New York, New York

Jack H. Bond
Evaluation
Computer Based Project
City Schools-Prescott
Syracuse, New York 13205

Gary D. Borich
Institute for Child Study
Indiana University
Bloomington, Indiana

Harry L. Bowman
Bureau of Educational Research
College of Education
Memphis State University
Memphis, Tennessee 38111

David J. Brown
32 Havenwood Drive
Brockport, New York 14420

Leroy P. Clinton
R & D Center for Handicapped Children
Box 89
Teachers College
Columbia University
New York, New York 10027

William H. Cormier
Department of Educational Psychology
CEB 108
University of Tennessee
Knoxville, Tennessee 37916

Gary H. deMik
3340 Airport Road
Ogden, Utah 84403

Shirley C. Feldmann
3333 B Henry Hudson Parkway
Bronx, New York 10463

Edward B. Fry
233 Harrison Avenue
Highland Park, New Jersey 08904

Beatrice G. Green
47 East Street
Stockbridge, Massachusetts

Mark M. Greene
Northwest Regional Educational
Laboratory
710 S.W. Second Avenue
Portland, Oregon 97204

Franklin Greenough
E 313 Health Sciences Bldg.
University of Washington
Seattle, Washington 98105

Naim C. Gupta
Department of Educational Psychology
Ball State University
Muncie, Indiana 47306

Donald L. Haefele
203 Arps Hall
College of Education
Ohio State University
Columbus, Ohio 43210

Vynce A. Hines
313A Norman Hall
College of Education
University of Florida
Gainesville, Florida 32601

Coy F. Hollis
720 Moss Road
Memphis, Tennessee 38117

Carl J. Huberty
Fain Hall
University of Georgia 30601

Ernest B. Jaski
10438 S. Hamilton
Chicago, Illinois 60643

John J. Kennedy
236 Ramseyer Hall
The Ohio State University
Columbus, Ohio 43210

William E. Knabe
W14 East Hall
University Computer Center
University of Iowa
Iowa City, Iowa 52240

William Landrum
67 Legare Street
Charleston, South Carolina 29401

James C. Leavell
44001 Garfield
Macomb Intermediate School District
Mount Clemens, Michigan 48043

Robert J. Lesniak
Pennsylvania State University
The Capitol Campus
Middleton, Pennsylvania 17057

Luigi F. Lucaccini
Dental Health Center
14th. Avenue and Lake Street
San Francisco, California

Walter M. Mathews
1526 Simpson Street #3
Madison, Wisconsin 53713

Garry L. McDaniels
1542 Live Oak Drive
Silver Spring, Maryland

Douglas McDonald
P.O. Box 142
University, Mississippi 38677

Lawrence McNally
7 Monroe Heights
Cortland, New York 13045

Sidney J. Micek
Health Sciences Building SD-10
University of Washington
Seattle, Washington 98105

Jerome Moss, Jr.
125 Peik Hall
University of Minnesota
Minneapolis, Minnesota 55455

John W. Newfield
355 39th. Street
New Orleans, Louisiana 70124

Herbert Ozur
3407 Duke Street
College Park, Maryland 20740

Roger P. Phelps
718 Barnes Avenue
Baldwin, New York 11510

Laurel Anne Pickett
16636 S.E. 26th. Street
Bellevue, Washington

Peter C. Rasmussen
725 Riga-Humford Road
Churchville, New York 14428

Cheryl L. Reed
Educational Psychology SCC-G
Purdue University
Lafayette, Indiana

Bruce G. Rogers
6513 Fairbanks Street

Dr. Louis Scheiner
District Research Associate
School District of Philadelphia
21st and Parkway
Philadelphia, Pennsylvania

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W14 East Hall
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Iowa City, Iowa 52240

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Detroit, Michigan 48204

Orval Totdahl
Rt. 3 Box 159
Racine, Wisconsin 53403

Robert Warmbrod
208 Agricultural Administration Bldg.
Ohio State University
2120 Fyffe Road
Columbus, Ohio 43210

Mary Kathleen Zillioux
93 Rock Beach Road
Rochester, New York 14617

The following biographical data were obtained from the 1971 presession application forms. Comparative data for the 1968 - 1970 presessions on nonparametric statistics are also reported.

a. Sex of the participants

Sex	Frequency	Percentage			
	F	1971	1970	1969	1968
Male	40	85	90	73	71
Female	7	15	10	27	29

As was true in previous years, the majority of the participants were males.

b. Age of the participants

Age	Frequency	Percentage			
	F	1971	1970	1969	1968
20-29	8	17	27	10	12
30-39	24	51	23	56	47
40-49	7	15	43	27	35
50 and over	5	11	7	7	6
no response	3	6			

This year many of the participants (68%) were in the "under 40" category. There appear to be two major reasons for this large percentage of young participants: 1) professional staffs are acquiring younger members who find they need an upgrading of their basic statistical skills; 2) since many schools do not offer a course in nonparametric statistics, advanced graduate students and recent graduates find the presessions an excellent opportunity for acquiring needed information.

c. Institutional affiliation

Type of Institution	Frequency F	Percentage 1971	1970	1969	1968
College or University	34	72	63	54	67
Research Center or School District	11	24	20	23	20
Other	2	4	17	23	13

Most participants attended or held a position at a university or college; however, a number of participants (24%) were employed by public school districts or federally funded research centers.

d. Attendance at previous AERA presessions

Previous Attendance	Frequency	Percentage 1971	1970	1969	1968
Yes	17	36	20	38	29
No	30	64	80	62	71

Most participants (64%) were attending their first AERA presession. Of those who had attended previous AERA presessions, 4 recorded multiple presessions and 13 reported having attended a single AERA presession prior to this one. Past presession topics and numbers attending were:

Multivariate Statistics	7
Design and Analysis of Comparative Experiments	5
Systems Approach to Instruction and Instructional Product Development	3
Applied Linear Regression Analysis	2
Computers and Natural Language	2
Person-free & Item-free Test Calibration	2
Bayesian Statistics	1
Curriculum Evaluation	1

Inspection of this list suggests that most presession "repeaters" had had previous presession experience in the area of statistics and research design.

e. Years since doctorate

Years	Frequency	Percentage 1971	Percentage 1970
0	16	34	37
1-3	18	38	37
4-6	6	13	13
6-10	2	4	7
over 10	5	11	7

Most of the participants are either just completing their degree or are recent graduates in their first three years of completion. One of the purposes of the research training sessions has been to provide an opportunity for people who have been out of graduate school for a number of years to learn about new innovations in educational research. Obviously, this presession is not drawing extensively from the older audience.

f. Courses in statistics

Number	Frequency	Percentage 1971	1970	1969	1968
1	1	2	00	8	10
2	3	6	17	21	22
3	10	20	10	25	29
4	13	28	20	19	16
5	4	8	23	10	4
6 or more	16	36	30	17	19

As is evident from the table, the level of statistical competence as measured by the number of statistics courses was higher in 1970 and 1971 than for either of the two previous years this presession was taught.

The relatively low incidence of persons with minimal formal training in statistics (1 or 2 courses) reflects both self-selection on the part of the

participants and some selectivity on the part of the co-directors in discouraging attendance of persons who did not appear to have the prerequisite entry skills (3 persons).

Although we do not have comparative data from previous years to check our impressions against, we felt that this year's participants were decidedly different from past participants in their mathematical training and professional interests. The following course background in mathematics was reported:

Number of courses in mathematics, exclusive of mathematics education	Frequency	Percentage
0	14	30
1-2	9	18
3-5	10	20
6 or more	15	32

When primary research interests of the participants were tabulated, the following distribution resulted:

Primary research interest	Frequency	Percentage
Experimental design	14	30
Curriculum	11	23
Measurement and evaluation	8	17
Learning	3	6
Reading	2	4
Motivation	2	4
Creativity	2	4
Administration	1	2
Exceptional Children	1	2
Experimental psychology	1	2
Attitude measurement	1	2
Computers	1	2

Once again the heavy orientation of presession members in the areas of experimental design and measurement and evaluation suggests that for a substantial minority of participants (47%) the presession topic was one which fell within

the domain of their major professional interest. Further evidence for this conclusion is found in a tabulation of number of courses taught in the areas of statistics, educational research and evaluation and measurement by presession participants. Of the 47 presession participants, 27 of whom report teaching one or more courses, 9 (33%) teach one or more courses in statistics, 17 (63%) teach one or more courses in educational research and 8 (30%) teach courses in evaluation and measurement. There are, of course, overlapping assignments in these three areas so that the percentages would exceed 100% were they added across disciplines.

Our informal observations imply that for approximately 45% of our participants, this presession was being used to meet the participants' need for advanced training in a specialty within their major academic discipline. The very active presession involvement of these participants, their interest in teaching nonparametric statistics, and the high percentage of participants (67%) who expressed the intention of "maintaining some sort of contact with at least one of the presession staff," suggest that this training session may serve as a stimulus for continuing study of and dissemination of nonparametric techniques in the institutions to which the participants return.

g. Allocation of duties among teaching, research and graduate study (for those who responded to this item)

Teaching

Amount of time	Frequency	Percentage			
		1971	1970	1969	1968
0-24%	14	39	50	38	13
25-49%	7	19	19	8	24
50-74%	8	23	19	38	20
75-100%	7	19	13	16	43

Research

ount of time	Frequency	Percentage			
		1971	1970	1969	1968
0-24%	11	25	7	16	13
25-49%	12	27	25	9	24
50-74%	9	20	29	18	20
75-100%	12	27	39	57	43

Graduate Study

ount of time	Frequency	Percentage 1971
0-24%	3	25
25-49%	2	17
50-74%	4	33
75-100%	3	25

The majority of participants divide their time between teaching and research ctivities. Almost 50% of the people are spending at least half of their time research activities but over 60% are teaching on at least a quarter time asis. This result is similar to that found in previous years.

Articles accepted in refereed journals

Number	Frequency	Percentage			
		1971	1970	1969	1968
0	22	47	53	53	43
1	7	15	3	9	12
2	4	9	17	17	18
3	3	6	0	9	6
4	2	4	7	6	2
5	0	0	0	2	2
6 or more	9	19	20	4	17

i. Number of articles and reports written

Number	Frequency	Percentage 1971	1970	1969	1968
0-9	33	70	53	77	78
10 and over	14	30	47	23	22

It is interesting to note that most of the participants actually have published very little to date. This is somewhat related to the fact that many are graduate students or have only recently finished their degrees. The profile of percentages conforms to the pattern set over the past three years.

j. The number of research projects funded by USOE, NIMH, or other granting agencies.

Number	Frequency	Percentage 1971	1970	1969	1968
0	22	47	60	53	59
1-2	15	32	24	33	28
3-5	7	15	10	10	10
6-10	3	6	6	4	2

The incidence of funded research projects for the presession participants is slightly higher this year than in past years, but the differences are not sizable. Many participants have not had research projects funded by an outside agency.

k. Geographic area of participants

The presession participants came from 22 states with approximately equal proportions drawn from the East and Midwest.

State	f	Region
California	1	West
Florida	1	South
Georgia	1	South
Illinois	2	Midwest
Indiana	3	Midwest
Iowa	2	Midwest
Louisiana	1	South
Maryland	3	South
Massachusetts	1	East
Michigan	3	Midwest
Minnesota	1	Midwest
Mississippi	1	South
New Jersey	1	East
New York	10	East
Ohio	3	Midwest
Oregon	1	West
Pennsylvania	2	East
South Carolina	1	South
Tennessee	3	South
Utah	1	West
Washington	3	West
Wisconsin	2	Midwest

In the past, proximity to the location of the presession has been a factor in attendance; however, attendance from the East has typically been less than predicted on the basis of proximity and attendance from the Midwest has been greater than would be predicted on the basis of proximity. Once again, this pattern is repeated for a presession held in the East.

Region	Frequency	Percentages			
		1971-East	1970-Midwest	1969-West	1968-Mdwst
East	14	30	17	31	25
Midwest	16	34	33	10	41
South	11	23	23	17	14
West	6	13	20	29	10
Canada & Puerto Rico	0	0	7	13	10

V. Proceedings

A. Prior Scheduling

The majority of the participants arrived in New York City the day preceding the beginning of the presession. Information on hotel rates, the schedule of the lectures to be presented and an "advance organizer" for the presession had been sent to each participant with his letter of acceptance. Arrangements for travel and lodging were the responsibility of each participant.

B. Facilities

The majority of the participants stayed in the New Yorker Hotel during the presession. All presession meetings were conducted in a large conference room or in one of several smaller conference suites in the New Yorker.

C. Presession Structure

Instruction covered a five day period with three lectures and one discussion session each day. Midmorning and midafternoon breaks were used to encourage participant-staff interaction as well as to provide some change from the lecture-discussion pattern of the ninety minute sessions. The prsession participants and staff members were asked to wear specially prepared name tags during the presession.

A complete set of lecture notes, multiple-choice-questions, discussion materials and a computer listing of nonparametric statistical programs in a loose-leaf binder was given to each participant at the start of the presession. Participants could refer to the multilithed lecture notes as the instructor lectured. This allowed for a minimum of blackboard writing. Since we have always been plagued by a lack of board space, having the lectures written up provided a valuable tool for effective presentation of material. It was also true that the lighting in the classroom left something to be desired so the printed lectures were even more appreciated.

The printed lectures were somewhat more thorough in coverage than the oral presentations since they included derivations of the test statistics, and annotated references as well as an "intuitive" development of the techniques and examples of their use. The more extensive presentation provided by the written lecture notes was thought desirable since the participants would have permanent copies of the presession materials to be reviewed at their leisure. That the participants shared this view of the usefulness of the materials was indicated by the requests of several participants for additional copies of the presession materials.

VI. Course Outline

The planned schedule was presented to each participant prior to the start of instruction. The schedule was followed in its entirety and proved to be an effective means of proceeding.

DAY	TIME	TOPIC
Saturday January 30, 1971	8:30 - 10:00	Discussion of class objectives; Review of probabilistic concepts and of simpler ANOVA designs and post hoc analyses
	10:30 - 12:00	Wilcoxon Matched-pairs test
	1:30 - 3:00	Friedman test and post hoc procedures
	3:30 - 4:30	Informal discussion
Sunday January 31	8:30 - 10:00	Mann-Whitney test (Wilcoxon and inversion forms)
	10:30 - 12:00	Kruskal-Wallis test and post hoc procedures
	1:30 - 3:00	Application of the Wilcoxon test to blocked data; test for aligned observations
	3:30 - 4:30	Informal discussion

Monday February 1	8:30 - 10:00	Normal scores tests
	10:30 - 12:00	Irwin-Fisher Exact test
	1:30 - 3:00	Median Test, Chi-square test of homogeneity
	3:30 - 4:30	Informal discussion
Tuesday February 2	8:30 - 10:00	Confidence intervals for the tests for homogeneity
	10:30 - 12:00	Tests for equality of difference across proportions
	1:30 - 3:00	Cochran's Q test
Wednesday February 3	8:30 - 10:00	Tests of independence and qualitative measures of association
	10:30 - 12:00	Rank measures of association
	1:30 - 3:00	Complete review of all material presented at the presession

The selection of particular non-parametric techniques for inclusion in this presession was made on the basis of the versatility of the techniques for a wide variety of research problems and their power relative to that of parametric procedures. Thus, the "quick and dirty" nonparametric tests such as the sign test were ignored in favor of more powerful and more versatile techniques such as the Wilcoxon Matched-pairs test, the Hodges-Lehmann Alignment procedure, the Goodman tests for interaction across contingency tables.

VII. Evaluation

Of the 47 participants who came to the presession, 46 were in attendance the first day, 46 the second day, 46 the third day, 39 the fourth day and 39 the final day. The drop in attendance from the third to the fourth day may be partially explained by a lack of heat in the building on the fourth day.

At the conclusion of each day's lecture each participant was given a multiple choice test covering the day's material. The tests were turned in the following morning and corrected. A total of four tests were given and corrected. No special effort was made to collect exams from reluctant participants, since this might have created an uneasy situation for the rest of the session. Copies of the exams are presented as an appendix. The statistics for the four tests are as follows:

Test	# items	N	Mean	S.D.
1	13	33	9.06	1.94
2	12	27	9.96	2.33
3	13	25	9.64	2.80
4	12	23	9.83	2.72

The staff was pleased with the performance of the participants on the exams. The majority of the participants made a concerted effort to attempt the questions and thus consolidate the learning that had taken place during the day.

The "Evaluation By Participants" questionnaire supplied by AERA was given to participants at the end of the two morning sessions on the final day of our presession. Thirty-nine of the 47 participants or 81 percent

completed the questionnaire. The number responding to each option of an item and the corresponding percentage of total responses to that item are reported below.

AERA 1971 Research Training Sessions

Evaluation by Participants

Name of Session: NON-PARAMETRIC METHODS

Director: _____

****

1A. To what extent did the relative availability or unavailability of books and journals interfere with or promote your attempts to master the content of this session?

NONE 3(8%) LITTLE 13 (33%) SOME 23 (59%)

1B. To what extent did reproduced materials given to you by the staff improve matters?

HELPFUL 2 (5%) VERY HELPFUL 37 (95%)

2A. Did you feel that you lacked a "place to work", either alone or in small groups?

YES 3 (8%) NO 33 (85%) No COMMENT 3 (8%)

2B. Was your room satisfactory?

YES 19 (49%) NO 14 (36%) No COMMENT 6 (15%)

3A. Which features of the meeting rooms were inadequate or not conducive to learning?

BLACKBOARDS 24 (62%)
SIZE 4 (10%)
LIGHT 11 (28%)
AIR 13 (33%)
LACK OF OVERHEAD PROJECTOR 4 (10%)
FURNISHINGS 1 (3%)
MISCELLANEOUS 15 (38%)

3B. Which features were especially facilitative in the same regard?

LIGHT 1 (3%)
SOUND 6 (15%)
CONVENIENCE 15 (38%)
AIR 0 (0%)
FURNISHINGS 8 (21%)
No COMMENT 13 (33%)

4A. Was five days too long a period to leave your work at home for the purpose of attending this session?

YES 8 (21%) NO 30 (79%)

4B. Was five days too short a period in which to learn much of the content of this session?

YES 15 (39%) NO 23 (61%)

5A. Were you allowed enough time in which to pursue activities of your own choosing?

YES 21 (55%) NO 8 (21%) No COMMENT 9 (24%)

5B. Would you have preferred not to meet in the evening after dinner?

YES 10 (26%) NO 8 (21%) No COMMENT 20 (53%)

5C. Would you have preferred more or fewer meetings per day than there actually were or was the number of meetings per day agreeable to you?

FEWER 3 (8%) ENOUGH 32 (84%) MORE 3 (8%)

6A. Were the individual lectures too long to sit and listen or take notes?

YES 7 (18%) NO 31 (82%)

6B. Were the lectures scheduled in an appropriate sequence?

YES 32 (86%) NO 5 (14%)

7. Did you have sufficient opportunities to interact with other participants?

YES 30 (79%) NO 8 (21%)

8A. Were the instructors too inaccessible or unapproachable so that you did not get the individual attention that you desired?

YES 0 (0%) NO 35 (92%) No COMMENT 3 (8%)

8B. Was it helpful to have graduate student assistants present?

YES 17 (46%) NO 5 (14%) No COMMENT 15 (40%)

9A. Did the content of the lectures and readings presuppose more previous training than you had?

YES 11 (29%) NO 27 (71%)

9B. Did the content of the lectures and readings presuppose less previous training than you had?

YES 2 (5%) NO 36 (95%)

10. To what extent was the content of the lectures and readings relevant to what you hoped to accomplish during the session?

SOME 5 (13%) MUCH 34 (87%) No COMMENT 0 (0%)

11A. Were the lectures stimulating and interesting?

YES(usually, or somewhat) 22 (56%) VERY 17 (44%)

11B. Were the lecturers competent to speak on the subject assigned them?

YES 39 (100%) NO 0 (0%)

11C. Were the lecturers well prepared?

YES 39 (100%) NO 0 (0%)

12. Were you disappointed in any way with the group of participants?

YES 0 (0%) NO 39 (100%)

13. If you had it to do over again would you apply for this session which you have just completed?

YES 39 (100%) NO 0 (0%)

14. If a session such as this is held again would you recommend to others like you that they attend?

YES 39 (100%) NO 0 (0%)

15. Do you anticipate maintaining some sort of contact with at least one of the session staff?

YES 26 (67%) NO 13 (33%)

16. Do you feel that AERA is making an important contribution to education by sponsoring sessions such as this one?

YES 38 (100%) NO 0 (0%)

17. Do you feel that anything has happened during these five days to make it more likely that you will leave your present position of employment?

YES 4 (11%) NO 33 (89%)

18. Is it likely that you will collaborate in research with someone else attending this session (other than those you already were likely to collaborate with)?

YES 9 (24%) NO 29 (76%)

19. Do you think that the staff should feel that it has accomplished its objectives during this five-day session?

YES 38 (100%) NO 0 (0%)

Because of the wording of item 1A, the responses are difficult to interpret. Either the participants felt that the limited number of books and articles that we supplied were of some help, or that our supply of books and articles was so limited as to have interfered with their attempts to master the content of the presession. Responses to item 1B indicate that our 327 pages of reproduced materials were helpful. Items 2A and B and 3A and B suggest that the participants were generally satisfied with the physical arrangements, singling out convenience as a strong point and blackboards, lack of heat for one day and light as the weak points. Responses to items 4A and B suggest that if anything 5 days is perhaps too short a period of time for several of the participants. Responses to items 5A through 7 indicate that participants approved of the schedule of lectures and discussion sessions used in the presession. Responses to questions 8A and 11A through C indicate that the instructors were perceived as being accessible and competent and their lectures were well prepared and generally interesting and stimulating. Responses to questions 9A through 10 indicate that the content of the lectures was highly relevant to the expectations of the participants and in general was presented at an appropriate level of difficulty. Responses to questions 12 through 16 and question 19 clearly indicate that participants had a high degree of satisfaction with their participation in our presession.

Directors' Evaluation

The staff felt that our presession was highly successful in nearly all respects. The staff's perceptions were overwhelming supported by the participants' responses to the evaluation questionnaire. An important contributor to the success of this year's presession is the experience gained from 3 prior offerings of similar presessions. The staff were all familiar with each other and, with the exception of the assistant, were used to working together. The unanticipated loss of one staff member due to illness forced a last-minute reassignment of staff duties, but the presession instruction did not seem impaired by a few somewhat impromptu presentations. The staff also felt that the background of participants this year was slightly better than in previous years and that this also contributed to the success of the presession.

The presession started on schedule with almost no time lost to the administrative details of getting under way. The presession stayed on schedule through out and all the material that we had intended to cover in the five days was covered. In addition, there was reasonable time for the spontaneous discussion of topics that were raised by the participants during the more formal presentations.

A friendly and somewhat informal relationship developed between staff and participants both during lectures and discussion periods. The participants indicated informally and on the evaluation questionnaire that the content of the presession was consistent with their expectations and not out of line in terms of difficulty level. As in our past presession, the materials provided to each participant at the beginning of the presession were seen as extremely valuable.

The most unfortunate aspect of the presession was the lack of heat in the hotel on the fourth day. It became cold enough that participants wore outside coats and gloves. Milder contributions to this lack of comfort were that the main lecture room was a little too small and had inadequate blackboards and lighting.

The initial uncertainty about funding and the subsequent conditioning of whether a presession would be offered or not on the basis of having at least 20 paid applicants was unfortunate. As a result the several months preceding February were rather trying on the codirectors. There was some initial hesitancy to prepare materials for a presession that might not be offered. When it became clear that our presession would be given, there was quite a bit of work to be done in a short period of time. We hope that future directors of presessions will not have to labor under similar conditions of uncertainty.

For future presessions we recommend that applications received be allowed to accumulate without action being taken on them until most applications have been received. Obviously, action would still have to be taken sufficiently in advance of the presession to allow for the accepted applicants to make the necessary arrangements for their attendance. If the pool of applications was larger than the number that could be accepted, then appropriate criteria could be used in selecting the "best" applicants. This year we started by accepting all but the most obviously unqualified applicants until we reached a number slightly larger than what we had initially set as an upper bound. The results were that several of the later applications were even more desirable than some already accepted but were rejected because no more room was available.

Appendices 3

Tests administered to participants

in Non-parmetric Statistics

NAME: _____

TEST 1

Material Covered

a) Introduction to nonparametric statistics

b) The Wilcoxon Test for Matched-Pairs

c) The Friedman Test

To be returned at 8:30 A.M. on January 31

1. Nonparametric tests are also called distribution-free tests, but distributions such as the chi-square distribution are used in determining whether the test statistics are significant. To what does the term "distribution-free" apply?

   a) the population (of observations)

   b) the sample (of observations)

   c) the sampling distribution of the test statistic

   d) all of the above

   e) none of the above

2. The term "conservative test" when used in reference to a particular nonparametric test means that:

   a) the test makes fewer assumptions about the population than does its parametric analogue

   b) the probability of a type I error for the test is less than or equal to the upper bound, α .

   c) the test does not permit inferences to be drawn about the population

   d) the nonparametric test is more powerful than its parametric analogue when the assumptions for the latter have been violated.

3. To interpret a statement that the asymptotic relative efficiency of the sign test is .637, we must know:
   a) the test statistic with which it is being compared
   b) the distribution of the parent population
   c) both of the above
   d) none of the above

4. The Wilcoxon matched-pairs test is the nonparametric analogue of the
   a) paired t test
   b) two independent-sample t test
   c) one-way ANOVA F test
   d) none of the above

5. The procedure of discarding pair differences equal to zero when computing the Wilcoxon matched pairs test statistic is
   a) desirable because it discards observations which give no information
   b) desirable because it permits the use of exact tables
   c) undesirable because it spuriously increases the power of the test
   d) undesirable because it reduces the power of the test

6. When parametric assumptions are met, the Wilcoxon matched-pairs test is more powerful than the
   a) Sign test
   b) Fisher randomization test for matched pairs
   c) Corresponding ANOVA F test
   d) All of the above

Questions 7 - 9. An investigator is interested in teachers' use of various types of questions in teaching mathematics. He identifies 4 types of questions which demand responses of different levels of complexity. He records the number of questions of each type asked by each teacher in a random sample of 10 teachers. The frequencies are reported for teacher and question type.

Question type	1	2	3	4
Teacher				
A	9	1	9	2
B	4	6	7	0
C	8	2	5	1
D	6	9	2	3
E	7	5	6	2
F	7	3	4	1
G	8	5	2	5
H	8	9	7	1
I	6	5	8	4
J	7	2	5	1

7. The most appropriate nonparametric test for these data would be:

   a) Fisher randomization test

   b) Friedman test

   c) Wilcoxon matched-pairs test

   d) Other specify _____.

8. The null distribution of the nonparametric test would be asymptotically

   a) standard normal

   b) chi-square with 3 degrees of freedom

   c) chi-square with 9 degrees of freedom

   d) chi-square with 10 degrees of freedom

   e) chi-square with 27 degrees of freedom

9. After rejection of the null hypothesis, the investigator could set up a contrast to determine whether the fourth type of question differed from the other three types. The procedure(s) used to determine whether this contrast was significantly different from zero would be:

   a) Large-sample procedure using $\sqrt{\chi^2}$

   b) Rosenthal and Ferguson procedure using $\sqrt{\text{constant} \cdot F}$

   c) Both of the above

   d) None of the above

10. To calculate the Friedman test one must

a) rank the observations in each block separately and find the sum of ranks for each block

b) rank the observations in each block separately and find the sum of ranks for each treatment

c) rank all of the observations disregarding blocks and find the sum of ranks for each block

d) rank all of the observations disregarding blocks and find the sum of ranks for each treatment

11. The parametric analogue of the Friedman test is the

a) one-way ANOVA F test

b) two-way ANOVA F test

c) Wilcoxon matched pairs test

d) two independent samples t test

12. The post hoc procedures for significant Friedman test define contrasts to be tested in terms of the

a) treatment population means

b) treatment population medians

c) treatment expected average ranks

d) treatment population variances

13. An administrator who is interested in the possible effect of school district consolidation on pupil-teacher ratios compares the median pupil-teacher ratios for 60 presently consolidated districts before and after consolidation. He believes that the underlying distribution of pre-post consolidation differences is extremely positively skewed. Indicate the <u>most</u> and <u>least</u> appropriate test statistics respectively for his hypothesis.

a) Wilcoxon matched-pairs test, Fisher randomization test

b) Sign test, Wilcoxon matched - pairs test

c) Fisher randomization test, Sign test

d) Wilcoxon matched-pairs test, Sign test

NAME: _____

TEST 2

Material Covered

a) Mann-Whitney Test

b) Kruskal-Wallis Test

c) Wilcoxon Test on Block Designs and Hodges-Lehmann Test on Aligned Observations

To be returned at 8:30 A. M. on February 1.

1. In performing an experiment when comparing two samples, let one sample contain 2 subjects and the other 5 subjects. Assume ranks from 1 to 7 are to be assigned to the scores of the two samples. How many combinations of ranks can the sample with 5 subjects take on?

   a) 7

   b) 10

   c) 35

   d) 42

   e) none of the above.

2. Let $E(T_1) = (n_1/2)(n_1 + n_2 + 1)$ where T_1 is the Wilcoxon statistic. If the Mann-Whitney statistic U equals $T_1 - (n_1/2)(n_1 + 1)$ where $n_1 = 4$ and $n = 9$, find the E(U).

   a) 10

   b) 18

   c) 20

   d) 36

   e) 45

Questions 3 - 5. An investigator has randomly selected 48 students and randomly assigned 12 students each to one of 4 experimental conditions. At the conclusion of his experiment he finds that for each group the test scores have a very pronounced negative skew. He wishes to determine

whether the four distributions differ in location.

3. The most appropriate nonparametric test for these data is:
   a) the Friedman test
   b) the Hodges-Lehmann test for aligned observations
   c) the Kruskal-Wallis test
   d) the Mann-Whitney (Wilcoxon) test

4. If the investigator in (3) assigned midranks to all tied scores but made no other corrections for ties in his test statistic, the test statistic in this form would be numerically
   a) larger than the test statistic fully corrected for ties
   b) smaller than the test statistic fully corrected for ties
   c) exactly the same as the test statistic fully corrected for ties

5. After rejection of the hypothesis of equality of performance under the various experimental conditions, the investigator could set up contrasts to determine whether there were any pair-wise differences among the treatment groups. The procedure(s) used to determine whether these contrasts were significantly different from zero would be:
   a) Large-sample procedure using $\sqrt{\chi^2}$
   b) Tobach, Smith, Rose and Richter procedure using exact tables
   c) Rosenthal and Ferguson procedure using $\sqrt{\text{constant} \cdot F}$
   d) Both (a) and (b)
   e) Both (a) and (c)

6. The major reason for selecting a nonparametric test for (3) would probably be suspected violation of the assumption of:
   a) continuity in the parent populations
   b) equality of variance in the parent populations
   c) normality in the parent populations
   d) equality of the pair-wise correlations of treatments in the populations

Questions 7 - 8. Siegel and Tukey developed a nonparametric test to compare the relative spread (dispersion) of two distributions. To perform the test, write the observations from samples A and B in increasing order, but assign the LOW RANKS to the MOST EXTREME OBSERVATIONS and the HIGH RANKS to the LEAST EXTREME OBSERVATIONS. For example,

Score	0	3	5	6	8	8	10	10	11	12	13	13	14	15	16	17	19	25
Sample	A	B	A	B	A	A	B	B	B	B	B	B	A	A	B	A	A	A
Rank	1	4	5	8	9	12	13	16	17	18	15	14	11	10	7	6	3	2

The test statistic is the sum of the ranks for sample A.

7. The nonparametric test to which the Siegel-Tukey test bears the greatest resemblance is the:
   a) Friedman test
   b) Hodges-Lehmann test of aligned observations
   c) Mann-Whitney test
   d) Wilcoxon Matched-Pairs test

8. If the Siegel-Tukey test is used to test the hypothesis that populations A and B are the same in dispersion against the alternative that the dispersion in population A is greater than that in population B, the null hypothesis will be rejected if the sum of the ranks for sample A is
   a) "too small"
   b) "too large"
   c) either "too large" or "too small"

9. The Hodges-Lehmann Method of Alignment in the two sample case is used to test equality of two distributions with respect to:
   a) proportions (i.e., $p_1 = p_2$)
   b) location
   c) dispersion (i.e., $\sigma_1^2 = \sigma_2^2$)
   d) correlation between variables X and Y

10. The large-sample statistic for the Hodges-Lehmann Method of Aligned observations has a sampling distribution that is approximately _____ when each block consists of a treatment and control group.

a) χ^2 with (R - 1) (C - 1) degrees of freedom

b) N(0, 1)

c) t with $N_1 + N_2 - 2$ degrees of freedom

d) F with 2 and (R-1) (C-1) degrees of freedom

e) none of the above

11. The Hodges-Lehmann Test on Aligned Observations uses:

a) intrablock differences in the observations alone

b) interblock differences in the observations alone

c) both intrablock and interblock differences in the observations

d) neither intrablock nor interblock differences in the observations

12. To test whether training can increase the amount of a certain chemical in the brain, three litters of rats were each divided at random into a control group and a treatment group (which received the training). The amounts (in appropriate units) of the chemical present after a given period of time are shown in the following table.

Litter	Control	Treated
1	.3	1.3 2.9
2	3.2 4.0	3.5 4.5
3	9.5 10.0	10.5

The most appropriate test to use in testing the hypothesis that training has no effect on the amount of chemical present in the brain is the:

a) Friedman Test

b) Hodges-Lehmann Test of Aligned Observations

c) Wilcoxon Matched-Pairs Test

d) Kruskal-Wallis Test

e) Mann-Whitney Test

NAME: _____

TEST 3

Material Covered

a) Normal Scores Test

b) Irwin-Fisher Exact Test

c) Median Test and Chi-square test of Homogeneity

To be returned at 8:30 A.M. on February 2

1. The Chi-square test of homogeneity for a 2 x 2 table is the large sample form of

   a) the Fisher Exact test

   b) the two independent - sample t-test

   c) the Z-test where $Z = \dfrac{\hat{P}_1 - \hat{P}_2}{\sqrt{\hat{P}_0 \hat{Q}_0 \left(\frac{1}{N_1} + \frac{1}{N_2}\right)}}$

   d) none of the above

2. The Fisher Exact test for a 2 x 2 table assumes:

   a) independent random samples from identical continuous distributions

   b) matched-pairs of observations from a binomial distribution

   c) independent random samples from binomial distributions

   d) matched-pairs of observations from a hypergeometric distribution

3. When the null hypothesis for the Fisher Exact test is true, the resulting test statistic has an exact

   a) t distribution

   b) binomial distribution

   c) Chi-square distribution

   d) normal distribution

   e) hypergeometric distribution

4. Which of the following is NOT an assumption needed to insure valid use of the chi-square approximation to the Fisher Exact Test?

   a) the expected cell frequencies should be greater than or equal to five

   b) observations are independent

   c) underlying distribution of the variable of interest is normal

   d) probability of the qualitative variable is constant over subjects

   e) all of the above assumptions are needed

Questions 5 - 6. In a study of reading ability and syntactical mediation in paired-associate learning an investigator reports:

> "... the fourth grade distribution of mediators and non-mediators approached a significant level, suggesting that good readers may be more likely to mediate spontaneously."

His data are:

Table 1 - Frequency of Spontaneous Use of Syntactical Mediation

	Mediators	Nonmediators	Total
Good Readers	5	3	8
Poor Readers	1	7	8

5. What nonparametric test would you recommend?

   a) Chi-square test of homogeneity

   b) Fisher Exact test

   c) Median test

   d) Normal curve test for equal proportions

6. What statistical hypothesis would you test for the data in Question (5)?

   a) $\mu_1 = \mu_2$

   b) $Pr(X_1 > \hat{M}_0) = Pr(X_2 > \hat{M}_0)$

   c) Pr (Mediator/Good Reader) = Pr (Mediator/Poor Reader)

   d) $\sigma_1^2 = \sigma_2^2$

7. Which is not a condition needed to insure valid use of the Chi-square approximation to the Irwin-Fisher test?

   a) the expected frequencies should be 5 or greater

   b) independence among the observations

   c) the underlying distribution of the variable is known

   d) the probability of the qualitative variable is constant over subjects

8. In the computation of the median test, each sample is dichotomized

   a) at its own median

   b) at its respective population median

   c) at the pooled median

   d) at the combined population median

   e) in some inexplicable fashion

Questions 9 - 10: An investigator interested in the stability of self-ascribed social class constructs the following table of data based on two independent survey samples (a 1945 and a 1963 survey):

Table of frequencies

Self-ascribed social class	1945 survey	1963 survey
Upper and upper middle	33	89
Middle and lower middle	472	463
Working and lower	570	168

9. Which of the following tests should the investigator use?

   a) chi-square test of homogeneity

   b) Fisher Exact test

   c) normal curve test for equal proportions

   d) other, specify _____

10. The null distribution of the test statistic chosen in (9) is

a) standard normal

b) chi-square with 2 degrees of freedom

c) chi-square with 3 degrees of freedom

d) chi-square with 5 degrees of freedom

e) other, specify _____

11. When the median test is used to test the hypothesis, H_o: $\mu_I = \mu_{II}$ the following must be assumed:

a) symmetry of the populations

b) normality of the populations

c) both of the above

d) none of the above

12. The major advantage cited for the use of normal scores tests is:

a) computational ease and speed

b) availability of extensive, exact tables for the K-sample problem

c) high asymptotic efficiency relative to their parametric analogues even when the assumptions for the latter have been satisfied.

d) other, specify _____

13. Large-sample normal scores tests in the two-sample problem are referred to the _____ distribution to determine statistical significance.

a) standard normal

b) t with $n_1 + n_2 - 2$ degrees of freedom

c) F with 1, and $n_1 + n_2 - 2$ degrees of freedom

d) Chi-square with $n_1 + n_2 - 1$ degrees of freedom

NAME: _____

TEST 4

Material Covered

a) Confidence Interval Procedures for the Chi-square and the Median Tests.

b) Test for Equality of Differences across Proportions

c) Cochran Q Test

To be returned at 8:30 A.M. on February 3

1. An investigator who uses a Chi-square test for homogeneity to test H_o: $P_1 = P_2 = \ldots = P_7$ in a 2 by 7 table rejects his hypothesis. He decides to use the Chi-square analog to Scheffe's theorem to examine differences among the $\hat{P}_k$. The value of $\sqrt{\chi^2}$ to be used in the confidence interval would have how many degrees of freedom?

   a) 1

   b) 2

   c) 6

   d) 7

   e) indeterminate from the information given

2. How many confidence intervals may the investigator of question 1 set up if he uses the Chi-square analog and wants to hold the overall probability of a Type I error to .05?

   a) 1

   b) 6

   c) 7

   d) 21

   e) an unlimited number.

3. Which of the following is not a valid contrast?

a) $\hat{p}_1 - \hat{p}_2$

b) $\hat{p}_1 + \hat{p}_2 + \hat{p}_3 - 3\hat{p}_4$

c) $\hat{p}_1 - \hat{p}_2 - \hat{p}_3$

d) $2\hat{p}_1 + \hat{p}_2 - 3\hat{p}_3$

4. The variance of the contrast $p_3 - p_4$ is estimated by:

a) $\dfrac{\hat{p}_3\hat{q}_3}{n_3} + \dfrac{\hat{p}_4\hat{q}_4}{n_4}$

b) $\dfrac{\hat{p}_3\hat{q}_3 + \hat{p}_4\hat{q}_4}{n_3 + n_4}$

c) $\dfrac{\hat{p}_3\hat{q}_3}{n_3} - \dfrac{\hat{p}_4\hat{q}_4}{n_4}$

d) $\dfrac{\hat{p}_3\hat{q}_3 - \hat{p}_4\hat{q}_4}{n_3 + n_4}$

e) none of the above.

5. The principal reason for using the arc sin transformation, $\hat{\phi}_k = 2 \arcsin \sqrt{\hat{p}_k}$, in place of $\hat{p}_k$ in test statistics and confidence intervals is to:

a) test the hypothesis of equality of the populations in terms of more easily interpreted parameters

b) simplify computations

c) increase the degrees of freedom in the computation of the test statistic and confidence intervals

d) guarantee that the null distribution of the test statistic is approximately Chi-square

e) increase the power of the test

6. The test of H_o: $\Delta_1 = \Delta_2 = \ldots = \Delta_K = \Delta_0$ where $\Delta_K = p_{1k} - p_{2k}$ is the K-sample extension of the _____ for the case of large samples.

   a) The t-test

   b) The Irwin-Fisher Exact test

   c) The Wilcoxon test

   d) The Friedman test

7. For valid use of the test $U'_o = \sum_{pq=1}^{K} \hat{W}_k \, (\hat{\Delta}_k - \hat{\Delta}_0)^2$

   a) The underlying variables must have equal standard deviations

   b) The sample sizes must be equal

   c) The underlying variables must be correlated

   d) The values of p_{1k} must be equal for all k (k = 1, 2, . . . , K) and the values of p_{2k} must be equal for all k (k = 1, 2, . . . , K).

   e) The sample sizes must be large

8. Cochran's Q may be used to test data which could also be analyzed by means of

   a) a k-sample Chi-square test of homogeneity

   b) a one-way analysis of variance

   c) a randomized block analysis of variance

   d) an n x k contingency table with both margins free.

9. For the following table, the computed value for

$$Q = \frac{K(K-1)\Sigma(T_{.j} - \frac{1}{K}\Sigma T_j)^2}{K\Sigma T_{i.} - \Sigma T_{i.}^2}$$

	TREATMENT		
	I	II	III
Subject 1	1	1	0
2	1	0	1
3	1	1	1
4	0	0	1
5	0	1	1

   a) 1/2

   b) 1

   c) 5

   d) 1-1/3

Questions 10 - 12. A researcher is interested in determining whether children's preferences for form versus color change as the children grow older. She collects longitudinal data for a random sample of 25 children who are tested at ages 2 1/2, 3, 3 1/2, 4, 4 1/2, and 5. At each testing, each child is classified as form-dominant (score = 1) or color dominant (score = 0). The null hypothesis states that the probability of a form-dominant classification does not change over time (i.e., the proportion of form-dominant classifications remains constant.)

10. The most appropriate nonparametric test for this hypothesis would be:
    a) chi-square test of homogeneity
    b) Friedman test
    c) Cochran Q test
    d) Kruskal-Wallis test

11. The null distribution of the nonparametric test statistic would be asymptotically:
    a) standard normal
    b) chi-square with 5 degrees of freedom
    c) chi-square with 6 degrees of freedom
    d) chi-square with 24 degrees of freedom
    e) chi-square with 120 degrees of freedom

12. If the null hypothesis of equal proportions of form-dominant classifications over time is rejected, can the investigator use a contrast with orthogonal polynomials to determine whether there is a linear trend in the proportion of form-dominant classifications?
    a) Yes, such a contrast is justified.
    b) No, such a contrast is not justified because the proportions are correlated
    c) No, such a contrast is not justified because the levels of the independent variable do not satisfy the conditions for orthogonal polynomials

NAME: _____

TEST 5

Material Covered

a) Tests of Independence and Qualitative Measures of Association

b) Rank Measures of Association

1. For a Chi-square test of the independence of two categorical variables it is necessary that

   a) the underlying distribution of both categorical variables be normal

   b) the frequencies in the cells result from categorization of independent units in the sample

   c) the frequencies be normally distributed

   d) the marginal frequencies be known a priori

2. The square root of the mean square contingency coefficient and the Pearson Product Moment coefficient are equivalent for contingency tables where

   a) R and C both equal 2

   b) R and C are equal

   c) R equals one and C can take on any value

   d) C equals one and R can take on any value

Questions 3 - 4. An investigator wants to determine the reliability of 12 readers who are charged with rating the performance of doctoral candidates on their comprehensive exams. To assess the reliability of the raters, all 12 are asked to rank order the same six candidates.

3. If the investigator wants a single reliability coefficient falling between 0 and 1 inclusive, what would you recommend?

   a) Cochran Q test

   b) Friedman test

   c) Kendall Coefficient of Concordance

   d) Spearman Rank Order Correlation Coefficient

   e) ϕ' Coefficient

4. The investigator decides that he wants the added assurance that his measure of reliability will be statistically significant (statistically different from 0) at $\alpha = .01$. Use the appropriate tables to determine how large the coefficient must be in order to meet this criterion.

   a) at least .10
   b) at least .25
   c) at least .37
   d) at least .50
   e) none of the above

5. The number of degrees of freedom for a chi-square test of independence in a 3 x 4 table is:

   a) 4
   b) 6
   c) 9
   d) 12
   e) none of the above

6. The parametric analogue to the chi-square test of independence is:

   a) one sample test for correlation coefficient equal to zero
   b) two sample t-test for independent samples (means)
   c) two sample t-test for related samples (means)
   d) F-test for columns in two way ANOVA fixed effects model
   e) none of the above

7. The Spearman coefficient of correlation is identical to a Pearson Product Moment correlation coefficient if the two variables being correlated are

   a) both dichotomous
   b) one dichotomous and one continuous
   c) both rank order values
   d) both continuous

8. Two advantages of Kendall's tau over the Spearman rank order correlation coefficient are

   a) τ is normally distributed for $n > 10$ and can be extended to partial correlations

   b) τ is easier to compute than r_s and tends to be somewhat more conservative

   c) τ is normally distributed for $n > 10$ and is easier to compute.

   d) τ has no advantages since it is algebraically equivalent to r_s.

9. The value of Kendalls τ for the two rankings

   Ranking A: 1 2 3 4 5 6 7

   Ranking B: 2 1 3 4 7 5 6

   is

   a) 17/21

   b) 1 3/7

   c) 11/21

   d) 5/7

10. A measure of the degree of agreement among several judges' ranking of a set of objects is the

    a) Spearman correlation coefficient

    b) Phi correlation coefficient

    c) Mean square contingency coefficient

    d) Kendall coefficient of concordance

11. The mean square contingency coefficient denoted by $\hat{\phi}^2 = \frac{\chi^2}{n}$ has a range of possible values from

    a) -1 to +1

    b) 0 to +1

    c) -min (R-1, C-1) to +min (R-1, C-1)

    d) 0 to min (R-1, C-1)

    e) none of the above

12. The number of degrees of freedom for the Chi-square test of independence test statistic when calculated on an R by C contingency table is

a) $n - 1$

b) $n - R - C + 1$

c) RC

d) $(R-1)(C-1)$

13. The numerical value of the measure of association ϕ' $(0 \leq \phi' \leq 1)$ for a 3 x 4 table for which N = 100 and the computed chi-square is 19.22 is (to the nearest hundredth):

a) .10

b) .18

c) .25

d) .31

e) .44

14. In a study in which doctoral students in Counseling and in Higher Education were sampled, the two groups of students were asked whether they favored or opposed foreign language exams and whether they had or had not completed their language requirements. It was found that $\hat{\gamma}_C = .0283$ and $\hat{\gamma}_{HE} = 3.216$ and $U_o' = 12,26$ was significant at .05. A valid statistical conclusion to be drawn on the basis of these data is:

a) for doctoral students in C, favoring language exams and having completed the language requirements are unrelated.

b) for doctoral students in HE, favoring language exams and having completed the language requirements are positively related.

c) The confidence interval for $\gamma_C - \gamma_{HE}$ will lie completely below zero

d) all three conclusions can be made

e) none of the three conclusions can be made

15. The test of H_o: $\gamma_1 = \gamma_2 = \ldots = \gamma_K$ against H_1: H_o is false, where $\gamma_k = \log_e \Delta_k = \log_e p_{11k} + \log_e p_{22k} - \log_e p_{12k} - \log_e p_{21k}$ assumes:

a) K match paired samples from binomial distributions.

b) 2K independent random samples from binomial distributions.

c) 2K correlated samples from hypergeometric distributions.

d) K large independent random samples from K bivariate qualitative variable universes.

Research Training Session

Operations Analysis Techniques in Educational Planning and Administration

George S. Tracz, OISE & James E. Bruno, UCLA

AMERICAN EDUCATIONAL RESEARCH ASSOCIATION

1971 RESEARCH TRAINING SESSION

OPERATIONS ANALYSIS TECHNIQUES IN EDUCATIONAL PLANNING AND ADMINISTRATION

Held at the NEW New Yorker Hotel
New York, N. Y. 10001
January 30 - February 3, 1971

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3. GENERAL DESCRIPTION:

This presession will expose educational planning personnel and school administrators to the use and application of management science and operations research models to problems in education. Sessions will be devoted not only to theory and techniques necessary for improved resource allocation to and planning of school activities, but also to explanations of a number of recent successful applications in education. Throughout the session, the utility and limitations of such models to improve and effect changes in educational planning and administrative practices will be stressed.

Applications for this session are invited from educational planners and administrators from the local, state, and federal levels (of education) involved in the allocation and administering of resources (financial, facilities, and personnel) to elementary and secondary school activities. Participants then would include USOE staff, regional laboratory personnel, State Education Department staff, professors of educational administration, local school administrators, and socio-economic planners interested in the recent development in the field of education.

4. OBJECTIVES:

The chief objectives of this presession, offered for the first time, are these:

(i) to provide a method of assessing the value of Operations Analysis to operational and resource allocation problems in elementary and secondary education;

(ii) to provide the necessary computer and mathematical techniques to appreciate and understand Operations Analysis and Systems Approaches to educational planning and administration; and

(iii) to disseminate up-to-date findings in the applications of Operations Analysis to education.

5. SCHEDULE (ACTUAL):

DAY 1: SATURDAY, JANUARY 30, 1971

SESSION #0:	8:45 - 10:00 a.m.	STAFF: final stages of preparation.
SESSION #1:	10:30 - 12:00 noon	OPENING OF SESSION. INTRODUCTION OF STAFF AND PARTICIPANTS. NATURE AND PHILOSOPHY OF OPERATIONS ANALYSIS.
	12:00 - 1:30 p.m.	LUNCH BREAK
SESSION #2:	1:30 - 3:00 p.m.	REVIEW OF MATHEMATICAL TECHNIQUES.
	3:00 - 3:30 p.m.	COFFEE BREAK
SESSION #3:	3:30 - 5:00 p.m.	CASE STUDIES OF OPERATIONS ANALYSIS.
	8:30 - 10:00 p.m.	ON-LINE COMPUTER INTERACTION AND VOLUNTARY WORKSHOP AND BOOKSHELF STUDY.

DAY 2: SUNDAY, JANUARY 31, 1971

SESSION #4:	10:30 - 12:00 noon	SPECIAL ELECTIVE SESSION FOR ADDITIONAL REVIEW OF MATHEMATICAL CONCEPTS.
	12:00 - 1:30 p.m.	LUNCH BREAK
SESSION #5:	1:30 - 3:00 p.m.	LINEAR PROGRAMMING AND MPS/360.
	3:00 - 3:30 p.m.	COFFEE BREAK
SESSION #6:	3:30 - 5:00 p.m.	LINEAR PROGRAMMING IN VOCATIONAL-TECHNICAL EDUCATIONAL PLANNING.
	8:30 - 10:00 p.m.	LINEAR PROGRAMMING WORKSHOP.

DAY 3: MONDAY, FEBRUARY 1, 1971

SESSION #7:	9:00 - 10:15 a.m.	LINEAR PROGRAMMING IN TEACHER SALARY SCHEDULES.
	10:15 - 10:30 a.m.	COFFEE BREAK
SESSION #8:	10:30 - 12:00 noon	SHORT-RANGE PLANNING MODELS.
	12:00 - 1:30 p.m.	LUNCH BREAK
SESSION #9:	1:30 - 3:00 p.m.	MANAGEMENT INFORMATION SYSTEMS.
	3:00 - 3:30 p.m.	COFFEE BREAK
SESSION #10:	3:30 - 5:00 p.m.	SIMULATION TECHNIQUES.
	MID-SESSION EVALUATION (QUESTIONNAIRE)	
	8:30 - 10:00 p.m.	COMPUTER WORKSHOP SESSION; BOOKSHELF OPEN.

DAY 4: TUESDAY, FEBRUARY 2, 1971

SESSION #11:	9:00 - 10:15 a.m.	APPLICATIONS OF OPERATIONS ANALYSIS TO PERFORMANCE CONTRACTING.
	10:15 - 10:30 a.m.	COFFEE BREAK
SESSION #12:	10:30 - 12:00 noon	MATHEMATICAL PROGRAMMING MODELS IN EDUCATIONAL PLANNING. GROUP DISCUSSION.
	12:00 - 1:30 p.m.	LUNCH BREAK
SESSION #13:	1:30 - 3:00 p.m.	APPLICATIONS OF SIMULATION.
	3:00 - 3:30 p.m.	COFFEE BREAK
SESSION #14:	3:30 - 5:00 p.m.	APPLICATION OF MONTE CARLO ANALYSIS TO USE OF TEACHER SUBSTITUTES.
	5:30 - 7:00 p.m.	STAFF'S COCKTAIL RECEPTION FOR PARTICIPANTS.
	9:00 - 10:00 p.m.	COMPUTER WORKSHOP SESSION.

DAY 5: WEDNESDAY, FEBRUARY 3, 1971

SESSION #15: 9:00 - 10:15 a.m. MICRO-ECONOMIC THEORY.

10:15 - 10:30 a.m. COFFEE BREAK

SESSION #16: 10:30 - 11:30 a.m. COMPREHENSIVE PLANNING.

AERA QUESTIONNAIRE EVALUATION

CLOSING REMARKS BY INVITED SPEAKER.

CLOSING REMARKS BY STAFF.

12:30 END OF SESSION.

6. PARTICIPANTS:

The following tables summarize information about the 48 participants, on a number of selected variables. This information was collected prior to the pre-session on the standard AERA pre-session Application Form.

TABLE 1

AGE OF PARTICIPANTS

AGE	FREQUENCY
20-24	-
25-29	2
30-34	14
35-39	16
40-44	9
45-49	5
50-54	2
55+	-

TABLE 2

SEX OF PARTICIPANTS

SEX	FREQUENCY
MALE	40
FEMALE	8

TABLE 3

GEOGRAPHICAL DISTRIBUTION OF PARTICIPANTS

STATE	FREQUENCY
Arizona	2
California	4
Florida	4
Georgia	2
Illinois	6
Iowa	1
Kentucky	1
Maryland	2
Michigan	8
Minnesota	3
Mississippi	1
New Mexico	1
New York	5
Ohio	2
Pennsylvania	3
Tennessee	1
Wisconsin	2

TABLE 4

QUESTION: HAVE YOU ATTENDED AN AERA PRESESSION IN THE PAST?

REPLY	FREQUENCY
Yes	16
No	32

TABLE 5

EDUCATIONAL BACKGROUND OF PARTICIPANTS

YEAR DEGREE RECEIVED:

MASTER'S	FREQUENCY	DOCTORATE	FREQUENCY
1937-1950	2	1937-1950	-
1951-1960	15	1951-1960	4
1961-1970	24	1961-1970	28
		EXPECTED(1971)	4

TABLE 6

EMPLOYMENT BACKGROUND OF PARTICIPANTS

	FREQUENCY
University or State College	23
City School District	11
Regional Educational Labs	8
State Department of Education	6

TABLE 7

PROFESSIONAL AND SCHOLARLY INTERESTS OF PARTICIPANTS

A. Approximately how many research articles which you have authored alone or jointly have been accepted in a scholarly (refereed) journal?

	FREQUENCY
None or No Reply	31
1-5	15
Over 5	2

B. In total, about how many research articles, theses, or technical reports (both published and unpublished) have you authored alone or jointly?

	FREQUENCY
None or No Reply	10
1-5	17
Over 5	21

TABLE 7 (cont'd.)

C. How many funded (by USOE, NIMH, Ford Foundation, or other granting agencies) research projects are in progress or completed on which your name appears as either the first or a joint author?

	FREQUENCY
None or No Reply	23
1-5	24
Over 5	1

TABLE 8

SOURCE OF PAYMENT OF PARTICIPANTS

	FREQUENCY
Personal	
Institutional	
Research Grant	
Not Given	

7. INSTRUCTIONAL AND EVALUATION MATERIALS:

A. MIMEOGRAPHED NOTES

"Social Goals, Educational Priorities, and Dollars: Planning Education in the Seventies." George S. Tracz. 5 pages.

Graduate Course 1704X: Course Bibliography. "Mathematical Models in Educational Planning." George S. Tracz. 6 pages.

"Review of Mathematical Concepts in Operations Research, Document One: Mathematical Models." James F. McNamara. 6 pages.

"Review of Mathematical Concepts in Operations Research, Document Two: Elements of Matrix Algebra." James F. McNamara. 27 pages.

"Review of Mathematical Concepts in Operations Research, Document Three: Simultaneous Linear Equations." James F. McNamara. 15 pages.

"Review of Mathematical Concepts in Operations Research, Document Four: Differential and Integral Calculus." James F. McNamara. 28 pages.

"Mathematical Programming Models in Educational Planning." James F. McNamara. 12 pages.

"A Systems Approach to Educational Planning." James F. McNamara. 23 pages.

"Some Comments on Operations Research and Educational Planning Models." James F. McNamara. 11 pages.

"Mathematical Programming Models in Educational Planning." James F. McNamara. 50 pages.

"A Labor Market Information System for State-Local Program Planning and Evaluation in Vocational Education." James F. McNamara. 14 pages.

"Linear Programming." James E. Bruno. 50 pages.

"Notes on the MPS 360 Mathematical Programming System." James E. Bruno. 18 pages.

"Operations Research: A Missing Link." G. Ernest Anderson, Jr. Educational Researcher, Vol. XXI, March 1970. 3 pages.

"Computer Helps Redistrict Schools." James C. Green. Educational Researcher, Vol. XXI, March 1970. 2 pages.

7. A. (cont'd.)

"Simulation Modeling in METEP." G. Ernest Anderson, Jr. 7 pages.

"Queue." G. Ernest Anderson, Jr. 6 pages.

"Adult Resources Flow (ARF-1)." G. Ernest Anderson, Jr. 12 pages.

"EDSIM I." G. Ernest Anderson, Jr. 9 pages.

"Introduction to UMASS Time-Sharing System." G. Ernest Anderson, Jr. 19 pages.

"Short Range Planning for Educational Management." I. B. Turksen. 20 pages.

Exercise: "Simulated Inventory." S. Padro.

"Micro-Economic Theory - Theory of the Firm: An Outline." S. Temkin. 7 pages.

"Comprehensive Planning." S. Temkin. 5 pages.

"An Assessment of the Contribution of Operations Research to Educational Planning." Harold Weitz. 25 pages.

B. REPORTS

ERIC Clearinghouse on Educational Administration. Management Information Systems. Analysis and Bibliography Series, No. 4. University of Oregon. Eugene, Oregon: 1970.

_____. Models for Planning. Analysis and Bibliography Series, No. 5. University of Oregon. Eugene, Oregon: 1970.

_____. Models for Rational Decision Making. Analysis and Bibliography Series, No. 6. University of Oregon. Eugene, Oregon: 1970.

Arnold, Walter M. Vocational, Technical and Continuing Education in Pennsylvania. A report to the Department of Public Instruction and the Pennsylvania State Board of Education. 1969.

McNamara, James F. A Mathematical Programming Model. Harrisburg, Pa.: Pennsylvania Department of Education, 1970.

McNamara, James F., and Franchak, Stephen J. Planning Vocational Education Programs in Pennsylvania. Harrisburg, Pa.: Pennsylvania Department of Education, 1970.

Temkin, Sanford. A Comprehensive Theory of Cost-Effectiveness. Philadelphia, Pa.: Research for Better Schools, Inc., 1970.

8. EVALUATION AND TEST RESULTS

AERA 1971 RESEARCH TRAINING SESSIONS

EVALUATION BY PARTICIPANTS

NAME OF SESSION: OPERATIONS ANALYSIS TECHNIQUES IN EDUCATIONAL PLANNING AND ADMINISTRATION

DIRECTOR: G.S. TRACZ AND JAMES E. BRUNO

****

NUMBER OF RETURNS = 32; SUMMARIES IN % (ROUNDED OFF).

1A. To what extent did the relative availability or unavailability of books and journals interfere with or promote your attempts to master the content of this session?

NONE 55 LITTLE 25 SOME 20

1B. To what extent did reproduced materials given to you by the staff improve matters?

HELPFUL 55 VERY HELPFUL 45

2A. Did you feel that you lacked a "place to work", either alone or in small groups?

YES 20 NO 64 No COMMENT 6

2B. Was your room satisfactory?

YES 68 NO 26 No COMMENT 6

3A. Which features of the meeting rooms were inadequate or not conducive to learning?

BLACKBOARDS 39
SIZE 19
LIGHT 55
AIR 48
LACK OF OVERHEAD PROJECTOR 6
FURNISHINGS 13
MISCELLANEOUS. 26

3B. Which features were especially facilitative in the same regard?

LIGHT 6
SOUND 42
CONVENIENCE 13
AIR 3
FURNISHINGS 13
No COMMENT 32

NUMBER OF RETURNS = 32; SUMMARIES IN % (ROUNDED OFF).

4A. Was five days too long a period to leave your work at home for the purpose of attending this session?

YES 26 NO 74

4B. Was five days too short a period in which to learn much of the content of this session?

YES 38 NO 62

5A. Were you allowed enough time in which to pursue activities of your own choosing?

YES 48 NO 45 No COMMENT 7

5B. Would you have preferred not to meet in the evening after dinner?

YES 48 NO 39 No COMMENT 13

5C. Would you have preferred more or fewer meetings per day than there actually were or was the number of meetings per day agreeable to you?

FEWER 6 ENOUGH 84 MORE 10

6A. Were the individual lectures too long to sit and listen or take notes?

YES 16 NO 84

6B. Were the lectures scheduled in an appropriate sequence?

YES 42 NO 58

7. Did you have sufficient opportunities to interact with other participants?

YES 61 NO 39

8A. Were the instructors too inaccessible or unapproachable so that you did not get the individual attention that you desired?

YES 16 NO 74 No COMMENT 10

8B. Was it helpful to have graduate student assistants present?

YES 42 NO 32 No COMMENT 26

.....3

NUMBER OF RETURNS = 32; SUMMARIES IN % (ROUNDED OFF).

9A. Did the content of the lectures and readings presuppose more previous training than you had?

YES 42 NO 58

9B. Did the content of the lectures and readings presuppose less previous training than you had?

YES 32 NO 68

10. To what extent was the content of the lectures and readings relevant to what you hoped to accomplish during the session?

SOME 55 MUCH 42 No COMMENT 3

11A. Were the lectures stimulating and interesting?

YES(usually, or somewhat) 94 VERY 6

11B. Were the lecturers competent to speak on the subject assigned them?

YES 91 NO 9

11C. Were the lecturers well prepared?

YES 91 NO 9

12. Were you disappointed in any way with the group of participants?

YES 36 NO 64

13. If you had it to do over again would you apply for this session which you have just completed?

YES 71 NO 29

14. If a session such as this is held again would you recommend to others like you that they attend?

YES 68 NO 32

15. Do you anticipate maintaining some sort of contact with at least one of the session staff?

YES 77 NO 23

.....4

NUMBER OF RETURNS = 32; SUMMARIES IN % (ROUNDED OFF).

16. Do you feel that AERA is making an important contribution to education by sponsoring sessions such as this one?

YES 80 NO 3

17. Do you feel that anything has happened during these five days to make it more likely that you will leave your present position of employment?

YES 16 NO 71

18. Is it likely that you will collaborate in research with someone else attending this session (other than those you already were likely to collaborate with)?

YES 29 NO 58

19. Do you think that the staff should feel that it has accomplished its objectives during this five-day session?

YES 62 NO 13

8. EVALUATION AND TEST RESULTS

AMERICAN EDUCATIONAL RESEARCH ASSOCIATION
1971 RESEARCH TRAINING SESSION
OPERATIONS ANALYSIS TECHNIQUES IN EDUCATIONAL PLANNING AND ADMINISTRATION

MID-SESSION EVALUATION QUESTIONNAIRE

KEY: SA (Strongly Agree), A (Agree), ? (Undecided), D (Disagree), SD (Strongly Disagree), NA (No Answer).
PLEASE CIRCLE YOUR CHOICES.

NOTE: NUMBER OF REPLIES = 38 IN PERCENTAGES (ROUNDED OFF).

		SA	A	?	D	SD	NA
1.	The objectives of this program were clear to me	5	38	8	27	19	3
2.	The objectives of this program were not realistic	3	16	22	27	8	24
3.	The participants accepted the purposes of this program	0	22	32	19	5	22
4.	The objectives of this program were not the same as my objectives	3	24	14	38	5	16
5.	I have not learned much new	3	24	3	37	30	3
6.	The material presented seemed valuable to me	19	60	11	8		2
7.	I could have learned as much by reading a book	5	12	12	46	22	3
8.	Possible solutions to my problems are not being considered	3	27	8	35	11	17
9.	The information presented was too elementary	0	13	3	43	38	3
10.	The speakers really knew their subjects	SA 41	A 46	? 5	D 0	SD 0	NA 8
11.	I was stimulated to think about the topics presented	SA 24	A 57	? 3	D 13	SD 0	NA 3

MID-SESSION EVALUATION QUESTIONNAIRE (continued)

NOTE: NUMBER OF REPLIES = 38 IN PERCENTAGES (ROUNDED OFF).

		SA	A	?	D	SD	NA
12.	We worked together well as a group	8	19	27	27	8	11
13.	The group discussions were excellent	9	16	24	35	3	13
14.	There was little time for informal conversation	8	24	3	51	8	6
15.	I had no opportunity to express my ideas	2	5	8	57	16	12
16.	I really felt a part of this group	5	43	16	27	5	4
17.	My time was well spent	2	54	15	24	0	5
18.	The program met my expectations	5	32	30	19	3	11
19.	Too much time was devoted to trivial matters	0	15	13	54	8	10
20.	The information presented was too advanced	2	24	11	50	8	5
21.	The content was not readily applicable to much research in education	3	19	10	44	19	5
22.	The Assistant was very helpful	10	35	36	0	5	14
23.	Theory was not related to practice	5	16	5	60	8	6
24.	The schedule should have been more flexible	3	27	8	54	5	3

9. DIRECTOR'S EVALUATION:

(A) Some open-ended replies by the participants to the AERA Evaluation Questionnaire:

Q. 1B. To what extent did reproduced materials given to you by the staff improve matters?

A. McNamara supplied us with excellent materials.

Q. 3A. Which features of the meeting rooms were inadequate or not conducive to learning?

A. Cold temperatures at one session. (Reference to Consolidated Edison Utilities.)

Q. 6B. Were the lectures scheduled in an appropriate sequence?

A. Originally, they were not, but directors did make adjustments in schedule.

Q. 8A. Were the instructors too inaccessible or unapproachable so that you did not get the individual attention that you desired?

A. All instructors were interested and they acted just like us common folk.

Leaders were interested in "humans" -- often a quality missing in research types.

Q. 10. To what extent was the content of the lectures and readings relevant to what you hoped to accomplish during the session?

A. The review was invaluable and several new ideas were presented.

Q. 16. Do you feel that AERA is making an important contribution to education by sponsoring session such as this one?

A. Semiannually would be nice.

Q. 19. Do you think that the staff should feel that it has accomplished its objectives during this five-day session?

A. Yes, as a first effort.

GENERAL COMMENTS:

- the "Happy Hour" should be planned for the beginning.
- gave us an opportunity to not only develop our own crude model, but to try it out, with staff assistance, on the teletype.
- the descriptions of the sessions as presented in the AERA Newsletter should be much more detailed in order to assist people in selecting an appropriate session.
- this is a very poor evaluation instrument (AERA's) with many inconsistencies and positively weighted questions. (e.g., #11A.)

DIRECTOR'S COMMENTS:

Two important considerations must be recalled. This session was the first of its kind held anywhere, and the unsettled funding situation persisted for a long time.

The session was particularly satisfying to the directors and the staff because:

1. It brought together a large number of researchers (who previously had never attended an AERA pre-session) from many distant places and diverse employment backgrounds.
2. It allowed the participants to establish a dialogue and overcome their pre-defined positions in the locus of decision-making.
3. It assisted the participants in developing and refining their quantitative skills of systems analysis.
4. It pointed out to the staff possible improvements in setting the format for a future undertaking of this type.

DIRECTOR'S COMMENTS: (cont'd.)

Taking this report into an overall perspective, the directors are strongly justified to feel, as did the participants, that this first session on "Operations Analysis Techniques in Educational Planning and Administration" went a long way to meet its objectives successfully.

10. ACKNOWLEDGMENTS:

The directors and the staff wish to take this opportunity to thank the AERA staff, particularly Miss Donna Durgin, and other associated individuals, particularly Dr. J. L. Byers, for their tremendous assistance in making this session--a first-time offering--an outstandingly successful venture.

They also would like to thank the following individuals, who, through their firms, helped greatly in providing books on loan and other materials for the use of the participants:

Dr. P. K. Piele	ERIC Clearinghouse on Educational Management
Mr. A. R. Rittenberg	Prentice-Hall, Incorporated
Mr. R. Miranda	Pergamon Press, Incorporated
Miss E. Adams	John Wiley and Sons, Incorporated
Mr. S. H. Levine	College of Engineering, State University of New York
Mr. H. Weitz	International Business Machines

AMERICAN EDUCATIONAL RESEARCH ASSOCIATION

1971 RESEARCH TRAINING SESSION

OPERATIONS ANALYSIS TECHNIQUES IN EDUCATIONAL PLANNING AND ADMINISTRATION

Held at the NEW New Yorker Hotel
New York, N. Y. 10001
January 30 - February 3, 1971

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Dr. Carolyn D. Wilkerson
2057 East Alameda Drive
TEMPE, Arizona 85281

Research Training Session

Individual Differences, Learning and Instruction

Frank H. Farley, University of Wisconsin

1. Title: Individual Differences, Learning and Instruction

2. Staff: Frank H. Farley (Director), University of Wisconsin
Thomas J. Shuell, State University of New York at Buffalo
Richard E. Snow, Stanford University
Arthur R. Jensen (two days), University of California, Berkeley
Lauren B. Resnick (one day), University of Pittsburgh
Robert C. Calfee (one session), Stanford University
Wallace L. Mealiea (one session), University of Wisconsin

3. General Description:

The content of this presession was heavily in the direction of what is presently known about individual differences in learning and instruction, what are the best methodologies for the solution of the problems in the area, what are the implications of the knowledge and methodology for educational research, and what are their use in educational practice. The scientific winnowing and sifting of the research evidence was emphasized, and the most recent best research was included.

The individualization of learning and instruction is a major goal of American education. In addition, the role of individual differences in learning is a basic concern in the scientific study of learning and instruction. Where the former is concerned, a number of individualized learning and instruction programs have been developed in recent years and disseminated in schools. The psychology underlying some of these is often unclear, and their efficacy relative to other approaches is often unknown. Where the latter is concerned, the inclusion of individual difference terms in the development of learning and instructional theories

remains one of the most difficult and least satisfactorially handled problems in theory construction.

This presession considered the basic modes of individualizing instruction, the merits of their psychological bases, and the direction research into individualization should most fruitfully take. In addition, optimal ways of including individual difference considerations in the development of learning and instructional theories were dealt with throughout the presession.

4. Objectives:

The general objective was to attain theoretical and research sophistication in the study of individual differences in learning and instruction, and in the individualization of school learning. The specific objective was to conceptualize and design a research study or program of studies directed at the solution of a significant problem(s) in this area.

5. Schedule:

First Day: Morning:

Introduction of staff. Introduction to the session. Discussion of session objectives. Entering level test. Historical overview of the field. Theoretical models and issues in the study of individual differences and learning.

Afternoon:

Individual differences in retention and forgetting. Ability, fast versus slow learners, and forgetting. Interactions of presentation mode and ability.

Second Day: Morning:

Discussion of previous day's sessions.

Biological and psychophysiological approaches.

Teplovian analyses. Intrinsic individual differences.

Motivational-attentional approaches to individual differences in learning and memory.

Afternoon:

Continuation of above. Outline of a heuristic for studying motivational-attentional-personality individual difference variables in learning and memory.

Introduction to aptitude x treatment interaction research. Measurement considerations.

Third Day: Morning:

Discussion of previous day's sessions.

Aptitude x treatment interactions continued. Methodological issues.

Afternoon:

Continuation of above.

Representations of individual differences in learning.

Woodrow tradition. Methodological issues. The measurement of change.

Gain scores; residual gain. Learning and ability.

Special interest groups meet with individual staff members for discussion session.

Fourth Day: Morning:

Discussion of previous day's sessions

Consideration of heredity and environment in determination of learning performance and intelligence.

Methodological issues. Sex differences. Socio-economic status factors.

Afternoon:

Hierarchies of ability and school instruction.

Intelligence and thinking versus learning.

Evening: Special Session

Some methodological approaches to subject x treatment interactions, with an emphasis on applications to pre-reading skills and reading acquisition.

Fifth Day: Morning:

Discussion of previous day's sessions.

The individualization of learning and instruction.

Afternoon:

Continuation of above.

Division into two groups (1) continuation of above and (2) behavior modification and individual differences.

Critical individual discussions of research questions and/or designs concerning individual differences, learning and instruction which have been generated by participants.

6. Participants:

Sixty-two individuals applied to the AERA Presession Individual Differences, Learning and Instruction. The staff had set a limit of 50 participants in the published announcement of the presession. However, this limit was not rigidly adhered to. A total of 54 persons were accepted for the presession. It was felt at that time that many more would have made the total group unmanageable. Those persons rejected were mainly very late in applying, after the staff had agreed to cease any further admitting. Of the 54 accepted applicants, 44 actually appeared at the presession. At the conclusion of the presession, the staff felt

that a group considerably larger than the 44 could be handled without difficulty with the format employed.

7. Instructional and Evaluation Materials:

Participants were assigned three seminal readings to be completed prior to attendance at the presession. These were selected exclusively from R. M. Gagné (ed.) Learning and individual differences. Columbus, Ohio: C. E. Merrill. This book was chosen because of its central character in the field, and because it was expected that if all readings came from one source there would be more chance of the participants completing each of the readings prior to the presession. The chapters assigned were:

Glaser, R. Some implications of previous work on learning and individual differences.

Cronbach, L. J. How can instruction be adapted to individual differences?

Jensen, A. R. Varieties of individual differences in learning.

A brief 12 item achievement test based on these three chapters was given all participants in the first hour of the presession.

An approximately 200 item bibliography prepared by the Director on the topic of Individual Differences, Learning and Instruction was given to all participants the first morning of the presession. A library of reprints was maintained, with every item in the bibliography being represented in the library by from two to ten copies. Participants could borrow these materials for daily or overnight use. In addition, a number of books and individualized instruction program manuals were available in this library. A typewriter was made available for participant use. A list of participants and their research interests was provided

each participant, as well as a program outline for presession.

A number of handouts were provided during the presession. These were:

General

1. A complete bibliography of Project PLAN, plus assorted brochures.
2. A complete bibliography of Individually Guided Education in the Multiunit School. Also a complete bibliography of "Individually Guided Motivation."

Specific

1. Farley presentations: Farley, F. H., & Severson, H. H. "The stability of individual differences in the strength and sensitivity of the nervous system."
2. Snow presentations: "Aptitude and instructional methods: the search for interactions."
3. Jensen presentations: "Do schools cheat minority children?" In addition, a 200 page review by Jensen will be distributed to all participants when it is completed in May or June of 1971.
4. Resnick presentation: "Implications of individual differences for the design of instructional environments. Topics for discussion."

All formal sessions made extensive use both of slides and overhead projection.

Besides the printed material noted above, seven films and/or film cartridges on individualized learning and instruction programs were available for screening by participants. One special session for participants interested in these programs was provided, with the films being shown for group discussion and analysis.

8. Evaluation and Test Results:

The brief (12 item) "entering level test" based on the three readings to be completed prior to the presession yielded the following results: of the 37 persons who returned the questionnaire, the mean score was 6.4, suggesting a fairly low level of achievement for the three (relatively straightforward) readings. Participants were asked to indicate whether they had completed the assigned readings prior to arrival at the presession. Of the 37 respondents, 26 or 70.3% had read all or portions of the readings, while 11 or 29.7% had read none of the assigned material. The mean test performance of the former was 7.1, while that of the latter was 4.8 ($t = 3.07$, $p < .01$).

The objective of designing a study was optional for all participants, as a large number indicated they were less interested in developing a study or research program at that time than in being expcsed to the most recent developments in the area, with an objective of consolidating this knowledge after the presession with perhaps the development of research or enrichment of their current research efforts coming then. Accordingly, only a few participants discussed with the staff specific research designs developed during the session. These were judged satisfactory by the staff, and in some cases, continued interaction with staff has taken place following the presession.

On the last afternoon of the presession the anonymous session evaluation questionnaire developed by AERA Central Office in cooperation with the directors of the individual sessions was distributed. The responses of the participants were generally quite favorable. A slight sequencing problem where lectures were concerned was apparent from the responses to one of the 30 questions asked. One or two lectures had to be presented

somewhat out of a logical sequence because the speakers were not available at any other time.

9. Director's Evaluation:

The presession seemed to be well received by participants and seemed to represent a successful attempt to pull together a dynamic and currently very active but diverse area of educational research. On the basis of viewpoints expressed by participants, a slightly increased emphasis on the area of aptitude x treatment interactions might be desirable in future comparable sessions.

AERA 1971 Research Training Sessions

Evaluation by Participants

Name of Session: INDIVIDUAL DIFFERENCES IN LEARNING AND INSTRUCTION

Director: FRANK FARLEY

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1A. To what extent did the relative availability or unavailability of books and journals interfere with or promote your attempts to master the content of this session?

NONE 55% LITTLE 15% SOME 30%

1B. To what extent did reproduced materials given to you by the staff improve matters?

HELPFUL 90% VERY HELPFUL 10%

2A. Did you feel that you lacked a "place to work", either alone or in small groups?

YES 20% NO 70% No COMMENT 10%

2B. Was your room satisfactory?

YES 65% NO 25% No COMMENT 10%.

3A. Which features of the meeting rooms were inadequate or not conducive to learning?

BLACKBOARDS 95%
SIZE 10%
LIGHT 5%
AIR 65%.
LACK OF OVERHEAD PROJECTOR 0%
FURNISHINGS 0%
MISCELLANEOUS. 20%

3B. Which features were especially facilitative in the same regard?

LIGHT 0%
SOUND 10%
CONVENIENCE 25%
AIR 0%
FURNISHINGS 10%
No COMMENT 60%

4A. Was five days too long a period to leave your work at home for the purpose of attending this session?

YES 65% NO 35%

4B. Was five days too short a period in which to learn much of the content of this session?

YES 10% NO 90%

5A. Were you allowed enough time in which to pursue activities of your own choosing?

YES 65% NO 30% No COMMENT 5%

5B. Would you have preferred not to meet in the evening after dinner?

YES 30% NO 45% No COMMENT 25%

5C. Would you have preferred more or fewer meetings per day than there actually were or was the number of meetings per day agreeable to you?

FEWER 5% ENOUGH 90% MORE 5%

6A. Were the individual lectures too long to sit and listen or take notes?

YES 15% NO 85%

6B. Were the lectures scheduled in an appropriate sequence?

YES 40% NO 60%

7. Did you have sufficient opportunities to interact with other participants?

YES 85% NO 15%

8A. Were the instructors too inaccessible or unapproachable so that you did not get the individual attention that you desired?

YES 5% NO 85% No COMMENT 10%

8B. Was it helpful to have graduate student assistants present?

YES 30% NO 10% No COMMENT 60%

9A. Did the content of the lectures and readings presuppose more previous training than you had?

YES 20% NO 80%

9B. Did the content of the lectures and readings presuppose less previous training than you had?

YES 20% NO 80%

10. To what extent was the content of the lectures and readings relevant to what you hoped to accomplish during the session?

SOME 95% MUCH 5% No COMMENT

11A. Were the lectures stimulating and interesting?

YES(usually, or somewhat) 95% VERY 5%

11B. Were the lecturers competent to speak on the subject assigned them?

YES 95% NO 5%

11C. Were the lecturers well prepared?

YES 70% NO 30%

12. Were you disappointed in any way with the group of participants?

YES 50% NO 50%

13. If you had it to do over again would you apply for this session which you have just completed?

YES 85% NO 15%

14. If a session such as this is held again would you recommend to others like you that they attend?

YES 80% NO 20%

15. Do you anticipate maintaining some sort of contact with at least one of the session staff?

YES 80% NO 20%

16. Do you feel that AERA is making an important contribution to education by sponsoring sessions such as this one?

YES 85% NO 15%

17. Do you feel that anything has happened during these five days to make it more likely that you will leave your present position of employment?

YES 15% NO 85%

18. Is it likely that you will collaborate in research with someone else attending this session (other than those you already were likely to collaborate with)?

YES 20% NO 80%

19. Do you think that the staff should feel that it has accomplished its objectives during this five-day session?

YES 50% NO 50%

PARTICIPANT ROSTER

Individual Differences, Learning and Instruction - AERA Research Training Session

AUSTIN, Gilbert R.
Secretary's Office
Health, Education and Welfare
Washington, D.C. 20201
Research on Compensatory education.

BARTON, Grant E.
Instructional Research and Development Dept.
Brigham Young University
Provo, Utah
Development of systematically designed and validated instructional packages.

BERNSTEIN, Norma T.
California State College
Long Beach, California
Curriculum development and individualization of instruction in area of language and thinking

BILSKY, Maxwell G.
Madison College
Harrisonburg, Virginia 22801
Motivation and learning from students and instructors viewpoint.

BORICH, Gary D.
Institute for Child Study
University Schools
Indiana University
Bloomington, Indiana
Learning and individual differences

BORTNICK, Robert M.
University of Chicago and
Glen Ellyn Elementary School District
Glen Ellyn, Illinois
Criterion references testing, cognition.

BRODY, Helen, M.
Dept. of Student Personnel
Queensborough Community College
City University of New York
Bayside, New York 11364
Educational change, personal development change.

BRYANT, Norman D.
Teachers College
Columbia University
New York, New York 10027
Learning disabilities and educationally relevant neuropsychological process.

BUCK, Elizabeth B.
School of Education
University of California
Los Angeles, California
Motivation, affective measures, operations research approach in education.

CLARK, Richard M.
Dept. of Educational Psychology
State University of New York
Albany, New York 12203
Child development, school learning.

COFFING, David G.
Educational Media, Technology and Systems
School of Education
University of Massachusetts
Amherst, Massachusetts
Paired-associate learning, pictorial versus symbolic representation, characteristic based learning i.e.,aptitude - treatment interaction.

CONNOLLY, John A.
American Institutes for Research
Washington Office
The measurement and instructional treatment of individual differences in learning

EVANS, Ross A.
Research and Demonstration Center for the Education of Handicapped Children
Teachers College
Columbia University
New York, New York 10027
Basic and applied learning research with the mentally retarded.

FULD, Paula A.
Dept. of Foundations, Psychology and Services
School of Education
Fordham University
New York, New York 10023
Verbal learning, individual differences, learning disabilities.

GILL, Noel C.
Psychology Department
Illinois State University
Normal, Illinois
Individualized instruction, attitude formation, group work and communication skills.

GRIMALDI, Joseph
Psychological and Educational Testing and Research
Marymount College
Tarrytown, New York
Neuropsychology, personality measurement, psychophysiological aspects of emotion.

GUSTAFSON, Kent L.
Instructional Media Center
Michigan State University
East Lansing, Michigan 48823
Design and development of validated instructional systems

HARRIS, Elizabeth
Computer Services
Illinois State University
Normal, Illinois
Individual differences related to learning experimental design.

HAWKES, Ellen G.
Public School System
Newtown, Connecticut
Curriculum development in social studies curriculum coordination K-12, individualized instruction, programmed instruction in cognition, reflective teaching, differential learning style diagnosis.

HONEYCUTT, Joan K.
Dept of Early and Middle Childhood
College of Education
The Ohio State University
Columbus, Ohio
Learning theories and their application.

JACOBS, Paul I.
Ferkauf Graduate School
Yeshiva University
New York, New York 10003
Experimental manipulations that affect cognitive development.

JENNINGS, Bettye Lea
Elementary and Special Education
College of Education
Michigan State University
East Lansing, Michigan 48823
Curriculum development.

KINGSLEY, David C.
Learning Institute of North Carolina
Durham, North Carolina 27701
Measurement of individual differences

LEE, Key T.
Dept. of Educational Psychology and Foundations
University of Northern Iowa
Cedar Falls, Iowa 50613
Teacher education.

LEE, Moon Yong
College of Education
Michigan State University
East Lansing, Michigan 48823
Motivation

LEONARD, W. Patrick
Instructional Materials Center
Temple University
Philadelphia, Pennsylvania
Curriculum development, teacher educatior

LOVELESS, Eugene J.
Dept. of Student Personnel
Queensborough Community College
City University of New York
Bayside, New York 11364
Individual differences, attitude scale construction, measurement of personality cognitive styles and orienting behavior.

LOWE, William T.
Dept. of Curriculum and Teaching
College of Education
University of Rochester
Rochester, New York 14627

McLOUGHLIN, William P.
Dept. of Curriculum and Instruction
St. John's University
New York, New York
Curriculum development, nongraded school individualization of instruction.

MILLER, George
Learning Research and Development Center
University of Pittsburg
Pittsburg, Pennsylvania 15213
Curriculum development, instructional materials design, instructional systems.

NATKIN, Gerald L.
Dept. of Education
Bucknell University
Lewisburg, Pennsylvania 17837
Learning and memory, individual differences, path analysis.

KOSMAC, Leona
Eastern Reginal Institute for Education
Syracuse, New York
Creativity, individual differences, learning.

KROLL, Herman
Dept. of Instructional Technology
School of Education
University of Southern California
Los Angeles, California
Learning theory, mediated instruction, experimental design, individual differences.

LANDRUM, Bill
Charleston County School District
Charleston, S. C.
Statistical theory, measurement

NUMMEDAL, Susan G.
Early Childhood Research Center
University of California
Los Angeles, California 90024
Motivation and cognitive development of young children of various ethnic and socioeconomic backgrounds.

OHNMACHT, Fred W.
Dept. of Educational Psychology
State University of New York
Albany, New York 12203
Transfer of abilities at different stages of acquisition, associational structures of school related concepts.

PIPER, Terrence J.
Dept. of Exceptional Education
School of Education
University of Wisconsin
Milwaukee, Wisconsin
Motivation, individual learning differences, individualized instruction, remediation of learning deficits.

REID, J. Christopher
Educational Research
University of Missouri
Columbia, Missouri 65201
Human Learning, measurement, statistics.

ROELKE, Patricia L.
Psychology Department
Emory University
Atlanta, Georgia
Language development, particularly semantics, relation of cognitive development-concept formation to language development application to reading ability-teaching.

RUBIN, Rosalyn A.
Research and Development Center in Education of Handicapped Children
University of Minnesota
Minneapolis, Minnesota
Biosocial characteristics, individual differences, gifted.

SCHALOCK, H. Del
Teaching Research
Oregon State System of Higher Education
Monmouth, Oregon 97361
Human development within the context of education, educational models, principles of instruction.

SMITH, Earl P.
School of Educatio
University of Virginia
Charlottesville, Virginia 22901
Selection and utilization of visual materials, formulation of objectives, teacher characteristics.

SPANGENBERG, Ronald W.
Human Resources Research Organization
Division No. 2
Fort Knox, Kentucky 40121
Message design and learning.

SPORBORG, Anthony
Curriculum Studies and Research
Instructional Services
Wilton Public Schools
Wilton, Connecticut
Individualism in students, divergent versus convergent productability and its implications for instruction and learning

STARKMAN, Stanley S.
Educational Laboratory
Chicago State College - West Center
Chicago, Illinois 60624
Instruction, remedial reading, experiment design, communication and classroom interaction.

Research Training Session

Multivariate Statistical Analysis

in Educational Research

Charles E. Woodson

University of California at Berkeley, California

RESEARCH TRAINING SESSION 2

1. Title: Multivariate Statistical Analysis in Educational Research

2. Staff:

M. I. Chas. E. Woodson	University of California, Berkeley
R. Darrell Bock	University of Chicago
Neil H. Timm	University of Pittsburgh
Jeremy D. Finn	State University of New York at Buffalo
Joel R. Levin	University of Wisconsin
Robert M. Pruzek	State University of New York at Albany
R. Gnanadesikan	Bell Laboratories

3. General Description:

This session consisted of an introduction to the concepts and techniques of multivariate analysis, including computer programs for making the appropriate calculations. Topics included: Univariate Analysis of Variance in Matrix Notation, Hotellings' T^2, multivariate regression and canonical correlation, multivariate analysis of variance, multivariate data reduction techniques, post-hoc tests, and other multivariate techniques, with emphasis upon multivariate analysis of variance.

Lectures began with a review of univariate statistics and the expression of univariate statistics in the matrix formulation necessary for multivariate designs. Much of the time there were alternative lectures with one designed for relatively advanced participants and another designed for those encountering multivariate techniques for the first time.

Although many of the recent advances in statistical inference for multivariate problems have not yet become widely used by behavioral scientists, there is an increasing awareness of the importance of multivariate statistical techniques for behavioral science research. Most behavioral science studies involve multiple dependent variables and it is desirable to simultaneously use the information from these multiple variables in making statistical inferences. Multivariate methods bring to such research problems the techniques of experimental design, linear estimation of points and intervals, techniques of experimental design, linear estimation of points and intervals, and tests of hypotheses which have been so useful in univariate situations.

4. Objectives:

The primary objectives of this presession were:

1. To present and interrelate the basic techniques and concepts of multivariate statistical analysis and to provide a conceptual foundation to research problems. In many cases this amounted to introducing the participants to new ways of thinking about their data.

2. To assist the participants in gaining some practical knowledge of the use of computers for doing multivariate analysis calculations.

5. SCHEDULE OF THE 1971 AERA RESEARCH TRAINING SESSION ON MULTIVARIATE STATISTICAL ANALYSIS MEETING AT EDUCATIONAL TESTING SERVICE

General Comments: Sessions will begin at 9:00 a.m. with a light breakfast at ETS; include a morning coffee break (10:30 a.m.), a 1:00-2:00 break for lunch, and an afternoon coffee break (3:00 p.m.), and will end at approximately 5:15 p.m. Evening sessions will be held at the Nassau Inn.

Saturday, 30 January, 1971 (Introduction and Univariate Analysis)

1. Overview of the Session and Procedures (Woodson).

2. Welcome from ETS; research at ETS (Messick of ETS).

3. The Role of Multivariate Methods in Educational Research (Bock).

4. Elementary Matrix Operations, Matrix Algebra, Data Matrices, and Matrix formulation of Designs (Woodson, Pruzek, Levin).

5. Introduction to Computers, Univariate Examples (Finn).

6. General Multivariate Linear Model: One-sample, Two-sample (Timm).

Sunday, 31 January, 1971 (Two-sample Multivariate Cases, Introduction to the General Linear Model, Further development of Univariate Cases)

7. Announcements (Woodson).

8a. Intuitive Introduction to Multivariate Analysis of Variance (Pruzek).
8b. Examples: Univariate (Levin).

9a. MANOVA: One-Way, & Criteria (Timm).
9b. Two-sample & k-sample, univariate problems (Woodson).

10a. Discriminant Analysis, two sample case (Pruzek).
10b. Post-hoc Tests for Univariate Problems (Woodson).

11a. Examples (Levin).
11b. Office Hours (Woodson).
11c. Office Hours (Bock).
11d. Computer Session: control cards and exercises (Finn).

Monday, 1 February, 1971 (Multivariate Analysis of Variance)

12. Announcements (Woodson)

13. Repeated Measures, I (Bock).

14a. MANOVA: Factorial Designs (Timm).
14b. Examples (Finn).

15a. Factorial vs Nested Designs, and Post-hoc Tests (Levin).
15b. Tour of ETS.

16a. Regression, Cannonical Correlation, Multivariate Analysis of Covariance (Timm).
16b. Examples (Woodson).

17a. Example: Multiple Multivariate Regression (Finn).
17b. Factor Analysis S& Covariance Structure Analysis, I (Pruzek).

18a. Examples (Levin).
18b. Office Hours (Timm).
18c. Office Hours (Pruzek).
18d. Computer Session: Results from MANOVA exercise (Finn).

Tuesday, 2 February, 1971 (Special Topics of Multivariate Analysis)

19. Announcements (Woodson).

20. Repeated Measures, II (Bock).

21a. MANOVA: left over topics (Timm).
21b. Example: 2x3 multivariate Design with Post-hoc Tests (Woodson).

22a. MANOVA: Nested Designs and Block Designs (Timm).
22b. Factor Analysis & Covariance Structure Analysis, II (Pruzek).

23a. Some relationships between factor analysis and MANOVA (Pruzek).
23b. Examples (Levin).

24a. 2***k MANOVA Designs and Planned Contrasts (Pruzek).
24b. Example: unequal n published study (Finn).
24c. Tour of ETS.

25a. Missing data in data reduction problems (Timm).
25b. Computer Session: Review Regression exercise (Finn).
25c. Introduction to the Cramer Program for Multivariate Analysis (Chas. Hall of ETS).
25d. Office Hours (Levin).

Wednesday, 3 February, 1971 (Overview of Multivariate Analysis)

26. Announcements (Woodson).

27. Informal Techniques of Inference, I (Gnanadesikan).

28. Methods and Issues in the Analysis of Repeated Measures and the Analysis of Covariance (Bock).

29. Informal Techniques of Inference, II (Gnanadesikan).

30. Discussion and evaluation of session (Woodson).

31. Panel discussion (questions and comments from the participants welcome): Multivariate Statistical Analysis in Educational Research (all instructors).

6. Participants:

Applications were screened and evaluated by the director in consultation with the staff. Approximately 168 formal and 25 informal applications were received, 99 were admitted (approximately 20 as replacements for cancelation), and 77 actually attended.

A priority system was established on admissions. Persons holding a doctorate and teaching graduate courses in applied statistics at the level of Hays and Kirk were admitted at once. Following that, persons with a doctorate and reporting considerable formal training in applied statistics were admitted. Following that, persons without the doctorate but with special interest in these techniques were admitted. Persons indicating very little background in statistics were not admitted. The standards for admission became stricter as the available space filled.

The participants, on the average, indicated they had an average of 4.6 (s=2.8) graduate courses in statistics, 1.8 (s=1.4) graduate courses in measurement, taught 2.7 (s=3.8) courses in elementary stastics, taught 1.1 (s=1.9) courses on research design, and had published an average of 3.7 (s= 5.2) research articles.

The average level of statistical competency was higher than last year. This is probably a function of persons with a particular interest in the techniques becoming aware of the program as well as the selectivity of admissions. Participants included researchers in biology, medicine, public health, computer science, as well as in psychology and education.

Most participants were from the east, some from the south and midwest, and very few from the west. Many of the cancelations were from the west and referred to travel funds as a major problem.

7. Materials

A large number of handouts were prepared and used during this session. These handouts, as last year, received a large number of favorable remarks. The letter of acceptance to participants suggested texts, readings, and concepts the participant should explore as preparation for the session.

Copies of the chapter by Bock and Haggard, some duplicated materials by Woodson, and information about ETS and Princeton were mailed to participants

At the session, the following materials were distributed:

1. Bock, R. D. & Haggard, E. A. The use of multivariate analysis in behavioral research, Whitla, D. K. (Ed.), Handbook of Measurement and Assessment in Behavioral Sciences. Reading, Mas. Addison, Wesley, 1968.

2. Finn, J. D., Multivariance: Fortran Program for Univariate and Multivariate Analysis of Variance and Covariance. State University of New York at Buffalo, 1967.

3. Timm, N. H. Prepublication copies of three chapters on multivariate statistics.

4. Pruzek, B. Two in-press articles and other class notes.

5. Levin, J. Several duplicated examples and other class notes.

6. Bock, R. D. Chapters 4 and 5 of forthcoming book on multivariate statistics.

7. Finn, J. D. Several duplicated examples.

8. Gnanadesikan, R. Bibliography on informal methods.

9. Woodson, M. I. C. E. Duplicated lecture: notes, examples, and bibliography.

8. Evaluation and Test Results:

Short quizzes on matrix algebra, linear models and analysis of experimental data were given early in the session. Correlations of scores on these tests and a number of descriptive variables were examined. The highest correlations (about .5) were with number of statistics courses taught and number of research design courses taught.

A number of short quizzes were given during the lectures. These were used primarily by the instructor involved and provided a useful feedback device, particularly for dealing with the less vocal participants and early in the program.

Participants were encouraged to give their comments and problems to the director. Many suggestions were made and many adaptations to the program were made.

An evaluation questionnaire was distributed at the end of the session. Most participants felt satisfaction with the staff and lectures.

9. Director's Evaluation:

The major factor in the success of the research training session on "Multivariate Statistical Analysis" was the excellent staff. Their work and high degree of competence combined favorably with their variety of interests and approaches.

The cooperation and assistance of Educational Testing Service was an important factor in the success of the session. In addition to providing meeting rooms and supplies, Anna Dragositz of ETS spent many hours of work in making arrangements for the session. Her experience and work added a great deal to the success of the session.

In general, I feel the meeting place used last year, the Continuing Education Center at the University of Chicago, was a better arrangement. Communication back and forth between Princeton and ETS was a greater problem than I expected and made evening meetings very difficult.

Some participants felt the description in the Educational Researcher was misleading. The description of the course as being for applied researchers was relatively accurate, but more effort could have been made to indicate background necessary for multivariate statistics. One of the major problems we anticipated and tried to meet was that many researchers do not know what multivariate statistics are and are unprepared to find the topic difficult.

The computer sessions were generally disappointing. The ETS computer staff apparently misinterpreted the directors' requests. Computer runs were not possible off hours or on weekends due to the ETS security procedures and the distance from the hotel. Computer runs were more limited than expected but by the last two days many participants were making runs successfully. The staff had prepared pre-run outputs which were distributed and discussed. The opportunity to submit computer runs was an important part of the objectives of the sessions and we had hoped it would be more successful.

In conclusion, both staff and participants seemed very pleased with the session. There was wide agreement that it served an important need. However, most participants felt it moved too fast and the preparation that they had was not adequate to fully benefit from the session. This is probably related to the lack of courses such as this in most universities. Perhaps one of the best measures of our success is that I have already received 21 requests for copies of the handouts and 24 inquiries about next year, from persons who have spoken to participants in the session.

AERA 1971 Research Training Sessions

Evaluation by Participants

NAME OF SESSION: MULTIVARIATE STATISTICAL ANALYSIS

DIRECTOR: CHARLES E. WOODSON

****

1A. To what extent did the relative availability or unavailability of books and journals interfere with or promote your attempts to master the content of this session?

NONE 41% LITTLE 30% SOME 29%

1B. To what extent did reproduced materials given to you by the staff improve matters?

HELPFUL 47$ 47% VERY HELPFUL 53%

2A. Did you feel that you lacked a "place to work", either alone or in small groups?

YES 11% NO 83% No COMMENT 6%

2B. Was your room satisfactory?

YES 48% NO 13% No COMMENT 39%

3A. Which features of the meeting rooms were inadequate or not conducive to learning?

BLACKBOARDS 33%
SIZE 16%
LIGHT 25%
AIR 25%
LACK OF OVERHEAD PROJECTOR 10%
FURNISHINGS 0%
MISCELLANEOUS. 6%

3B. Which features were especially facilitative in the same regard?

LIGHT 14%
SOUND 31%
CONVENIENCE 39%
AIR 13%
FURNISHINGS 27%
No COMMENT 33%

.....%

4A. Was five days too long a period to leave your work at home for the purpose of attending this session?

YES 13% NO 87%

4B. Was five days too short a period in which to learn much of the content of this session?

YES 63% NO 37%

5A. Were you allowed enough time in which to pursue activities of your own choosing?

YES 65% NO 10% No COMMENT 25%

5B. Would you have preferred not to meet in the evening after dinner?

YES 13% NO 45% No COMMENT 42%

5C. Would you have preferred more or fewer meetings per day than there actually were or was the number of meetings per day agreeable to you?

FEWER 7% ENOUGH 85% MORE 8%

6A. Were the individual lectures too long to sit and listen or take notes?

YES 3% NO 97%

6B. Were the lectures scheduled in an appropriate sequence?

YES 31% NO 69%

7. Did you have sufficient opportunities to interact with other participants?

YES 81% NO 19%

8A. Were the instructors too inaccessible or unapproachable so that you did not get the individual attention that you desired?

YES 9% NO 77% No COMMENT 14%

8B. Was it helpful to have graduate student assistants present?

YES 4% NO 4% No COMMENT 92%

9A. Did the content of the lectures and readings presuppose more previous training than you had?

YES 75% NO 25%

9B. Did the content of the lectures and readings presuppose less previous training than you had?

YES 8% NO 92%

10. To what extent was the content of the lectures and readings relevant to what you hoped to accomplish during the session?

SOME 42% MUCH 50% No COMMENT 8%

11A. Were the lectures stimulating and interesting?

YES(usually, or somewhat) 84% VERY 16%

11B. Were the lecturers competent to speak on the subject assigned them?

YES 100% NO

11C. Were the lecturers well prepared?

YES 84% NO 16%

12. Were you disappointed in any way with the group of participants?

YES 23% NO 77%

13. If you had it to do over again would you apply for this session which you have just completed?

YES 83% NO 17%

14. If a session such as this is held again would you recommend to others like you that they attend?

YES 86% NO 14%

15. Do you anticipate maintaining some sort of contact with at least one of the session staff?

YES 61% NO 39%

16. Do you feel that AERA is making an important contribution to education by sponsoring sessions such as this one?

YES 96% NO 4%

17. Do you feel that anything has happened during these five days to make it more likely that you will leave your present position of employment?

YES 19% NO 81%

18. Is it likely that you will collaborate in research with someone else attending this session (other than those you already were likely to collaborate with)?

YES 23% NO 77%

19. Do you think that the staff should feel that it has accomplished its objectives during this five-day session?

YES 64% NO 36%

American Educational Research Association
Training Session on

Multivariate Statistical Analysis in
Educational Research

at

Educational Testing Service

January 30 - February 3, 1971

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1/31/71

Research Training Session

The Research Component of Black Studies

LaMar P. Miller, New York University

1. Title: The Research Component of Black Studies

2. Staff:

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Dr. Roscoe C. Brown Jr.	Director Institute of Afro-American Affairs New York University
Mr. Ewa Eko	Coordinator Six Institutions Consortium Bennett College
Dr. Edgar G. Epps	Professor of Education School of Education University of Chicago
Dr. Edmund Gordon	Chairman, Guidance Department Teachers' College Columbia University
Dr. Henry Simmons	Chairman Black Studies Department University of Indiana
Dr. Francis Botchway	Director Institute of Afro-American Studies Richmond College
Mr. James Elsberry	Director of Community Department Research Division Center for Urban Education
Dr. James Rosser	Office of Academic Affairs University of Kansas

Dr. Ronald Walters

Director
Black Studies Department
Brandies University

3. General Description

One of the most publicized and controversial field in education over the past two years has been black studies. Although there is great concern about the conduct of black studies, universities, secondary and elementary schools continue to establish programs. Moreover, there is little agreement among scholars or students on how to define the field, who should develop it, what research is needed and how the research should be conducted.

From the onset of black student struggles for black studies programs, generated primarily on college campuses through the recent period of increased demands for black studies on elementary and secondary levels, educational institutions have faced new questions and troubling issues. If research is to be of assistance in helping schools to objectively include the contributions of various ethnic groups in the curriculum we need to be able to delineate what factors are currently operating in the system so that we can encourage or discourage choices. While many shortcomings and advantages in the curriculum are obvious to scholars, school men and Black Americans, there are specific questions that have not been raised and problem areas left not well understood. The

objectives of the training session provided direction for those seeking to improve the field as an academic discipline through research.

A frequent criticism of black studies is that no adequate foundation has been developed upon which to base instructional programs. Black scholars note that in historical, political, economic, psychological and sociological research one can find examples of gross negligence and cite instances of distortions or half-trutns in allegedly respectable work concerning black people. If we consider a field in which the systematically-synthesized knowledge may be either sparse or distorted, then the principle component of any ethnic or Afro-American studies program ought to be concerned with expanding the discipline base upon which the studies are built.

4. Objectives :

The research training session was designed to provide methodological and non-methodological information for those who are involved in developing and evaluating programs or working in related research areas. The program aimed to help participants acquire an understanding of the nature and proper place of black studies in education so that they would be better equipped to develop lasting programs in various settings. The three primary aims implementing

the program purpose were development of participants knowledge regarding basic ideology, organization and structure and program content. The objectives of the program were to:

1. examine existing research methodologies which can aid in establishing a solid discipline base for black studies.
2. describe new and innovative methods of research which seem most appropriate from a black scholar's point of view.
3. outline and encourage new areas of research that are related to black studies.
4. report on research projects involving black studies that are currently in progress or that have recently been completed.
5. examine new approaches to curriculum development in black studies and related areas.

5. Schedule:

First Day: Session 1:
Orientation: statement of objectives, introduction of staff with identification of their special competencies and interests, group discussion of participants, specific interests and needs.

Session 2:
The Relationship of the Community to Research in Black Studies. A Summary of complaints of black students on current educational programs.

Second Day: Session 1:
African Cosmological Ideas: Methodological Approaches. A delineation of African cosmological philosophy as the basis for the African component of Black studies programs.

Session 2:
Research, Curriculum Development and Black Studies in Schools of Education and in Elementary and Secondary Schools.

Third Day: Session 1:
Problems frequently overlooked that pertain to research in the Black community.
Research as a component of Black studies programs.

Session 2:
Research, Curriculum Development and Black Studies in the University.

Fourth Day: Session 1:
Some Research Designs for Evaluating Black Studies Programs.
New Strategies in Educational planning and Research for Black Studies.

Session 2:
Methodologies of Research on Achievement Orientation of Black Consciousness.

Evening Lecture:
A Saga of Black History
Alex Haley Author of the Autobiography of Malcolm X

Fifth Day: Session 1:
The Methodology of Oral History in Expanding the Discipline of Black Studies.

Session 2:
An Analysis of the Performance of Black Students in a Black Studies Program.
New Directions for Black Studies as a Discipline.

6. Participants:

The age of the twenty participants ranged from 27 to 53. Fourteen of the participants were under 40 and three were under thirty. Six of the participants were female. Only four of the participants were members of AERA and none had attended previous AERA pre-sessions.

Half of the participants held the doctorate and four were candidates for the doctorate. One participant held a law degree and the others held M.A. degrees.

Eighteen of the participants were from a college or university. One participant worked for a research consulting firm and the other was part-time lawywer and part-time Director of Black Studies Program. All of the participants held positions that were in some way connected with or related to the development or evaluation of Black Studies Programs.

The following list is a break-down of the positions held by the participants:

Coordinator Ethnic and Cultural Studies
Director of Research
Director of Black Studies
Coordinator of Urban Studies Program and Assistant Director of Program to Develop Social Studies Units
Program Analyst and Designer of Mental Health Programs - Consultant to Special Programs for Disadvantaged
Teacher - graduate courses - Introduction to Research, 1 Under Graduate Course - Educational Psychology

Professor of History and Chairman of Social Studies
Professor of Curriculum and Research on Problems of Indian Pupils
Chairman Black Studies
Assistant Professor - Higher Education
Research Assistant- Coordinator of Career Opportunities Programs
Director Black Education Center - Professor of Curriculum
Graduate Students
Director - Center for Afro-American Studies

Participants represented ten states; New York, Tennessee, California, Florida, Ohio, Nebraska, Maryland, Illinois, Michigan and Indiana. One student was from Toronto, Canada.

7. Instructional and Evaluation Materials:

Instructional reference materials were distributed during the pre-session. These consisted of recent papers by staff members, bibliographies, directories of Afro-American and Afro Resources, bibliographies of multi-media resources on Afro-American Studies and a Directory of Afro-American Studies and Departments in various colleges and universities around the country. All of the resources of the Institute of Afro-American Affairs at New York University were made available as well as the Schomberg Library in Harlem. The Institute of Afro-American Affairs donated copies of their materials such as the literary magazine, Black Creations, Dr. Miller's report on Black Studies In The 70's, and copies of the New York University Educational

Quarterly on Black Studies. Since many of the participants were actively involved in the development of programs they contributed by sharing their information on instructional and evaluational materials. Texts of a general nature were also provided such as Teaching the Black Experience (Banks), and Black Studies in the University (Robinson).

8. Evaluation:

Verbal feedback was illicited in informal, individual and small group conferences throughout the pre-session. Written observation or critiques were submitted by the participants following the pre-session. In general, participants judged the program as a highly useful experience that provided valuable information. Since one of the major objectives was to provide direction for participants an effort will be made in the form of a follow-up questionnaire. In addition to this, the director of the pre-session, has maintained close contact with 70% of the participants. Most have been back to the Institute of Afro-American Affairs for additional assistance and consultation. There were, of course, some negative aspects of the pre-session. The physical facilities were inadequate. While regular staff members were able to hold individual conferences with participants, thosewho came in as part-time instructors did not have this opportunity.

The participants were most interested in having a pre-session such as this one repeated. While a great deal of ground was covered, they felt that we had indeed only scratched the surface. On the other hand, they were particularly pleased that the offerings were specific and to the point.

9. Directors Evaluation:

In general both the staff and the participants felt that the pre-session was successful. Probably the best single index of this success was that the participants overwhelming indicated that the pre-session should be offered again.

What we were able to do in this pre-session was but a small segment of the story of the developing discipline of Black Studies. Of primary value is that hopefully this experience will help delineate some of the more serious issues of Black Studies.

While many of the sessions delt with issues that have been debated at Black Studies Conferences, there was far more specificity concerning ideology, but participants and speakers clearly recognize that the organization and such things as scope and sequence of programs depended on the philosophy of those conducting or planning programs.

In this pre-session, unlike others I have attended, the backgrounds and interests of the participants were quite similar. Their expectations, however, varied. Perhaps we could have done more to have a better indication of what their expectations were.

This kind of pre-session, in an area that is in itself controversial, should be and was quite different than those dealing with strictly methodological concerns. In many ways, if it is true that it was valuable, it was also relevant. The outstanding qualifications of staff members in a pre-session such as this one is highly unusual. I think it would be difficult to bring together this kind of expertise in any other geographic area except New York City.

In all probability the most important function of the pre-session was that it clearly suggested that the future development of Black Studies must be based on research. We do not know the extent to which the pre-session encouraged future research. This aspect, of course, is difficult to evaluate at the present time. We did, however, raise some critical issues for research in an attempt to stimulate those interested in improving Black Studies. We also believe we were able to define the perimeters and dimensions of a new and improved field.

AERA 1971 Research Training Sessions

Evaluation by Participants

NAME OF SESSION: THE RESEARCH COMPONENT OF BLACK STUDIES

DIRECTOR: LAMAR MILLER

****

1A. To what extent did the relative availability or unavailability of books and journals interfere with or promote your attempts to master the content of this session?

NONE 55% LITTLE 28% SOME 17%

1B. To what extent did reproduced materials given to you by the staff improve matters?

HELPFUL 60% VERY HELPFUL 40%

2A. Did you feel that you lacked a "place to work", either alone or in small groups?

YES 11% NO 72% No COMMENT 17%

2B. Was your room satisfactory?

YES 59% NO 35 No COMMENT 6

3A. Which features of the meeting rooms were inadequate or not conducive to learning?

BLACKBOARDS 33%
SIZE 0
LIGHT 10%
AIR 72%
LACK OF OVERHEAD PROJECTOR 11%
FURNISHINGS 0
MISCELLANEOUS 5%

3B. Which features were especially facilitative in the same regard?

LIGHT 11%
SOUND 33%
CONVENIENCE 22%
AIR 0
FURNISHINGS 11%
No COMMENT 33%

4A. Was five days too long a period to leave your work at home for the purpose of attending this session?

YES 12% NO 88%

4B. Was five days too short a period in which to learn much of the content of this session?

YES 12% NO 88%

5A. Were you allowed enough time in which to pursue activities of your own choosing?

YES 86% NO 7% No COMMENT 7%

5B. Would you have preferred not to meet in the evening after dinner?

YES 17% NO 56% No COMMENT 27%

5C. Would you have preferred more or fewer meetings per day than there actually were or was the number of meetings per day agreeable to you?

FEWER 12% ENOUGH 88% MORE 0

6A. Were the individual lectures too long to sit and listen or take notes?

YES 6% NO 94%

6B. Were the lectures scheduled in an appropriate sequence?

YES 82% NO 18%

7. Did you have sufficient opportunities to interact with other participants?

YES 100% NO 0

8A. Were the instructors too inaccessible or unapproachable so that you did not get the individual attention that you desired?

YES 6% NO 76% No COMMENT 18%

8B. Was it helpful to have graduate student assistants present?

YES 65% NO 0 No COMMENT 35%

9A. Did the content of the lectures and readings presuppose more previous training than you had?

YES 17 % NO 83%

9B. Did the content of the lectures and readings presuppose less previous training than you had?

YES 28% NO 72%

10. To what extent was the content of the lectures and readings relevant to what you hoped to accomplish during the session?

SOME 33% MUCH 61% No COMMENT 6%

11A. Were the lectures stimulating and interesting?

YES(usually, or somewhat) 82% VERY 18%

11B. Were the lecturers competent to speak on the subject assigned them?

YES 88% NO 12%

11C. Were the lecturers well prepared?

YES 88% NO 12%

12. Were you disappointed in any way with the group of participants?

YES 12% NO 88%

13. If you had it to do over again would you apply for this session which you have just completed?

YES 94% NO 6%

14. If a session such as this is held again would you recommend to others like you that they attend?

YES 88% NO 12%

15. Do you anticipate maintaining some sort of contact with at least one of the session staff?

YES 88% NO 12%

16. Do you feel that AERA is making an important contribution to education by sponsoring sessions such as this one?

YES 94% NO 6%

17. Do you feel that anything has happened during these five days to make it more likely that you will leave your present position of employment?

YES 0 NO 100%

18. Is it likely that you will collaborate in research with someone else attending this session (other than those you already were likely to collaborate with)?

YES 44% NO 56%

19. Do you think that the staff should feel that it has accomplished its objectives during this five-day session?

YES 94% NO 6%

AERA 1971 Research Training Session

The Research Component of Black Studies

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Long Term Follow Up

of

1971 AERA Research Training Sessions

Since 1966 AERA has sponsored research training activities. Some of these training activities have been workshops preliminary to the regular Annual Convention. A regular part of the "presessions" has been their evaluation. Each presession director has planned and conducted some sort of evaluation of his presession, usually on the final day of the workshop. In some cases these evaluations have been exams covering the skills and concepts taught, and in other cases they have been more in the vein of attitude surveys. In recent years the Association has conducted its own post-training session evaluation. These have been primarily designed to obtain information from participants relative to the relevance, effectiveness and utility of the presession topic and instructional procedures as well as the logistical support of accomodations and services available to the trainees.

Prior to the 1971 Research Training Sessions there had been no long term follow up on the possible effects of the sessions on the research and research related behaviors such as teaching, administration and service. Clearly, if the Association is going to continue its support of these activities, there should be some evidence of the sessions' influence on what the trainees do when they return to their home institutions.

As a first attempt to obtain such data, a survey instrument was devised which solicited information from those attending the 1971 Research

Training Sessions. Often such questionnaires ask the respondent if he thinks the experience he has had (the training) has made a difference in his attitude or feelings. In the instrument developed to assay the effects of the 1971 presessions, the questions were worded in such a way as to inquire into the actual research related behaviors. For example, respondents were asked three questions relating to the frequency of their communication with their colleagues on topics relating to their presession. They were not asked if they felt their communication about research ideas related to the presession had changed.

The questionnaire had two major parts. The first was general and was directed to all trainees irrespective of the particular session they attended. In addition, a second part contained questions related to specific presessions. Each director was contacted and invited to submit a series of items relating specifically to the use being made of the concept and skills taught in his presession. Three of the nine directors responded with a set of questions. They were included as the second part of the questionnaire sent to their "students".

Each respondent was asked to provide information on his general research activity since the presession, the identification of his presession, and more specific information if the presession he had attended was one of the three mentioned above. The presession identification would permit analysis of the returns by presession. Mailing lists were prepared from the enrollment records in the AERA Central Office. The first mailing went out about November, 1971, approximately nine months after the 1971 presessions were held. There was a follow up letter sent two weeks after the first mailing to remind

the respondents to complete and return the survey. Appendix A presents the general part of the final survey instrument.

Results and Analysis

The data were collected and coded for analysis in the AERA Central Office in Washington. Final returns and code sheets were sent to Michigan State University for key punching and analysis about January 15, 1972. During a preliminary analysis of the data, certain inconsistencies in the identification of the presession led us to make a thorough check of the mailing lists. This check revealed that an error had occurred in their preparation which resulted in a failure to send questionnaires to all those who did attend a presession. The nature of this error and its consequences for subsequent analysis can be seen in Table 1.

Table 1

Enrollment, Sampling Proportion and Response Rate for Each 1971 Research Training Session

Presession Director(s)	Number Enrolled	Proportion Sampled	Response Rate
Miller	20	1.60 (32)*	.25 (8)
Woodson	77	1.09 (84)	.57 (48)
Farley	62	.81 (50)	.48 (24)
Ryan	22	1.00 (22)	.59 (13)
Baker & Popham	91	.38 (35)	.94 (33)
McSweeney & Porter	48	1.00 (48)	.48 (23)
Tracz & Bruno	48	.94 (45)	.49 (22)
Rothkopf & Frase	38	.63 (24)	.50 (12)
Totals	406	.84(340)	.54(183)

*See text for meaning of sampling proportions in excess of 1.00. Numbers in parantheses indicate frequencies.

As can been seen, some of the presessions were badly undersampled and two were oversampled. This latter occurred because some individuals attending one of the presessions were erroneously included in Miller's and Woodson's sessions. We have no reason to believe that we sampled individuals not attending any presession. Since this error was not discovered until long after the original mailing and even the follow up mailing, we had to live with it. The consequence was that no comparison among presessions could be made. All analyses had to be restricted to the total group.

Table 2

Means, Standard Deviations, Percent of Responses in Each Category for Survey Questions One to Ten and Fourteen

Question	Decreased 1	2	3	Remained the same 4	5	Increased 6	7	N	Mean	S.D.
1. The number of letters exchanged related to presession	2.81	0.0	.56	64.04	16.85	9.55	6.18	178	4.45	1.08
2. The number of requests for articles related to presession	1.69	1.69	.56	63.48	15.17	10.11	7.30	178	4.48	1.10
3. Number of requests sent out for articles related to presession	1.11	.56	.56	36.67	26.11	22.78	12.22	180	5.03	1.16
4. Collaboration with others on research related to presession	1.12	1.68	1.12	40.78	25.14	16.76	13.41	179	4.91	1.22
5. Independent research related to presession topic	1.69	1.69	.56	37.85	31.07	13.56	13.56	177	4.90	1.22
6. Time devoted to reading literature	.56	.56	2.78	20.00	36.67	25.00	14.44	180	5.24	1.11
7. Time devoted to thinking about related problems	.55	.55	1.10	14.36	29.28	32.04	22.10	181	5.56	1.11
8. Tendency to see qualifications, etc., in recently read articles	0.0	.56	1.67	20.00	33.33	26.67	17.78	180	5.37	1.08
9. Skill in planning and developing research	0.0	0.0	0.0	20.11	39.11	24.58	16.28	179	5.37	.98
10. Relationships seen between instruction and presession	0.0	0.0	1.12	19.18	32.02	29.78	17.98	178	5.44	1.03
14. Since presession professional activity	0.0	0.0	3.37	71.35	15.73	5.62	3.93	178	4.35	.80

Table 2 presents the percent, mean and standard deviation for the responses to items one to ten and fourteen of the general questionnaire. The majority of respondents had not experienced any increase in the number of presession-related letters they have exchanged, nor had they noted an increase in the number of requests for articles and materials related to the presession topics. The majority did report, however, that they had requested more articles and materials on the presession in the period following the end of the presessions.

The next two questions dealt with independent and collaborative research activity. In both cases the majority of the respondents reported an increase in activities. Over 75% of the respondents reported an increase in the time they devoted to reading and thinking about the research related to the topics considered in the training session they attended.

Questions #8 and #9 solicited information on changes in the skill related to planning and designing of research activities. Again, over 75% of the respondents reported an increase in their ability to see qualifications and complicating factors in the research reports they had read since completing the presession. They also reported an increase in their skill in planning and developing research activities.

It was believed important to ascertain how research training sessions might influence teaching activities. Question #10 was developed to obtain data relevant to this problem. A sizeable majority of the respondents reported an increase in their recognition of the relationship between instruction and the presession topic. Finally, a majority indicated that the presession did not change their involvement in professional activity.

Questions #12 and #13 sought to determine the degree and nature of the "student's" efforts at continuing his learning about the topics related to the presession. Eighty-three percent said they had made an attempt during the nine months following the presession to add to their understanding of the problems discussed during their training period. Of those reporting continuing involvement in learning, 15% said they accomplished their study by reference to materials handed out during the presession, 22% reported using textbooks, 44% reported using a combination of presession materials and textbooks, and the remaining 19% reported using short-courses and various combinations of the two most preferred means.

Another way in which the presessions might have had an influence on their students is through their (students) allocation of time. Question #15 sought information on this point. Table 3 presents the results of this question.

Table 3

Response to Question #15
Percent of Time Allocated to Various
Professional Activities Before and
After the Presession

Percent of Time Devoted	Mid Category Score	Teaching		Research		Administration		Service	
		Before	After	Before	After	Before	After	Before	After
0 to 20	10	48.21	49.40	40.48	35.12	66.67	66.07	80.36	83.33
21 to 40	30	13.69	14.88	20.83	27.98	14.29	13.10	12.50	10.71
41 to 60	50	26.19	21.43	17.26	14.88	8.93	10.71	5.36	4.17
61 to 80	70	6.55	9.52	8.33	8.33	4.76	5.95	1.19	1.79
81 to 100	90	5.36	4.76	13.18	13.69	5.36	4.17	.60	0.00
Mean		31.4	31.4	37.1	37.6	23.4	23.9	19.0	15.0
N		168	168	168	168	168	168	168	168

Table 3 was prepared by first categorizing the percents recorded by the respondents into one of five categories; 0 to 20%, 21 to 40%, 41 to 60%, 61 to 80% and 81 to 100%. The mean times reported on the bottom of the table were computed by using the mid-category (10, 30, 50, 70 and 90) as the score for that category. As can be seen from Table 3, there is very little, if any, evidence for a change in the allocation of time across the four activities of teaching, research, administration and service from before the presessions to after.

Questions #11 and #16 dealt with the incidence of scholarly and teaching activity related to the presession. Over two-thirds (66.86%) of the respondents reported they had written a scholarly paper which they believed directly benefited from their presession attendance. However, only 25% indicated they had planned courses that were related to the presession topics.

Factor Analysis of Questionnaire

Since this was the first attempt at a long term follow up of the effects of the AERA Research Training Sessions, and there might be others in succeeding years, it was decided to determine the factor structure of the items included in the survey instrument. Items one through twelve, fourteen and sixteen (see Appendix A) were included in the analysis. There were useable responses from 181 respondents for the first stage of the analysis. This first stage was a principal axis analysis of the matrix of intercorrelations (Table 4). The first four roots had Eigen Values greater than one (4.92, 1.37, 1.20, and 1.03).

Table 4

Intercorrelations Among Fourteen Selected Variables (n=181)

Variables*	1	2	3	4	5	6	7	8	9	10	11	12	14	16
1	1.000													
2	.595	1.000												
3	.389	.341	1.000											
4	.480	.458	.348	1.000										
5	.305	.364	.227	.608	1.000									
6	.260	.346	.415	.273	.335	1.000								
7	.283	.341	.330	.366	.356	.624	1.000							
8	.262	.292	.165	.239	.276	.388	.501	1.000						
9	.238	.302	.285	.356	.376	.349	.473	.490	1.000					
10	.229	.319	.293	.259	.294	.422	.527	.366	.491	1.000				
11	.218	.178	.134	.389	.418	.142	.241	.277	.258	.316	1.000			
12	.149	.140	.285	.241	.243	.293	.346	.242	.220	.352	.222	1.000		
14	.077	.043	.106	.203	.082	.057	.128	.197	.205	.288	.092	.035	1.000	
16	.236	.347	.150	.306	.314	.190	.318	.169	.215	.324	.351	.229	.142	1.000

*See Appendix for an identification of the variables. The variable numbers are the same as the item numbers from the questionnaire. Items #13 and #15 were eliminated because their format did not lend itself to factor-analytic treatment.

These roots accounted for approximately 60% of the variance. The Eigen vectors associated with the first four roots were rotated to "simple structure" by the varimax criterion with the results as portrayed in Table 5.

Factor I is characterized by high (greater than .50) positive loadings on the following items: time devoted to reading the literature (#6), time devoted to thinking about research problems (#7), tendency to see qualifications and complications in the literature (#8), skill in developing and planning research activities (#9), seeing of relationship between the literature and instruction (#10), and making attempts to increase knowledge of literature (#12). The highest two loadings were on items dealing with the commitment of time (#6 and #7). Since the remaining high loadings, though not treating time directly, do indicate an allocation of time to research activities related to the presession topic; the factor might be characterized as a motivational factor tapping the depth of the individual's involvement and commitment to the research area covered by the presession he attended.

Table 5

Varimax Rotational Analysis
Questionnaire Items
Numbers 1-12, 14 & 16

Variables (Item No.)	Factor I	Factor II	Factor III	Factor IV	h^2
1	.0817	.8152*	.1848	.0715	.7105
2	.1825	.7699*	.2119	.0455	.6731
3	.4011	.5828*	-.0286	-.0739	.5068
4	.1175	.5603	.5720*	.1374	.6738
5	.2129	.3233	.6660*	.0070	.5935
6	.7407*	.3222	.0032	-.1312	.6696
7	.7788*	.2195	.1897	.0262	.6914
8	.6162*	.1151	.1600	.2847	.4997
9	.5848*	.1762	.2329	.3369	.5407
10	.6682*	.0825	.2698	.2720	.6001
11	.1415	-.0090	.7955*	.0489	.6554
12	.5504*	-.0265	.3270	-.3080	.5054
14	.1289	.0126	.0709	.8656*	.7710
16	.1651	.1417	.6169*	.0610	.4317
High Loading	.7788	.8152	.7955	.8656	
Proportion of Variance	.2107	.1600	.1546	.0834	
Cumulative Proportion of Variance	.2107	.3707	.5253	.6088	

Factor II had only three items with loadings in excess of .50. All three of these items dealt with rather overt communication behaviors; i.e., letters exchanged (#1), requests for articles and/or materials (#2) and requests sent out for articles and/or materials (#3).

Factor III had four items loading on it. They were, in order of size: publication of a paper which benefited from the presession (#11), planning of courses related to the presession topic (#16), independent research related to presession (#5) and presession related collaborative research (#4). Where Factor I seemed to be related to motivation or commitment to research, Factor III seems to be more concerned with the product of research commitment or the manner in which that product is generated.

The final factor, IV, had only one item with a loading in excess of .50, number 14, dealing with involvement in professional associations since the presession.

Summary

A survey of the long term (nine months) effects of the research training sessions sponsored by AERA prior to the 1971 Annual Convention was conducted. An instrument was designed to obtain data from those Association members attending the presessions relating to their presession related research activities. The results showed some rather large, self-reported effects of those responding. A factor analysis of the questionnaire items was reported which yielded four factors.

Appendix A

The general questions, to be answered by all respondents, refer to your behavior or activities since your attendance at the presession. Please circle your response to each question.

1. The number of letters that I have exchanged related to the Presession topic has,

decreased			remained the same			increased
1	2	3	4	5	6	7

2. The number of requests that I have received for articles and/or materials related to the Presession topic has,

decreased			remained the same			increased
1	2	3	4	5	6	7

3. The number of requests that I have sent out for articles and/or materials related to the Presession topic has,

decreased			remained the same			increased
1	2	3	4	5	6	7

4. My collaboration with others on research related to the Presession topic has,

decreased			remained the same			increased
1	2	3	4	5	6	7

5. My independent research related to the Presession topic has,

decreased			remained the same			increased
1	2	3	4	5	6	7

6. The time that I have devoted to reading the literature related to the Presession topic has,

decreased			remained the same			increased
1	2	3	4	5	6	7

7. The time that I devote to thinking about problems related to the Presession topic has,

decreased			remained the same			increased
1	2	3	4	5	6	7

8. My tendency to see qualifications and complicating factors in the literature that I have read recently (within 9 months) relating to the Presession topic has,

decreased			remained the same			increased
1	2	3	4	5	6	7

9. My skill in developing and planning research activities related to the Presession topic has,

decreased			remained the same			increased
1	2	3	4	5	6	7

10. The relationships that I see between instruction (teaching/research) and the topic of the Presession has,

decreased			remained the same			increased
1	2	3	4	5	6	7

11. Have you written a scholarly paper either published or unpublished which you feel directly benefited from your attendance at the 1971 Presession?

No Yes

12. Have you made an attempt in the last 9 months to increase your knowledge of (read here, the topic of the Presession you attended) as a result of your attendance at the 1971 Presessions (i.e., did you do something you might not have done if you had not attended)?

No Yes

13. If you answered the above question "yes" indicate how by circling one or more of the following alternatives:
    a. By studying the instructional materials handed out at the Presession.
    b. By independent study from textbooks.
    c. By attending a "short-course" or "workshop" on the same or/a clearly related topic.
    d. other (please specify) _____.

14. Since the 1971 Presessions my activity in professional associations has,

decreased			remained the same			increased
1	2	3	4	5	6	7

15. Indicate the approximate distribution of your time prior to and after the 1971 Presession.

	Prior to Presession	After Presession (e.g., 9/71)
Teaching	_____	_____
Research	_____	_____
Administration	_____	_____
Service	_____	_____

16. Have you planned and/or developed any new courses related to the Presession topic?

No Yes

APPENDICES

Program Announcement

Application Form

Sources of Fee Payment

EDUCATIONAL RESEARCHER

Volume XXI, SPECIAL EDITION, Nov. 1970

OFFICIAL NEWSLETTER OF THE AMERICAN EDUCATIONAL RESEARCH ASSOCIATION

This special edition of the *Educational Researcher* was instituted in order to transmit the enclosed information to the membership in the most expedient manner. Pages 1 through 4 contain information on and an application for AERA's Research Training Sessions to be held prior to the 1971 Annual Meeting; pages 5 through 16 contain the proposed new Association Bylaws which require membership ratification.

1971 Research Training Program

GENERAL INFORMATION PROGRAM DESCRIPTION APPLICATION

AN APPLICATION FOR PARTIAL FUNDING has been submitted to the United States Office of Education to enable AERA to conduct for the fifth year a program of intensive training sessions on research techniques and methodologies. Eight five-day sessions will be held January 30-February 3, 1971, just prior to the Annual Meeting, February 4-7. Seven of the sessions will be held in New York City; the eighth will be held in Princeton, New Jersey. This year's request for partial rather than full funding of the Research Training Program results from recent cutbacks in federal funding of education. AERA must initiate partially self-sustaining Research Training Sessions to insure the continuation of the program. A registration fee of $50.00 will be charged to allay session costs not covered by the federal grant.*

The AERA Research Training Sessions are carefully selected, designed, and organized for various audiences of full-time research producers from the most sophisticated to those whose original graduate training contained only minimal research preparation. The rapid growth of methodological and technical skills being employed in educational research is such that every researcher must continue to receive training not only in old established methods but also in new methods that are being proposed. The Research Training Sessions are expressly designed to meet these needs.

Participation in the Research Training Sessions is not restricted to members. Applications will be processed in the order they are received. Those who plan to attend are urged to apply early as all sessions will have limited enrollment. (Please note, however, that a session will not be held without a minimum enrollment of 20 participants.) January 15, 1971 is the deadline for the submission of applications. Most applicants may expect to be notified of the decision of the director of the session for which they have applied within three weeks after the receipt of the application. UPON NOTIFICATION OF ACCEPTANCE, please submit the registration fee to the AERA Central Office as soon as possible since registration will not be complete until this fee is paid. In the event of cancellations, full refund will be made if notification is given to the Central Office before January 22, 1970. From this date until January 29, a service charge of $10.00 will be assessed; no refunds will be given after that date.

* An additional $25.00 for cost of materials will be charged for the session conducted by Charles Woodson.

I. THE RESEARCH COMPONENT OF BLACK STUDIES

Director: LaMar P. Miller, Education Research Director, Institute of Afro-American Affairs, New York University, Washington Square Education Building, Room 778, New York, N.Y. 10003

Staff: Roscoe C. Brown, Jr., Institute of Afro-American Affairs; Ewa Eko, Bennett College; Edgar G. Epps, Tuskegee Institute; Edmund Gordon, Columbia University; Henry Simmons, University of Indiana; Francis Botchway, Richmond College; James Elsberry, Center for Urban Education; Sylvia Obradovic, Far West Laboratory for Educational Research and Development; James Rosser, Southern Illinois University

Content and Objectives: The most publicized controversial field over the past two years has been black studies. The objectives of this presession provide direction for those seeking to improve the field as an academic discipline through research.

The purpose of this proposed presession training session is to provide methodological and non-methodological information for those who are involved in developing and evaluation programs or working in related research areas. In accordance with the above purpose, and the need described in the introduction, this presession will:

1) Examine existing research methodolies which can aid in establishing a solid discipline base for black studies.
2) describe new and innovative methods of research which seem most appropriate from a black scholar's point of view.
3) outline and encourage new areas of research that are related to black studies
4 report on research projects involving black studies that are currently in progress or that have recently been completed
5) examine new approaches to curriculum development in black studies and related areas

Anticipated Audience: The program is designed primarily for: 1) Directors of Black Studies Programs in colleges and universities; 2) Coordinators of Black Studies Programs in elementary and secondary schools; 3) Research Directors and other individuals interested in researchonblack studies.

II. MULTIVARIATE STATISTICAL ANALYSIS IN EDUCATIONAL RESEARCH (Cosponsored by ETS and held in Princeton, N.J.)

Director: M. I. Charles E. Woodson, Assistant Professor, School of Education, Tolman Hall, University of California, Berkeley, California 94720

Guest Speaker: R. Gnanadesikan, Bell Telephone Laboratory

Staff: R. Darrell Bock, University of Chicago; Jeremy D. Finn, State University of New York, Buffalo and Ontario Institute for Educational Studies; Joel R. Levin, University of Wisconsin; Robert M. Pruzek, State University of New York, Albany; Neil Timm, University of Pittsburgh

Content and Objectives: The course content will consist of an introduction to the concepts and techniques of multivariate analysis, including computer programs for making the appropriate calculations. Topics will include: Univariate Analysis of Variance in Matrix Formulation, Hotelling's T^2, multivariate regression and canonical correlation, multivariate analysis of variance, post-hoc tests, and other multivariate techniques, with an emphasis on multivariate analysis of variance.

The presentation will focus upon an intuitive understanding of multivariate procedures and their application to educational research. The mathematical development and proofs of theorems will be restricted, as much as possible, to the handout materials.

The primary objectives of this presession are:

1. To present and interrelate the basic techniques and concepts of multivariate statistical analysis and to provide a foundation which will assist the researcher in applying these to educational research problems.

2. To assist the participants in gaining some practical knowledge of the use of available computer programs for doing multivariate analysis calculations.

Plans have been made for participants to do problems on a computer during the presession.

Anticipated Audience: This session will be open to holders of a doctorate in education and allied fields whose academic responsibilities include the design of educational research studies and analysis of research data. The course is intended for educational researchers with a strong background in quantative methods but whose primary commitment may be substantive areas other than statistics and experimental design. Participants will be expected to have a basic knowledge of algebra and the equivalent of 2 or 3 graduate courses in applied statistics.

III. INDIVIDUAL DIFFERENCES, LEARNING AND INSTRUCTON

Director: Frank H. Farley, University of Wisconsin, Wisconsin Research and Development Center for Cognitive Learning, 1404 Regent Street, Madison Avenue 53706

Staff: Joel L. Byers, Michigan State University; Arthur R. Jensen, University of California, Berkeley; Thomas J. Shuell, State University of New York, Buffalo; Richard E. Snow, Stanford University

Content and Objectives: The content of this pre-session will be heavily in the direction of what is presently known about individual differences (IDs) in learning and instruction, what are the best methodologies for the solution of the problems in the area, what are the implications of their knowledge and methodology for educational research and what are their use in educational practice. The scientific winnowing and sifting of the research evidence will be emphasized, and the most recent best research will be included. The session will begin with basic considerations of theory and method, proceed to biological and genetic analyses, through cooneeptions of intrinsic IDs vs. extrinsic IDs, to the major current considerations of aptitude x treatment interactions and programs and packages for individualized education.

The objectives are primarily to provide participants with critical understanding of present-day knowledge and practice in the area of individual differences and learning and give them the methodological and theoretical sophistication to evaluate work in this areas as well as undertake research and/or development of their own.

Anticipated Audience: Approximately 40-50 persons, possessing Ph.D. degree in some area of psychology, education or other behavioral science, with previous university course work in psychology or educational psychology required. Participants should have completed courses in the psychology of human learning, basic research methodology and experimental design or statistics.

IV. SYSTEMS RESEARCH FOR COUNSELING AND EDUCATIONAL ENVIRONMENTS

Director: T. A. Ryan, Researcher/Professor, University of Hawaii, Educational Research and Development Center, Wist Hall Annex 2, Room 127, 1776 University Avenue, Honolulu, Hawaii 96822

Staff: Donald G. Hays, Union High School District, California; Leonard C. Silvern, Education and Training Consultants, Co.; Norman R. Stewart, Michigan State University; Ray E. Hosford, University of California, Santa Barbara; Bob B. Winborn, Michigan State University; James W. Lawrence, University of Hawaii

Objectives and Content: The purpose of the presession in systems research is to achieve improvement in counseling, counselor education and related areas by training counselors, counseling specialists, counselor educators, supervisors, educational psychologists and researchers in application of systems research. It is intended that participants from urban centers will develop competencies which can be applied directly to research activities which will help to ameliorate problems of education in the large cities. A special effort will be made to meet the research needs of counselors, counselor educators, supervisors and personnel in related areas. Three primary aims implement the training purpose: (1) developing an understanding of the concepts of systems research; (2) developing an understanding of the systems research; and (3) developing proficiency in using techniques of systems research. A secondary aim will be to foster positive feelings about systems concepts and techniques. The course content will focus on concepts, principles, and techniques of systems research applicable in counseling and educational settings. The course will provide (1) instruction in basic concepts of systems approach, and introduction to computer simulation; (2) instruction relating to rules governing systems research; and (3) intensive training in analysis, synthesis, and flowchart modeling, and introduction to techniques of simulation.

Anticipated Audience: The session will be open to individuals in public schools, state departments of education, and colleges and universities who satisfy the following criteria: (1) employment in a position permitting use of systems research in counseling, counselor education, supervision or related areas, (2) commitment to achieve improvement and innovation through systems research; and (3) evidence of ability to profit from the instructional program.

V. EDUCATIONAL OBJECTIVES: FORMULATION, APPRAISAL, AND ASSESSMENT

Directors: Eva L. Baker, Assistant Professor, Graduate School of Education, University of California at Los Angeles, Los Angeles, California
W. James Popham, Professor, Graduate School of Education, University of California at Los Angeles, Los Angeles, California

Staff C. M. Lindvall, University of Pittsburgh; John D. McNeil, University of California, Los Angeles; Robert E. Stake, University of Illinois

Content and Objectives: The presession is designed to promote the attainment of competency in the formulation, appraisal, and assessment of measurable instructional objectives. While cleaving to the standard AERA presession scheme of providing specific skills for educational researchers, the proposed presession will in addition isolate key research and development areas wherein our instructional objectives technology is particulary deficient. The presession will focus on three aspects of educational objectives:

Formulation: How are instructional objectives generated so that they will be optimally useful in instruction and evaluation settings? What are the specific techniques to be used in clarifying and producing such goals?

Appraisal: How can one determine the worth of educational objectives, either during their formulation or after they have been developed? How does one establish priorities among competing educational objectives when designing an educational program?

Assessment: How can measuring procedures be developed for assessing the attainment of diverse types of instructional objectives? What types of methodological approaches should be used to develop defensible assessment procedures?

Anticipated Audience: The audience for this session will be both varied and large. Educational researchers in diverse pursuits have found themselves faced with the need to employ educational objectives in their work. Instructional designers, educational product developers, evaluators, to mention but a few, all need to increase their sophistication regarding the use and limitations of educational objectives.

VI. NONPARAMETRIC METHODS AND RELATED POST HOC PROCEDURES

Directors: Marylellen McSweeney, Michigan State University, 464 Erickson Hall, East Lansing, Michigan 48823
Andrew C. Porter, Michigan State University, 201 D Erickson Hall, East Lansing, Michigan 48823

Staff: David J. Wright, National Assessment

Content and Objectives: The purpose of this presession will be to increase the competency of the behavioral scientist in the design and analysis of experiments employing qualitative and quantitative variables. The presession will have a dual emphasis:

1. the extension of contingency table techniques to complex design, testing, and estimation problems in educational research.
2. the introduction of powerful statistical procedures which are less restrictive in their assumptions than are classical procedures and whicch are applicable to a wide variety of problems in data analysis.

It is hoped that exposure to these procedures will aid the participant in solving problems dealing with experimental design, hypothesis testing, and estimation commonly found in educational research.

The content of the course will be divided into three parts: rank procedures to test for location, contingency table procedures for qualitative data, and techniques for measuring association. To emphasize the parametric-nonparametric analogies, we plan to begin instruction with the rank procedures.

Anticipated Audience: This session will be open to holders of a doctorate or doctoral candidates in education and allied fields whose academic responsibilities include or will include the design of educational research studies and analysis of research data. The course is intended for educational researchers whose primary commitment is to substantive areas other than statistics and measurement. Participants will be expected to have a basic knowledge of inferential statistics. Generally, this will imply a familiarity with the basic elementary statistical techniques usually presented in a two quarter or two semester course in statistics.

VII. THE PSYCHOLOGY OF WRITTEN INSTRUCTION

Directors: Ernest Z. Rothkopf, Bell Telephone Laboratories, Research and Development Unit of Bell System, Mountain Avenue, Murray Hill, New Jersey 07974

Lawrence T. Frase, Bell Telephone Laboratories, Research and Development Unit of Bell System, Mountain Avenue, Murray Hill, New Jersey 07974

Staff: Paul Johnson, University of Minnesota; Barbara Musgrave, Smith College

Content and Objectives: The psychology of learning from written materials will be considered from a theoretical, experimental, and practical viewpoint. Written instruction will be discussed as an important current research area in educational psychology and as an example of problems in the rational improvement of documentary instructional systems.

The presession will include four major topics.

a. Analysis of Content. Quantitaive techniques such as digraph analysis, multidimensional scaling of text and of essay and association protocols; information analysis of content structure.

b. Textual Representation of Content. Syntactic and lexical analysis; syntactic predictors of difficulty; readability formulas; computer aids in the instructional analysis of text.

c. Psychological Models of Reading. The processes of translating written material into internal representations, mathemagenic activities; adjunct supports for study activities, use of questions, search procedures, and directions.

d. Measuring the Results of Instruction. Problems in measuring text effectiveness; analysis of essay protocols and prompted tests, Cloze procedure, internal and external criteria for performance.

Anticipated Audience: A doctorate in experimental psychology or educational psychology or equivalent experience is required.

XIII. OPERATIONS ANALYSIS TECHNIQUES IN EDUTIONAL PLANNING AND ADMINISTRATION

Directors: George S. Tracz, Ontario Institute for Studies in Education, 252 Bloor Street West, Toronto 5, Ontario, Canada
James E. Bruno, Graduate School of Education, University of California, Los Angeles, 405 Hilgard Avenue, Los Angeles, California 90024

Staff: G. Ernest Anderson, Jr., University of Massachusetts; James F. McNamara, University of Oregon

Content and Objectives: This presession will expose educational planning personnel and school administrators to the use and application of management science and operations research models to problems in education. Sessions will be devoted not only to theory and techniques necessary for improved resource allocation to and planning of school activities, but also to explanations of a number of recent successful applications in education. Throughout the session, the utility and limitations of such models to improve and effect changes in educational planning and administrative practices will be stressed. The chief objectives of this presession, offered for the first time, are these:

(i) to provide a method of assessing the value of Operations Analysis to operational and resource allocation problems in elementary and secondary education;
(ii) to provide the necessary computer and mathematical techniques to appreciate and understand Operations Analysis and Systems Approaches to educational planning and administration; and
(iii) to disseminate up-to-date findings in the applications of Operations Analysis to education.

Anticipated Audience: Applications for this session are invited from educational planners and administrators from the local, state, and federal levels (of education) involved in the allocation and administering of resources (financial, facilities, and personnel) to elementary and secondary school activities. Participants then would include USOE staff, regional laboratory personnel, State Education Department staff, professors of educational administration, local school administrators, and socio-economic planners interested in the recent development in the field of education.

APPLICATION FOR AERA RESEARCH TRAINING SESSION

DETACH AND MAIL APPLICATION TO DIRECTOR OF SESSION TO WHICH APPLYING

GENERAL INFORMATION

1. Session number you desire to attend—1st choice_____, 2nd choice_____.
2. Name: _____ (Last) _____ (First) _____ (Initial)
3. Mailing address: _____
4. Sex: M F Age: _____ Telephone No.: _____
5. Present Institutional Affiliation (e.g., UCLA): _____
6. Have you attended an AERA Presession in the past? Yes No
   If "Yes," when: _____ and which one: _____

EDUCATIONAL HISTORY

7a. Masters School: _____ Year of Degree _____
Major _____

b. Doctoral School: _____ Year of Degree _____
Major _____

8a. Record in the blank the approximate number of **courses** you have taken at either the **undergraduate** or **graduate** level in each of the following areas:

a. Anthropology_____
b. Curriculum_____
c. Educ. Administration_____
d. Educ. Measurement or Psychometrics_____
e. Electronic Computers_____
f. Linguistics_____
g. Mathematics (excluding math educ.)_____
h. Psychology (Exper., Soc., Devel., or Learning)_____
i. Sociology_____
j. Statistics and experimental design_____

b. Describe briefly your training and experience with computers: _____

EMPLOYMENT INFORMATION

9a. Describe briefly the nature of your present employment: _____

b. Describe briefly any changes you expect in your employment during the coming year with respect to either employer or type of activity: _____

10a. What percent of your time is allotted to teaching?_____ b. To research?_____ c. To grad. study?_____

11. Which courses do you teach (if any), at what level (undergraduate—U.G.—or graduate—G), and what textbook (if any) might you typically use?

Course	Level	Textbook
_____	U.G._____ G._____	_____
_____	U.G._____ G._____	_____
_____	U.G._____ G._____	_____
_____	U.G._____ G._____	_____

PROFESSIONAL AND SCHOLARLY INTERESTS

12. What are your primary research interests (e.g., motivation, creativity, curriculum development, experimental design)? _____

13. Approximately how many research articles which you have authored alone or jointly have been accepted in a scholarly (refereed) journal? _____

14. In total, about how many research articles, theses or technical reports (both published and unpublished) have you authored alone or jointly? _____

15. How many funded (by USOE, NIMH, Ford Foundation, or other granting agencies) research projects are in progress or completed on which your name appears as either the first or a joint author? _____

16. List no more than *three* professional societies other than AERA of which you are a member: _____

17. Describe briefly your reason for applying (use separate sheet).

NOTE: Do not send registration fee with this application

1971 RESEARCH TRAINING SESSIONS

Sources of Payment of Registration Fee

total number of participants = 365*

SESSION TITLE	SOURCE OF PAYMENT				
	personal	institutional	research grant	not given	total payments*
Research Component of Black Studies	7 (35%)	6 (30%)	1 (5%)	6 (30%)	20
Multivariate Statistical Analysis	24 (37%)	14 (21%)	8 (12%)	20 (30%)	66
Individual Differences, Learning & Instruction	7 (18%)	13 (33%)	4 (10%)	16 (40%)	40
Systems Research for Counseling and Educational Environments	10 (50%)	5 (25%)	1 (5%)	4 (20%)	20
Educational Objectives: Formulation, Appraisal & Assessment	24 (30%)	38 (47%)	3 (4%)	16 (19%)	81
Nonparametric Methods & Related Post Hoc Procedures	17 (39%)	15 (34%)	1 (2%)	11 (25%)	44
The Psychology of Written Instruction	7 (39%)	7 (39%)	1 (5%)	3 (30%)	18
Operations Analysis Techniques in Educational Planning & Administration	8 (19%)	25 (58%)	0	10 (23%)	43
TOTALS	104 (31%)	123 (37%)	19 (6%)	86 (26%)	* 332 (100%)

*not all participants have paid to date

FINAL REPORT

Supplement of Project No. 1-0155

Grant No. OEG-0-71-1173

Director: Joe L. Byers
Michigan State University
East Lansing, Michigan

for the

American Educational Research Association
1126 Sixteenth Street, N.W.
Washington, D.C. 20036

1971 American Educational Research Training Sessions

May, 1972

U.S. Department of Health, Education and Welfare

Office of Education

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INTRODUCTION

The American Educational Research Association (AERA) received a grant from the Office of Education to develop self-sustaining intensive training sessions on substantive issues in educational research. The training sessions were designed to cover a range of topics in educational research and to provide instruction that was suited to the needs of experienced researchers. Eight sessions were held in conjunction with AERA's 1971 Annual Meeting in New York. A detailed final report of this project is included in the preceding section.

A supplementary appropriation to the project specified above was awarded to AERA on June 30, 1971. A major objective of this grant was to design and develop additional in-service short-term training programs through either convention presessions (postsessions) or by other modes of training. These training activities were to be launched in the Spring or Summer of 1972. The professional staff of AERA in collaboration with the Association's Standing Committee on Research Training would identify critical areas in which in-service training was needed. More specifically, it would consider what training models and procedures could be produced to prevent potential obsolescence among educational researchers in newly developed methodology and technology, improve the skills and knowledge of persons involved in research and development roles who previously received only minimal training in this area, meet the needs of researchers outside the disciplines of education and psychology who are increasingly turning their attention to the study of educational issues, and for those involved in educational research with minorities and with the urban environment.

ACTIVITIES

Long-Term Evaluation

Research Training Sessions have been sponsored by AERA since 1966. Evaluations of these presessions have been conducted by the session directors. These evaluations typically examined both the skills and concepts taught, and the participant's attitudes toward the learning experience. In recent years, the Association conducted its own evaluations to elicit data about the relevance of the presession topic, effectiveness of the instructional procedures, adequacy of the accommodations and logistical support and selected demographic information.

Commencing with the 1971 Research Training Sessions, it was decided to conduct a long-term follow-up study of possible effects of the sessions on the behavior of participants in such areas as their teaching, research, publications and consulting. As a result of the financial support of this supplemental award, an instrument was devised and data collected to determine the session's influence on what trainees did when they returned to their home institution. The questionnaire solicited such information by querying participants on their pre (prior to the training session) and post (nine months after the session) actual research and research-related behavior. A detailed analysis of this data is included in the long-term evaluation of the Final Report of the 1971 AERA Research Training Sessions. Careful attention is and will continue to be given to this report as it relates to future training activities.

Experimental Session

The documented record of success enjoyed by AERA's Research Training Sessions held in conjunction with the Annual Meeting suggests that replica-

tion of this format may be the optimum model for transmitting certain skills and knowledge. However, the limited number of participants who find it possible to attend a training session that is only offered in the locale of the Annual Meeting, prompted a variation in this tradition. In this era of shrinking educational budgets, it is increasingly necessary to reduce the cost of instruction to individuals. Therefore, a training session was recently (March 20-24) conducted at Arizona State University, Tempe, Arizona. The 1972 Presession chairman, Thomas J. Shuell, will be analyzing the type of participant attending this session with the type of participant attending the traditional presessions. In addition to this data, the Association, by virtue of this experiment, has gained valuable experience in the logistics and management of conducting a regional training session. This information will be included in the Final Report of the 1972 Research Training Sessions. At this point, and on the basis of only one particular session, the evidence suggests that it is financially self-supporting and logistically feasible for AERA to conduct regional training sessions.

Development of Training Models for Educational Research: A Conceptual Scheme for a Professional Association

A systematic approach, working toward the solution of the complex problems associated with the training and retraining of research and research-related personnel in education, was the focus of a proposal (title listed above) submitted to the United States Office of Education. This document was a direct result of the activities specified in this final report and as a consequence of the Association's interest in assuming an active role in an ongoing training enterprise.

Briefly stated, there are two major components in the project. The first is the creation of four alternative training formats or models,

a) Traveling Training Institutes, b) Intensive Pre or Post Session Courses, c) Annual Meeting Training Activities, and d) Instructional Packages. The second component seeks to develop and evaluate a conceptual framework and organizational structure, irrespective of specific personnel involved, by which a professional association can provide for coordinated and continued training activities.

Organizational Structure

The Association's Standing Committee on Research Training is an outgrowth of the 1969-71 AERA Task Force on Training Educational Research and Research-Related Personnel. The committee is composed of W. James Popham, University of California, Los Angeles, Chairman; Jason Millman, Cornell University; Blaine Worthen, University of Colorado; Robert Morgan, Florida State University; Dave Merrill, Brigham Young University. Of these, Popham, Millman and Worthen were members of the Task Force, with Worthen serving as its most recent chairman.

After extensive deliberations a unique relationship between the specialists on AERA's Central Office staff and the representatives of the educational research community who serve on the Research Training Committee was agreed upon. This organizational structure, which incorporates and capitalizes on the expertise of the parties involved, assigns responsibilities as follows: The conduct of each of the four training models will be carried out by a member of the committee. The present assignments are:

Model A - Traveling Training Institutes, Jim Mitchell

Model B - Intensive Pre or Post Session Courses, Frank Farley

Model C - Annual Meeting Training Activities, Jay Millman

Model D - Development of Instructional Packages, Dave Merrill

The director of each model has assumed the responsibility for its budget, time schedule, implementation, formative and summative evaluations, and final report.

Although the individual directors of the four models are given considerable latitude in the implementation and operation of their model, the Committee retains responsibility for overseeing the planning, designing, operationalizing, evaluating and dissemination of the objectives and/or products of the project. The overall coordinations of the study are the responsibility of the principal investigator, Richard A. Dershimer, Executive Officer of AERA. Administrative supervision is furnished by AERA's Assistant for Federal and Professional Affairs and co-director of the project, William J. Russell. Conceptual and substantive supervision is the responsibility of the Chairman of the Research Training Committee and co-director of the project, W. James Popham. While the director of each model is charged with insuring provisions for summative and formative evaluations in his training activity, a member of the Committee, Blaine Worthen, will guide the evaluation phase of the entire project and be available as a consultant to the individual directors.

Broad Questions on Research Training

While the Committee on Research Training is integrally involved in the conduct of AERA's training enterprise, there is also the intention for them to remain sufficiently removed from that activity to enable them to consider more broadly based questions relevant to research training. In this regard, an initial and preliminary discussion was held to generate possible agenda items for the Committee's consideration or review in the

future. In no particular order, these items included:

a) The appropriateness of making formal recommendations to preservice training agencies regarding the nature of graduate training (e.g., content emphasis, alternatives to qualified examination procedures, graduate student interchange.)

b) Certification of individuals or training programs.

c) Apprenticeship training.

d) Ways to better utilize dissertation research energy potential for the advantage of education.

e) Training of middle level RDD & E professionals, e.g., development technicians.

f) Appropriate interaction vehicles between the Research Training Committee and the United States Office of Education officials responsible for research training.

g) The appropriateness of the Committee's involvement in manpower analysis.

h) The affects of training personnel for fields where low probability of employment exists.

i) Selectivity of students for training, i.e., representatives of minority groups as well as the identification of predictor variables.

j) Other items will be submitted.

PROGRESS

Self-Supporting Training Sessions

Over the years AERA's Research Training Presession program has

evolved to where it now occupies as prominent a position among the activities of the Association as its publications and Annual Meeting. After continued United States Office of Education support during its formative years, it now seems evident the sessions are a self-supporting activity.

This year, the following nine pre and post sessions were held:

1. Bayesian Statistics and Interactive Computing Systems

   Director: Melvin R. Novick, American College Testing Program, Iowa.

   Staff: Nancy Cole, American College Testing Program.

2. Data Collection in Educational Research and Development

   Director: William E. Coffman, College of Education, University of Iowa.

   Staff: Rodney Skager, University of California, Los Angeles; Joseph L. Mazur of South Florida.

3. Development of Objectives-Based Instructional and Accountability Systems

   Directors: Howard J. Sullivan and Vernon Gerlach, Arizona State University.

   Staff: Fred C. Niedermeyer, SWRL; Richard M. Wolf, Columbia University.

4. Applied Linear Regression Analysis in Educational Research

   Director: Joe H. Ward, Jr., Air Force Human Resources Laboratory, San Antonio, Texas.

   Staff: Robert Bottenberg, Air Force Personnel Research Division; Earl Jennings, University of Texas; Janos Koplyay, Air Force Personal Research Division.

5. Instructional Objectives: Their Role in Educational Development and Evaluation

Director: Eva L. Baker, Graduate School of Education, University of California, Los Angeles.

Staff: W. James Popham, University of California, Los Angeles; Robert E. Stake, University of Illinois.

6. Research Utilization Skills for the Educational Practitioner

Directors: Charles C. Jung, Northwest Regional Educational Laboratory, Portland, Oregon; Wayne Rosenoff, Far West Laboratory for Educational Research and Development, Berkeley, California.

Staff: Nancy C. Adelson, Far West Laboratory for Educational Research and Development.

7. Simulation Techniques for Evaluation Problem Solving

Directors: Christine McGuire and Philip Bashook, Center for Educational Development, College of Medicine, University of Illinois.

Staff: Edward Schwab, Jr., Mary Wise, Thomas Crawford, all of the University of Illinois.

8. Theory and Practice of Instructional Research and Development

Director: Robert D. Tennyson, Instructional Development Center, Florida State University.

Staff: Harvey Black, C. Victor Bunderson, Irwin Goodman and M. David Merrill, all of Brigham Young University; Robert G. Stakenam, Florida State University.

9. Toward an Ethnography of Schooling

Director: Frederick D. Erickson, Graduate School of Education, Harvard University.

Staff: Stephen L. Schensul, University of Illinois; Edward T. Hall and Paul J. Brohannon, Northwestern University, Stase

McPherron, Duquesne University.

Registration fees were assessed each participant; $100 for a three-day session and $150 for a five-day session. (Fourteen scholarships were awarded individuals from AERA funds.) This represented the Association's initial attempt toward making the sessions self-supporting. No outside funds were secured for support of these sessions this year. It is encouraging to note participants were willing to support such an activity. That is, all nine training sessions were, in fact, self-supported. A detailed Final Report, both financially and substantively, will be compiled by the chairman of the 1972 Research Training Sessions, Thomas Shuell.

Traveling Training Institutes

Substantial progress is being made toward implementation of the traveling research training sessions by late Summer of 1972. Outstanding scholars of acknowledged leadership and impact in their respective fields are being solicited as possible directors of sessions. Two such session directors have been selected to conduct regional training programs.

One session is entitled, Bayesian Statistics and Interactive Computing Systems. The co-directors are Melvin Novick, American College Testing Program and Donald Meyer, University of Pittsburgh.

A brief description of the objectives, content and anticipated audience of this session follows:

> The objective of this session is to provide participants with a grounding in the fundamentals of Bayesian methods of statistical inference and in the employment of these methods through interactive computing routines. These routines are designed to guide the researcher who has only a minimal acquaintance

with Bayesian methods step-by-step through a complete Bayesian analysis. The interactive computing routines begin by aiding the researcher in interrogating himself to specify his prior distribution. They then perform the required calculations and display the posterior distribution and its important characteristics.

The session will consist of a series of lectures, demonstrations and practicums with considerable time being reserved for hands-on work at an interactive computer terminal under the guidance of a graduate assistant. A low participant to assistant ratio will be maintained at the terminals to assure that each participant receives adequate personal assistance. Terminals will also be made available, on a limited basis, after hours for participants who desire to attain a higher degree of proficiency in these methods or who wish to process data of their own.

In addition to covering standard topics in the analysis of binominal, multinominal and Gaussian data in one or two groups, certain new Bayesian Model II techniques of estimating parameters in many groups will be described. The most interesting of these problems is that of multiple regression in "m" groups. Bayesian Model II methods for estimating means, proportions and regression weights in "m" groups will be discussed.

Participants in the training session can expect to obtain several worthwhile benefits from the training session. Among these are the following:

1. Learning about some powerful new methods of data analysis and their application to educational data.

2. Learning how interactive computing facilitates data analysis by the use of these methods.
3. Learning about the use of interactive computing in more general educational contexts.

Participants will be limited to forty persons. Participants will probably have backgrounds in the following areas: (a) educational measurement, (b) research design, (c) large scale guidance systems, (d) high school mathematics curriculum development, (e) test development and applications and/or (f) instruction in educational statistics at the undergraduate and graduate levels.

The second session will be conducted by Michael Scriven, University of California, Berkeley and Daniel Stufflebeam, Ohio State University. The details of this session at this point in time are in their very formative stages. However, the topic of the session will be "Alternative Approaches To Evaluation" and will focus on rather intensive training, working from fairly realistic examples of evaluation problems, rather than on the abstract philosophy of evaluation. The intended audience is hoped to have considerable research expertise.

Summary

The Final Report of this supplementary appropriation to the 1971 Research Training Sessions has indicated a number of activities that the Association was able to undertake during the past year. These activities included a long-term evaluation of the training sessions, experimenting with a regional training session, establishing an organizational structure to conduct training, and the development of other activities some of which

led to a proposal which provides for a systematic approach to the problem of training and retraining of personnel in educational research. An indication of progress being made in other areas is also reported.

This report should conclude by stating the project, to a large extent, has bridged the temporal span between the Association's formative years in providing research training with the United States Office of Education support to its present second generation of more sophisticated training activities on a self-supporting basis. Specifically, the grant has furnished AERA with the resources to conduct the necessary planning as it turns its attention to a more intensive next step toward the goal of a solution to the problem of educational research training.

Fiscal Report

The final fiscal report of this supplementary grant will be submitted under separate cover by the accounting office of AERA.