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Cooperative Research Projects

Fiscal 1960

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Abraham A. Ribicoff, *Secretary*

OFFICE OF EDUCATION
Sterling M. McMurrin, *Commissioner*

FOREWORD

THIS BULLETIN, the fourth in an annual series, presents a brief description of research projects that have been initiated with support from the Cooperative Research Program of the U.S. Office of Education. Most of the projects were contracted in fiscal year 1960. However, descriptions of projects which were recommended for support in May 1960 but which were not contracted until fiscal year 1961 are incorporated to eliminate unnecessary delays in the reporting of current research. Each description presents a statement of the problem, the major objectives, and the procedures to be followed. The name and title of the investigator, the name of the contracting institution, the project number, the duration of the project, and the starting and completion dates are included.

Except for the descriptions, the Program has little information available on each study during the course of the research. In some instances, the investigators may be able to provide information to interested persons. When studies are completed, the results are made available as described in the introduction to this report.

JOHN G. LORENZ, *Acting Assistant Commissioner for Research*

DAVID L. CLARK, *Director*
Cooperative Research Branch

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INTRODUCTION

FISCAL YEAR 1960 (July 1, 1959–June 30, 1960) marks the fourth year of operation for the Cooperative Research Program. The Program was initiated under Public Law 531, which was enacted in 1954 by the 83d Congress. The law authorizes the U.S. Commissioner of Education ". . . to enter into contracts or jointly financed cooperative arrangements with universities and colleges and State educational agencies for the conduct of research, surveys, and demonstrations in the field of education."

To carry out the intent of the law, the Cooperative Research Program entertains applications for the support of research projects related to education. More than 1,200[1] such applications have been submitted since the beginning of the Program; 372[1] of them have been recommended for support by an advisory committee and approved by the Commissioner of Education. From the tabulation below, in which the number of proposals reviewed by the Research Advisory Committee and the number and the percent approved are

Fiscal year	Number of proposals reviewed	Proposals approved	
		Number	Percent
1957	316	108	34
1958	173	50	29
1959	279	86	31
1960	321	82	26
TOTAL	1,089	326	30

[1] These numbers differ from the totals in the chart because they include proposals submitted in fiscal year 1961.

listed by fiscal year, it is clear that the number of proposals submitted has shown a gradual increase each year and the percentage approved has remained about the same from year to year.

Congress has appropriated over $12 million to support the projects. These appropriations are presented by fiscal year in the following tabulation.

Fiscal year	*Appropriations (millions of dollars)*
1957	1.1
1958	2.2
1959	2.7
1960	3.2
1961	3.4
TOTAL	12.6

Including the funds needed to complete the approved projects in subsequent years, the Federal investment exceeds $16 million. The average Federal expenditure per project has been approximately $40,000, although the cost of individual projects ranges from less than $1,000 to over $1 million. An additional sum of over $9 million has been contributed by the colleges, universities, and State education departments for this research.

The 372 projects approved to date are located at 104 colleges and universities and 16 State educational agencies in 44 States, the District of Columbia, Guam, and Puerto Rico. The Program has supported projects dealing with a wide range of problems at all levels of education and has encouraged the participation of a number of disciplines. In addition to education, psychology, sociology, anthropology, political science, economics, history, statistics, and other fields are represented.

Of the 321 applications for the support of research projects submitted to the Cooperative Research Program in fiscal year 1960, 82 were recommended for approval by the Research Advisory Committee at meetings in November, February, and May. Although $3.2 million was available for fiscal year 1960, about $1.8 million of this amount was needed to continue studies begun in previous years; the remaining $1.4 million was used to initiate new research.

In order to obtain the advice and recommendations of educational research specialists before entering into a contract for research, the Commissioner of Education has established the Research Advisory Committee to evaluate the proposals submitted to the Program. The committee is composed of nine outstanding educators and researchers

who are not on the staff of the Office of Education. Committee members are chosen from a number of disciplines and types of educational organizations in order that they might contribute their specialized knowledge to the discussion of the proposals. Each member is asked to serve for a 3-year term; the terms are staggered so that three members leave and three new members join the committee each year. The present [2] members are:

WARREN FINDLEY, assistant superintendent of schools, Atlanta, Georgia
JOHN H. FISCHER, dean, Teachers College, Columbia University
ERIC F. GARDNER, professor of education, Syracuse University
EVERETT C. HUGHES, professor of sociology, University of Chicago
DAVID R. KRATHWOHL, professor and research coordinator, Michigan State University.
HARRY LEVIN, professor of psychology, Cornell University
HENRY J. OTTO, graduate professor of elementary administration, University of Texas
DEWEY B. STUIT, dean, College of Liberal Arts, State University of Iowa
LLOYD TRUMP, associate secretary, National Association of Secondary School Principals, National Education Association

Each committee member reviews the proposals submitted to the Program on the basis of a number of criteria under the following four headings:

1. The significance of the problem for education.
2. The adequacy of the research design.
3. The personnel and facilities available to conduct the research.
4. The economic efficiency of the project (whether the probable results seem to justify the cost).

The committee members independently rate the proposals and then discuss them as a committee before deciding which proposals to recommend to the Commissioner for support. After proposals are approved by the Commissioner, the Cooperative Research Program staff members negotiate contracts with the appropriate college, university, or State education department.

The dissemination of the findings of research supported by the Program is carried out in a number of ways. A summary of each final report of a completed cooperative research project is available free of charge from the Cooperative Research Program.

The Office of Education publishes monographs based upon research supported by the Program. These monographs either describe the findings and implications of single studies or integrate the results of two or more projects in the same problem area. Single copies of the

[2] Eric Gardner, David Krathwohl, and Lloyd Trump joined the Committee in fiscal year 1961. They replaced Finis Engleman, Chester Harris, and Ralph Tyler, who served on the Committee during fiscal years 1958, 1959, and 1960.

monographs are available without charge from the Publications Inquiry Section, U.S. Office of Education, Washington 25, D.C., and multiple copies are sold by the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C.

The final reports themselves are not distributed directly by the Cooperative Research Program. However, the Program does provide for the Documents Expediting Project of the Library of Congress 65 copies of each approved final report for distribution to the university and public libraries subscribing to this service. Any library may obtain a copy of the reports on interlibrary loan from the repository libraries.

RESEARCH ON:

I. STUDENTS

THE GIFTED

Effects of Special Training on the Achievement and Adjustment of Gifted Children

Problem.—This study continues the work of projects 423 and 614 in developing and evaluating an administratively practical, special education program for intellectually gifted pupils in sparsely populated areas.

Major objectives.—The objectives include: (1) Establishing an 8-week summer program to which intellectually gifted children may be transported from surrounding areas, (2) constructing a curriculum and developing additional curricular materials for a summer program, (3) devising methods for preparing teachers to teach in such a program, (4) developing methods for educating parents of gifted children in such a program, and (5) evaluating the outcomes of the program.

Procedures.—The achievement and adjustment of 60 fifth-grade children participating in an 8-week summer program will be compared with the achievement and adjustment of two other groups of 60 fifth-grade children each from the same schools. One of these other groups will know that they have been identified as having the intellectual requirement for possible inclusion in the program but were not chosen in the random selection of subjects. The third group will not know that they have been identified as related to the program in any way. The curriculum, methods for preparing teachers, and methods for educating parents have been developed and will be revised on the basis of information obtained from the earlier studies. The Henmon-Nelson Tests of Mental Ability will constitute the measure of giftedness. Achievement will be measured by the Iowa Tests of

Basic Skills, Iowa Tests of Educational Development, and the Stanford Achievement Tests, and adjustment by the SRA Junior Inventory, What I Like To Do Inventory, and the Child Study Security Test. Analysis of variance will be used to test the significance of differences between achievement and adjustment means for the three treatment groups.

NELLIE HAMPTON, Professor of Education, Iowa State Teachers College, Cedar Falls, Iowa.

Project No. 923.
Duration: 1 year, 8 months.
May 1960–January 1962.

The Discovery and Guidance of Superior Students

Problem.—In this project three related studies deal with the discovery, the characteristics, and the development of superior students.

Major objectives.—The objectives are (1) to determine the extent to which the administration of an oral problem-solving test will add enough independent data to those obtained by more conventional means to warrant its use in the discovery and guidance of superior students, (2) to ascertain the value of using personal documents in analyzing the motivation of superior students, and (3) to investigate the relative effectiveness of actuarial and clinical methods in predicting the post-high school performances of such students.

Procedures.—The first study will use a stratified random sample of 400 high school freshmen, sophomores, juniors, and seniors selected by their schools to be sent to the Research and Guidance Laboratory of the University of Wisconsin. Each student will be required to solve 12 problems orally in the presence of one researcher, with a second researcher observing the student through a 1-way vision screen and listening to his performance while it is being taped. The data analysis will relate the total oral problem-solving scores to the scores obtained on the School and College Ability Test, sections of the Differential Aptitude Test, and the Terman Concept Mastery Test. A content analysis of the taped responses will be made to reveal how a student proceeds in solving a problem. In the second study the sample will consist of 200 students who were first sent to the laboratory as ninth graders in 1957–58 and who have written essays in ninth, tenth, and eleventh grade and will write another as high school seniors. The investigator will analyze these essays using categories such as adults, siblings, peers, religion, community offerings, schools and teachers, and perception of self to determine whether or not motivational forces which operate to produce high academic achievement can be identified. In the third study 56 subjects who first came to

the laboratory as ninth graders and who will graduate from high school in June 1960 will be used as a sample to establish procedures for evaluating success in college (a high percentage of the 56 is expected to attend college). These procedures will be used to evaluate students who will be graduating in later years. In addition to grade-point averages, the criteria for evaluating college success will include modifications of procedures used in the Eight-Year Study to permit the collection of data on intellectual competence, cultural development, practical competence, personal goal patterns, and social fitness.

JOHN ROTHNEY, Professor of Education, University of Wisconsin, Madison, Wis.

Project No. 932.
Duration: 2 years.
August 1960–July 1962.

Improved School Adjustment of Underachieving Gifted Fifth Graders

Problem.—This study seeks to provide information on how the counselor's behavior influences clients, on how clients influence each other, and on the methods of detecting changes in clients.

Major objectives.—The objectives are (1) to compare the growth of fifth graders who are counseled directly with that of pupils whose parents only are counseled, (2) to compare the growth achieved by parents and children who talk most about themselves in the counseling sessions with the growth of parents and pupils who talk least about themselves, and (3) to observe the effect of assigned client and counselor roles on the behavior of counselors and clients.

Procedures.—The sample for this study will consist of 32 underachieving fifth graders, defined as pupils whose total IQ score on the California Test of Mental Maturity is 125 or higher and whose grade-point average for the second semester of the fourth grade is 3.50 (A=5.00) or less. The parents of these pupils will also be included in the sample. The 32 pupils will be divided at random into two groups. In one group only the children will be counseled; in the other, only the parents. The clients will be counseled for a period of from 8 to 12 weeks. Growth will be measured by such instruments as the Iowa Every-Pupil Test of Basic Skills, the Social Acceptance Scale for Children, the Revised Behavior Inventory, the Picture Study Test and Baron's Ego-Strength Scale. Trained observers will note the reactions of counselors and clients to a variety of assigned roles.

MERLE M. OHLSEN, Professor, and FRED C. PROVY, Associate Professor, University of Illinois, Urbana, Ill.

Project No. 933.
Duration: 2 years, 1 month.
September 1960–September 1962.

Productive Thinking of Gifted Children

Problem.—This project attempts to identify the productive thought processes in intellectually gifted children within the context of classroom verbal activity at the junior high school level and to assess the relationships between these thought processes and certain variables that may influence their operation in the classroom.

Major objectives.—The objectives are (1) to measure productive thought processes of intellectually gifted children by classifying their verbal interaction in the classroom, (2) to relate these measures of productive thinking to standard measures of productive thinking, and (3) to correlate differences measured in the classroom verbal activities of children with measured differences in their attitudes, self-concepts, and other variables related to intellectual productivity.

Procedures.—Approximately 125 to 150 intellectually gifted children enrolled in six class sections in two Illinois junior high schools will constitute the sample for this study. To obtain a sufficient amount and variety of verbal activity, approximately 60 class sessions in three major subject areas will be recorded on tape. The Gallagher-Aschner classification system will be used to classify the taped interactions into a number of categories, including cognitive memory, and convergent, divergent, and evaluative-productive thought processes. Tests of ideational fluency, spontaneous flexibility, and sensitivity to problems; tests of productive thinking; the Quincy Semantic Differential Scale; and a sentence completion test will be administered. An analysis will be made of the total number of responses and the classifications of these responses for each child and each class, the relationships between occurrence of various types of thought processes in the classroom, and scores on productive thinking tests and measures of related variables.

JAMES J. GALLAGHER, Professor of Education, University of Illinois, Urbana, Ill.

Project No. 965.
Duration: 3 years.
August 1960–August 1963.

An Evaluation of a Model for Guidance Counseling

Problem.—This study will attempt to define and examine variables related to counselor behavior and client characteristics.

Major objectives.—The objective is to determine whether a counseling procedure which is designed for a specific group of able underachievers will result in a significant improvement in their academic

performance, their orientation to school, their concept of self, and their perspective in goals and tasks beyond school.

Procedure.—A sample of 150 boys in grades 10, 11, and 12 will be selected from a population of over 1,500 boys in Newton High School, Newton, Mass. The selection will be based upon the regression of grade point average upon the School and College Ability Tests (SCAT). An experimental and control group of 50 underachievers each and an additional control group of 50 high-achieving boys will be equated as far as possible on the basis of (1) the proportion of students in grades 10, 11, and 12; and (2) the proportion of students pursuing each level in the college preparatory program. The socio-economic status, the SCAT scores, and the magnitude of the under-achiever deviation score will also be comparable for each group. All subjects will be assessed through interviews and a battery of tests including the Wechsler Adult Intelligence Scale, Your Educational Plans, the Edwards Personal Preference Schedule, the Strong Vocational Interest Blank, the Allport-Vernon Study of Values, and the Test of Imagination. From these assessments an individual counseling strategy will be formulated for each member of the experimental group, and each one will be counseled once a week for five weeks by graduate assistants from Harvard who will be trained as counselors. The parents of the experimental subjects will also be interviewed one or more times to achieve the treatment goals with each client. Subjects in the two control groups will not be counseled by the research counselors but will have access to the usual school guidance services. At the end of the counseling period all subjects will be assessed again through interviews and the same battery of tests, and the groups will be compared on the stated variables.

RAYMOND CHARLES HUMMEL, Assistant Professor of Education, Harvard University, Cambridge, Mass.

Project No. 1057.
Duration: 2 years, 2 months.
August 1960–September 1962.

THE MENTALLY RETARDED

Principles for Programing Learning Materials in Self-Instructional Devices for Mentally Retarded Children

Problem.—This study investigates the use of self-instructional devices in the education of mentally retarded children.

Major objectives.—The objectives are to determine whether retarded children (1) learn faster and remember better by the prompting or by

the anticipation method; (2) learn faster with materials programed according to the minimum-change or the maximum-change principle; (3) learn faster with materials that are programed according to the class-descriptive-features principle or the object-component principle; (4) learn faster with materials that are programed in the sequence *A:* many-to-one followed by one-to-many, or in the sequence *B:* one-to-many followed by many-to-one.

Procedures.—The subjects will be children in attendance in the same special class for educable mentally handicapped. Each child will use a self-instructional device at a specific time and for a definite period of time. The child's task in learning a sight vocabulary, for example, is to select one of two word-picture combinations. When he does this he pushes a toggle switch beside his choice. The machine automatically programs the events for the child, depending upon the correctness of his choice and whether or not he is working under the prompting or the confirmation program. If his response is correct the machine exposes a new word to be learned; if it is incorrect, the machine repeats the beginning of the sequence designed to teach that word. Comparisons will be made of learning and retention scores.

Spelling programs will be compared using the minimum change and maximum change principles. A "vanishing" technique will be used with the child seeing less and less of the words with each presentation; thus greater dependence upon recall will be built into the programs. Eventually the child will have to supply all letters from memory. Concept learning will be studied with the aid of (a) the class-descriptive-features and object-component principles, and (b) the many-to-one followed by one-to-many sequence and the one-to-many followed by the many-to-one sequence. The primary statistic will be the F–test and, when appropriate, separate means will be compared. When necessary, as indicated by tests of homogeneity, the raw scores will be transformed so as to make a parametric analysis possible.

LAWRENCE M. STOLUROW, Professor of Psychology, University of Illinois, Urbana, Ill.

Project No. 661.
Duration: 2 years, 4 months.
July 1959–November 1961.

Inductive Concept Formation in Normal and Retarded Subjects

Problem.—The purpose of this study is to compare normal and retarded subjects on discriminative problems requiring classificatory and relational solutions.

Major objectives.—The objectives are (1) to explore and delineate the variables which influence concept formation and (2) to compare concept formation in normal and subnormal populations.

Procedures.—A group of normal children (ages 8–14), a group of retarded children (ages 10–18), and a group of normal adults (college students) will be studied under a number of conditions of learning and problem solving. In the first of two substudies three different types of problems will be presented with variations in complexity, abstractness, and attentional value of the stimulus elements. Four different response categories (direct and indirect, manual and verbal) and two reinforcement schedules (50 percent and 100 percent) will be used. In the second substudy, subjects will be presented with eight relational problems and four arrangements of classificatory problems, using valueless tokens as a means of reinforcement. Measures of the rate of learning and the frequency of errors will be used to differentiate the groups.

CLAUDE B. ELAM, Psychology Department, Adjunct Professor, Texas Christian University, Fort Worth, Tex.

Project No. 833.
Duration: 1 year, 6 months.
January 1960–July 1961.

Studies of the Effects of Systematic Variations of Certain Conditions Related to Learning (II—Conditions of Practice)

Problem.—This study attempts to evaluate the relative importance and contribution of certain accepted conditions of learning.

Major objective.—The objective is to determine the effect of systematic variations of the conditions of practice on the learning performance of mentally retarded, normal, and gifted subjects.

Procedures.—Forty-eight intellectually superior subjects (IQ 120 or higher), 48 normal subjects (90–110 IQ) and 48 mentally handicapped subjects (50–80 IQ) will constitute the sample of this study, which is a continuation of the work begun under project 470. The subjects will be randomly assigned to learn material by the whole method or the pure-part method and by massed practice or distributed practice. They will also be randomly assigned to use four different recitation approaches. Four equated forms of each of two tasks, one involving logically related material and the other involving nonlogically related material, will be employed in the recitation.

KATHRYN A. BLAKE, Assistant Professor of Special Education, University of Georgia, Athens, Ga.

Project No. 695.
Duration: 1 year, 10 months.
September 1959–June 1961.

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Relationship Between Perception and Learning in the Mentally Retarded

Problem.—This study seeks to determine whether perceptual disturbances in mentally retarded children interfere with their ability to profit from instruction.

Major objectives.—The objectives are (1) to determine the relationship between the visual-perceptual ability and the rote learning, discrimination learning, concept formation, retention, and transfer abilities of children with varying degrees of visual and auditory perceptual disability under two conditions of auditory and visual distraction, and (2) to compare the rote learning, discrimination learning, retention, and transfer abilities of exogenous children with defined visual and auditory perceptual disabilities with a comparable group of endogenous children with no defined visual and auditory perceptual disabilities.

Procedures.—Two groups of public school children, each containing approximately 30 mentally handicapped children from about 7–12 years of age, will constitute the sample. The one group will consist of exogenous children with visual and auditory perceptual disability as measured by tests such as the Syracuse Visual Figure Background Test and the Seashore Timbre Test. The second group will be composed of endogenous children with no perceptual disability indicated. Each group of children will be split in random order, and one-half of each will be administered learning tasks with visual and auditory distractions at a minimum, while the other half of each group will be administered the tasks under conditions of controlled visual and auditory distraction. The process for the subgroups will be reversed at a later date with equated learning tasks. One week after each administration of the learning tasks, recognition and recall tests of serial and paired-associate learning materials will be given.

G. Orville Johnson, Professor of Education, *and* Matthew Trippe, Associate Professor of Education, Syracuse University, Syracuse, N.Y.

Project No. 859.
Duration: 2 years, 5 months.
September 1960–January 1963.

A Comparison of Especially Designed Art Activities With Traditional Art Activities Used With Mentally Retarded Children and Youth

Problem.—This study attempts to determine whether mentally retarded children prefer art activities which have been specifically designed to meet their needs to the more traditional art activities.

Major objectives.—The objectives are (1) to evaluate the extent to which the predicted order of preference for art activities and teaching procedures agrees with the empirically determined preference for the same activities and procedures after they have been used in an experimental program, and (2) to test whether or not an experimental art program will modify significantly the development of general motor skills, academic achievement, and social behavior.

Procedures.—The study includes a total of 13 special classes in the elementary, junior high, and senior high schools of Arlington County, Va. New art programs will be initiated in experimental classes, and traditional programs will be conducted in six control classes. Data for comparing the groups will be obtained from anecdotal records of behavioral reactions; independent judgments of the art products; preference questionnaires; grades in all subjects; test results from mental maturity and achievement tests; teacher evaluations of student growth, behavior, and interest; and other measures.

JEAN R. HEBELER, Coordinator of Special Education, University of Maryland, College Park, Md.

Project No. 922.
Duration: 1 year, 4 months.
June 1960–September 1961.

Systematic Variation of Certain Conditions Related to Learning in the Mentally Retarded: Reinforcement

Problem.—This investigation extends the work of an earlier cooperative research project (470) by comparing the motivational characteristics and learning performance of a group of institutionalized mentally retarded children with groups of bright, normal, and mentally retarded noninstitutionalized subjects.

Major objectives.—The objectives are (1) to determine the effect of systematic variations in the conditions of reinforcement on the learning performance and motivational characteristics of institutionalized mentally handicapped subjects and (2) to compare the learning performance and motivational characteristics of the institutionalized subjects with the learning performance and motivational characteristics of noninstitutionalized mentally handicapped, intellectually normal, and intellectually superior students.

Procedures.—Data on the noninstitutionalized subjects has already been obtained from the earlier study. Exactly the same procedures will be followed in obtaining data from 96 institutionalized mentally retarded subjects with mental ages ranging from 8 years, 6 months

through 11 years, 6 months. Both verbal and nonverbal responses will be obtained from each subject on tasks designed to measure discrimination learning, rote learning, and concept formation. The motivational characteristics will be measured by a level of aspiration technique in which the subject is required to make estimates of his subsequent performance after his previous performance has been described to him. Level of aspiration is reflected in the discrepancy between the subject's performance on a trial and his predicted (by him) performance.

LOUIS A. FLIEGLER, Associate Professor of Special Education, Syracuse University, Syracuse, N.Y.

Project No. 862.
Duration: 1 year.
June 1960–May 1961.

The Effects of Listening Training on the Auditory Thresholds of Mentally Retarded Children

Problem.—This study investigates the effects of listening training on the auditory thresholds of mentally retarded children.

Major objectives.—The objectives are (1) to determine whether a battery of hearing tests can be used to obtain reliable and valid hearing thresholds from a large group of mentally retarded children, (2) to ascertain whether or not the losses indicated in initial hearing examinations are due to inability to receive sound, perceive sound, or both, and (3) to assess the effects of a listening training on the responsiveness of mentally retarded children to standardized audiometric tests.

Procedures.—All of the approximately 350 residents of the West Virginia Training School at St. Mary's will receive a puretone audiometric sweep test; any who demonstrate hearing thresholds of 30 db. or greater at two or more frequencies in either ear or who do not respond to testing, will form a group which will receive additional testing and listening practice. It is expected that this group will number 75 children. Thirty hours of listening training will be administered individually to each subject, using monaural and binaural amplification under earphones. After the training the battery of tests will be readministered and the results of the pre- and post-training tests will be compared.

BERNARD SCHLANGER, Director of the Speech and Hearing Clinic, West Virginia University, Morgantown, W. Va.

Project No. 978.
Duration: 1 year, 8 months.
June 1960–September 1961.

The Physically Handicapped

An Experimental Investigation of the Effects of Institutionalization on the Psychoeducational Development of Children With Impaired Hearing

Problem.—This study investigates the effects of institutionalization on the psychoeducational development of deaf children.

Major objectives.—The objective is to determine whether residential students in institutions for the deaf perform at a lower level on measures of academic achievement, social maturity, and communication ability than a similar group of children who are day students at the same institutions.

Procedures.—Selected aspects of the performance of a sample of 150 residential students and 150 day students of 15 institutions educating deaf children will be measured to provide a comparison of residential versus day students. Intelligence and socioeconomic status will be controlled statistically; the sample selection will be based upon chronological age, degree of hearing loss, age of onset of hearing loss, and physical impairments other than hearing loss. Educational achievement, social maturity, and ability to communicate in the English language will serve as measures of performance in comparing the experimental and control groups.

STEPHEN P. QUIGLEY, Associate Professor of Psychology, Gallaudet College, Washington, D.C.

Project No. 685.
Duration: 2 years.
July 1959–June 1961.

The Role of Nonverbal Symbols in the Education of the Deaf

Problem.—This study attempts to find a means of enabling the deaf child to communicate with others during the years of infancy and early childhood.

Major objectives.—The objectives are (1) to provide information that will lead to improvement in the mental, emotional, and social development of the deaf child; and (2) to investigate experimentally the effect of nonverbal symbol communication on the social development of the child.

Procedures.—The experimental group will consist of 25 profoundly deaf children between the ages of 18 months and 5½ years and their parents, instructed in communicating with their child in nonverbal symbols. A control group of 25 deaf children will be taught with traditional means, that is, an oral approach based on multisensory stimulation. Samples of nonverbal symbol communication as used by the child and by the parents will be recorded on film; language achievement will be measured at stated intervals. Samples of speech will be recorded on tape and measured through use of alternate forms of language achievement tests. A social maturity scale and a rating scale to evaluate parental acceptance and understanding of the child will be used with both experimental and control groups. The significance of differences between the experimental and control groups will be determined for each of the verbal language measures, the sound discrimination scores, and the social maturity ratings. Correlations will be computed of (1) nonverbal language development and intelligence, (2) verbal language development and intelligence, (3) nonverbal language development, and verbal language development and other measures.

BEATRICE JACOBY, Pathologist and Audiologist, and MARIE MEIER, Psychologist, Queens College, Flushing, N.Y.

Project No. 690.
Duration: 1 year.
September 1959–August 1960.

Effectiveness of Educational Audiology on the Language Development of Hearing Handicapped Children

Problem.—The problem is to determine whether a program of educational audiology can aid in the speech and language development of the moderate to severely hard-of-hearing child to the extent that the child, when he enters school, might be integrated into a normal classroom.

Major objectives.—The objectives are (1) to ascertain the effect of a program of educational audiology on the hearing handicapped child's speech and language development and to compare his development with that of a normal child, (2) to determine whether or not the preschool hearing-impaired child can develop, through such a program, the speech and language skills necessary for his effective performance in a normal classroom, and (3) to compare the speech and language abilities of preschool hearing impaired children trained by new methods of aural education with those trained by the oral method.

Procedures.—The sample will be selected from children referred to the University of Denver Hearing Center. The children will be be-

tween 6 months and 3 years of age and will have a verified bilateral hearing loss existing before the age of 1 year, or prior to the development of language. The total sample will consist of about 60 children. Data on speech and language development will be collected on three levels, representing prelanguage, early speech, and intermediate language development. At the prelanguage level, measures of the phonetic structure of the utterance and the amount of vocal production will be obtained before and after a program of individual amplification is initiated; at the early linguistic level, data will be collected on the amount of speech, vocabulary, and speech articulation; at the intermediate level, on sentence structure, amount of speech, vocabulary, and articulation. When each child reaches his fifth birthday, his language and speech development and social maturity will be compared with that of his peers in two matched control groups, one composed of normal hearing children and the other of hard-of-hearing children trained by the oral method.

JOSEPH L. STEWART, Director, Hearing Center, University of Denver, Denver, Colo.

Project No. 969.
Duration: 5 years.
January 1961–December 1965.

A Linguistic Approach to the Education of Aurally-Handicapped Children

Problem.—This study seeks to assess the role of the science of linguistics in the evaluation and improvement of techniques for teaching aurally-handicapped children.

Major objectives.—The objectives are (1) to describe the characteristics of language learning and speech development in the preschool and elementary school deaf child, (2) to determine the visibility of English speech based on a series of perception experiments designed to isolate the linguistic determinants of visual speech reception, and (3) to make a linguistic evaluation of current methods used in the education of aurally-handicapped children.

Procedures.—Two separate substudies will be conducted to obtain information on the first two objectives listed above.

Subjects for the first substudy will be drawn primarily from the John Tracy Clinic Demonstration Nursery School, which has an enrollment of 24 deaf children from 2 to 6 years of age. Followup studies will be conducted with deaf elementary school children from 7 to 9 years of age. In all, about 75 subjects will be used. As a technique to determine the phonological distinctions made by the aurally-handicapped child, both in perception and articulation, a series of tests will present sets of minimally-different words based on the tenta-

tive categories of visual difference established in experimental studies of lipreading. Two pictures will be shown with two words, such as "fish" and "dish," and the child will be asked to select the picture appropriate to the word. Each test in the series will be constructed to account for a limited number of variables at one of the three levels of the theoretical model (phonological, lexical, and grammatical), and the selections of stimulus materials for each subsequent test will be made in terms of the results at the preceding test level. Responses to these tests will be grouped according to age level and degree of hearing loss so that statistical measures of significance may be applied.

In the second substudy approximately 200 university students will be shown a series of films and asked to identify individual words of polysyllabic structure and of certain categories of English morphology and syntax, such as noun plurals and past tenses of verbs. Approximately 100 subjects will be shown the films without sound; another 50, with sound only, and a second 50, with both the picture and sound. Individual responses will be combined and transcribed phonemically, so that responses to each of the component phonemes may be tallied and stated in percentages. Also, using statistical measures of significance, perceptual units of consistently confused phonemes will be set up and compared with results from the earlier testing. The results from the two substudies will be used to evaluate current methods of educating the aurally-handicapped.

EDGAR L. LOWELL, Associate Professor, and MARY F. WOODWARD, Research Associate, School of Education, University of Southern California, Los Angeles, Calif.

Project No. 907.
Duration: 3 years.
July 1960–June 1963.

Verbal and Nonverbal Learning in Children Including Those With Hearing Losses

Problem.—This study extends the research which was begun under project 289. It is designed to provide a description of how children, including those with hearing losses, learn verbal and nonverbal paired associates.

Major objectives.—The objectives are (1) to describe the verbal and nonverbal learning of paired-associates materials by normal hearing children and children with hearing losses, and (2) to compare children's ability to learn meaningful material with their ability to learn nonmeaningful material when an auditory, a visual, or a combination of auditory and visual presentation is employed.

Procedures.—Verbal and nonverbal, meaningful and nonmeaningful material will be presented to normal hearing and hard-of-

hearing children between the ages of 3 and 16, using an auditory presentation, a visual presentation, and a combination of auditory and visual presentation. Each child will be given a specified number of trials selected so that the fastest learners attain one perfect trial. The correct number of responses will be recorded for each child, and learning curves will be plotted. Analysis of variance, analysis of covariance, and nonparametric statistics will be employed in the treatment of the data.

JOHN H. GAETH, Director, Hearing Clinic and Deaf Education, Wayne State University, Detroit, Mich.

Project No. 1001.
Duration: 3 years.
September 1960–August 1963.

The Nature and Development of Spatial Concepts in Congenitally Blind Children Between the Ages of 2 and 5

Problem.—This study evaluates the nature of spatial concepts in preschool blind children and the changes occurring in these concepts over a period of 2 years resulting from growth and maturation, and from special training.

Major objectives.—The objectives are (1) to identify the spatial concepts that become operational in congenitally blind children, (2) to trace the development of these concepts, and (3) to assess the effect of special training on the development of spatial concepts in blind children.

Procedures.—A group of approximately 30 congenitally blind children ranging from 2 to 5 years of age will be selected for intensive study and training. An initial evaluation of each child will be obtained from a test such as the Cattell Infant Intelligence Scale. The data from this instrument will be used to assign children to biweekly small group sessions. The training program, an adaptation of one used in an earlier study, will be concerned with teaching ways in which posture and body movements help in the determination of the position of self and in establishing a point of reference for the location of other places and objects. A variety of approaches will be used to help the child develop an understanding of extended space, proceeding from surface to direction, perimeter, and shape, and encouraging comparison of temporal and spatial sequences and the formation of spatial patterns. A spatial concept formation test and the Spatial Vocabulary Test will be administered periodically to all children and the Space Relation Performance Test, to children of 4 years and older. The performance of the experimental group of

children will be compared with the performance of an untrained group of 5- and 6-year-olds to determine the effectiveness of the training program.

RALPH GARRY, Professor of Educational Psychology, Boston University, Boston, Mass.

Project No. 916.
Duration: 2 years, 6 months.
May 1960–October 1962.

Comprehension by Blind Children of Information Presented in Braille and Recordings at Various Word Rates

Problem.—This study compares the comprehension of a group of blind children who read selections in Braille with the comprehension of similar groups of blind children who hear the same selections at several different word rates. Changes in word rate will be accomplished by the time compression technique.

Major objective.—The objective is to determine the effect on the comprehension of blind children of the mode of presentation, the auditory rate, and the type of material presented.

Procedures.—The subjects will be 320 Braille readers of both sexes in the sixth, seventh, and eighth grades of 14 residential schools for the blind. Atypical subjects, such as those newly blinded or recently admitted to the school, will be excluded from the sample.

The subjects will be assigned randomly to eight groups. One group will be given two selections in Braille to read. A recording of the same selections will be played at a different number of words per minute to each of six groups. Word-per-minute rates such as the following will be used: 175, 225, 275, 325, 375, and 425. The remaining group will serve as a control for previous learning. They will be given the tests of comprehension for the selections used in the experiment without previously having encountered those selections.

The two selections to be used in the experiment will be chosen from a seventh-grade literature book and a seventh-grade science book. The comprehension of each selection will be measured by a 4-alternative multiple-choice test. Analyses will be made of differences due to mode of presentation, word rate, type of material, and interaction of these variables.

RAY H. BIXLER, Head, Department of Psychology and Social Anthropology, University of Louisville, Louisville, Ky.

Project No. 1005.
Duration: 1 year.
September 1960—August 1961.

The Identification of Kindergarten Children Least Likely to Show Spontaneous Improvement in Speech Sound Articulation

Problem.—This study attempts to develop means to differentiate between those kindergarten children who will spontaneously correct their misarticulations and those who will not.

Major objective.—The objective is to identify factors which will differentiate those children who will be slow to mature in their articulation from those who will be atypical in their articulation toward the end of the primary grades.

Procedures.—The speech sound articulation of approximately 1,550 prekindergarten children will be tested several months before kindergarten entrance. These children will provide the pool from which the study sample will be drawn, and their articulation will be retested in second grade. The study sample will include approximately 320 children selected and divided into three groups: one group of about 120 children who consistently misarticulate speech sounds, a second group of about 100 children who inconsistently misarticulate speech sounds, and a third group of about 80 children whose production of speech sounds is essentially at the age norm. The articulation of these groups will be retested during the fall and spring of kindergarten and first grade, and during the fall of second grade. Measures of auditory memory span, attention span, listening ability, and other behaviors, and a detailed articulation diagnosis will be obtained. Data will be secured from school records, standardized tests, teacher ratings, and parent interviews. As a major part of the statistical analysis, the best combination of predictors of spontaneous improvement in articulation will be determined.

MILDRED C. TEMPLIN, Professor, Institute of Child Development and Welfare, University of Minnesota, Minneapolis, Minn.

Project No. 818.
Duration: 3 years, 6 months.
January 1960—June 1963.

Adapting for Classroom Use Clinical Techniques for Teaching Brain-Injured Children

Problem.—This study seeks to develop a public school program for brain injured children of average or low-average intellectual potential.

Major objectives.—The objectives are (1) to collect tutorial clinical techniques used in teaching brain-injured children; (2) adapt these techniques for group teaching in the classroom; and (3) to evaluate the effectiveness of such a classroom program.

Procedures.—Clinical and tutorial techniques that are used with brain-injured children will be gleaned from the literature and from consultation with major investigators in the field. These techniques will be classified according to type of dysfunction, subject matter, area, cost, complexity, source of the technique, and feasibility for classroom use. A model classroom will be established in the new campus school of Rhode Island College, and 10 children will be selected from the files of the Meeting Street School and Bradley Hospital. From the techniques that have been collected and classified, a curriculum will be designed to emphasize the recognition of basic forms, form discriminations, and perceptual organization. Evaluations of the progress of each child will be made at regular intervals.

E. GIL BOYER, Assistant Commissioner of Education for Research and Planning, Rhode Island State Department of Education, Providence, R.I.

Project No. 186.
Duration: 1 year, 6 months.
September 1959–February 1961.

ABILITIES, ATTITUDES, AND INTERESTS OF STUDENTS

The Etiology and Development of the Creative Personality

Problem.—This study is designed to obtain significant information on the family, the environmental, and the educational background of creative persons.

Major objective.—The objective is to determine the source and type of educational, environmental, and social conditions conducive to creative productivity.

Procedures.—This study, which is largely exploratory in nature, is designed to develop instruments and techniques for a more complete investigation. A limited number of adult subjects will be selected for an experimental and a control group from each of several areas of occupational interest. The experimental group will consist of subjects who have been judged to be outstanding in their creative productivity, while the control group will have demonstrated a minimum of intellectual and educational prerequisites for creativity but will not have demonstrated any significant degree of creativity. The educational, environmental, and family background of the subjects will be investigated by means of open-ended interviews, following the form outlined by the M–B History Record. Personality characteristics will be measured by an instrument such as the Sixteen Personality

Factor Questionnaire. Statistical analysis will involve appropriate tests of the significance of differences found between the experimental and control groups.

JOHN E. DREVDAHL, Assistant Professor of Psychology, University of Miami, Coral Gables, Fla.

Project No. 664.
Duration: 1 year, 6 months.
January 1960–June 1961.

Inference, Guesswork, and Creativity

Problem.—This study is designed (1) to develop a conception of creativity which is independent of demonstrated skill in a particular area, and (2) to develop a technique for identification and measurement of creativity in keeping with the conceptualization which evolves.

Major objectives.—The objectives are (1) to develop a conception of creativity which is based on performance related to the general body of psychological knowledge and which can be made operational, and (2) to produce measures which serve to assess the creative behavior in clear objective terms.

Procedures.—A set of problems will be presented to subjects who in their attempts to achieve solutions can take as much information from a pool of clues as they wish. The subjects will be instructed to solve as many of the problems as possible with the fewest possible clues. The problems will be presented to both random and selected samples of students, industrial researchers, and artists. The relationships between the tendency to solve problems successfully or unsuccessfully and the tendency to demand much or little information are under study, as are the relationships between these variables and both personality characteristics and external criteria of creativity.

MALCOLM R. WESTCOTT, Assistant Professor of Psychology, Vassar College, Poughkeepsie, N.Y.

Project No. 684.
Duration: 3 years.
October 1959–December 1962.

Role of Evaluation in Creative Thinking

Problem.—This study seeks to provide a scientific basis for designing classroom conditions favorable to the development of creative thinking. It is particularly concerned with the role of evaluation in creative thinking.

Major objective.—The objectives are (1) to determine the effect of teachers' attitudes toward creativity on their evaluative behavior in

the classroom and on the creative thinking of their pupils; (2) to ascertain the effect of various kinds of evaluative comments on the ideas offered by students; and (3) to determine whether or not suggestions for improvement or criticism of defects should be stressed in training individuals to evaluate their own creative products.

Procedures.—A series of interrelated laboratory and field studies will be conducted on the role of evaluation in creative thinking. In all of the studies, the subjects will be teachers and pupils from grades 1 through 6 drawn from the Minneapolis–St. Paul area. From 500 to 1,200 subjects will be chosen for each of the three studies and randomly assigned to experimental and control groups.

To achieve objective 1, an experimental group of teachers will be given a series of inservice training sessions and a written manual concerning the evaluation of creative thinking in the classroom. A control group of teachers will not be so trained. Pupils in the experimental and control groups will take tests of creativity at the beginning and end of the experiment. Questionnaires will be administered to teachers to obtain scores on creative attitudes, critical attitudes, and attitudes presumed to be inimical to creative thinking. Other questionnaires will be used to determine teachers' and pupils' perceptions of each teacher's evaluation behavior in relation to creative thinking and the creative activities of pupils.

To achieve the second objective, two classes at each grade level from the first through the sixth grade will be divided randomly into three groups, all of which will be given a task requiring creativity and inventiveness. During a practice session, comments about defects exhibited will be made to the one group, comments indicating possibilities for improvement or alternative approaches to the second group, and comments on defects and constructive possibilities to the third group. Data on the quantity and quality of ideas and on student motivation and morale will be collected by interviews and questionnaires.

In the third study, each class will be divided randomly into two groups, and training in identifying defects will be given to one, while the other will have training in suggesting new possibilities or different interpretations for the same creative product. Afterwards the two groups will be compared on the quantity and quality of the ideas developed during a creative task.

E. PAUL TORRANCE, Director, Bureau of Educational Research, University of Minnesota, Minneapolis, Minn.

Project No. 725.
Duration: 1 year, 2 months.
August 1959–October 1960.

Creative Thinking in Children at the Junior High School Level

Problem.—This project investigates the factors of divergent productive thinking which, it is believed, contribute most to creative behavior.

Major objectives.—The objectives are (1) to determine which factors of divergent thinking can differentiate individuals at the ninth-grade level; and (2) to explore the differentiation of factors of divergent thinking in a population previously identified as gifted.

Procedures.—The primary method to be used is factor analysis within the framework of the "structure of intellect" with five kinds of psychological operations differentiated: cognition, memory, divergent production, convergent production, and evaluation. The structure will embrace three kinds of content: semantic, having to do with verbal meanings or concepts; figural, characterized by such properties as form, size, and texture; and symbolic, such as letters and numbers. Two samples will be selected for two separate factor analyses, one sample of at least 200 boys, the other of at least 200 girls, and both samples will be given a battery of previously developed tests to determine which factors of divergent thinking differentiate within samples. Those children who have previously been identified as gifted will be used to explore the differentiation of factors of divergent thinking. Measures of factors other than divergent thinking but of relevance to the identification of the gifted child will be included.

J. P. GUILFORD, Professor of Psychology, University of Southern California, Los Angeles, Calif.

Project No. 737.
Duration: 2 years.
June 1959–May 1961.

Understanding the Fourth-Grade Slump in Creative Thinking

Problem.—This study continues the work of project 725 which identified a "slump" in the creative thinking of children that occurred at the fourth-grade level. The current project will explore more specifically the nature of this slump.

Major objectives.—The objectives are (1) to trace the development of the content and quality of the creative thinking of boys and girls throughout the third, fourth, and fifth grades; (2) to determine to what extent, if any, various experimental manipulations, such as varying the practice session, the motivation, and the evaluation procedures used in teaching creative thinking result in developmental curves different from those found "in nature"; (3) to compare the personality

characteristics and life experiences of children who exhibit this slump with those who do not, and (4) to identify differences in developmental curves for selected creative thinking abilities among selected cultures.

Procedures.—In previous research over 5,000 children from kindergarten through sixth grade have already been tested on a variety of tasks developed to measure creative thinking abilities. Longitudinal data have been collected with Buck's H–T–P and the Things Done Inventory; the Life Experience Inventory has been developed and pretested and will be administered with another personality measure; the data thus obtained will be used to attain the first three objectives. To achieve the fourth objective a battery of creative thinking tasks and an experience checklist will be administered to about 1,000 children in grades 1 to 6 in each of three or more cultures outside the United States which appear to differ in their treatment of creative needs of children. The data obtained from all these sources will be used to identify differences in developmental curves for the various cultures.

E. PAUL TORRANCE, Director, Bureau of Educational Research, University of Minnesota, Minneapolis, Minn.

Project No. 994.
Duration: 1 year, 8 months.
September 1960–November 1961.

Aptitude and Personality Measures Related to Creativity in Seventh-Grade Children

Problem.—This study explores the relationship between certain aptitude (divergent thinking) factors and nonintellectual personality traits and the development and expression of creativity in seventh-grade children.

Major objectives.—The objectives are (1) to determine which divergent thinking factors can differentiate children at the seventh-grade level and (2) to ascertain which nonintellectual personality traits can differentiate these children and how they are related to aptitude factors.

Procedures.—All of the approximately 600 seventh-grade children in a single school district will serve as the population for this study. The California Test of Mental Maturity will be used to select children whose IQ's range from 90 to 115 and these children (N=400) will constitute the sample. Selected tests of Guilford's divergent thinking factors and a 70-item personality inventory will be administered, and teacher ratings of creativity will be obtained. The personality inven-

tory items will be factor analyzed with separate analyses for approximately 200 boys and 200 girls. Scores derived from the loadings of items on each obtained factor, the aptitude measures, and the teacher ratings will be intercorrelated.

PHILIP R. MERRIFIELD, Adjunct Assistant Professor of Psychology, University of California, Los Angeles, Calif.

Project No. 1060.
Duration: 1 year.
July 1960–August 1961.

A Study of Leadership in School-Age Children

Problem.—This project investigates the development of leadership behavior in school-age children.

Major objectives.—The objectives are (1) to assess leadership and describe its development in children of elementary school age; (2) to establish a number of learning experiences whose potential for initiating and improving leadership behavior is high; (3) to develop a theoretical model of the dynamics of leadership from which further educational concepts and practices can be deduced.

Procedures.—A sample of 45 to 70 kindergarten children will be studied in a 2-phase research program. The first 2-year phase will be devoted to experimenting with methods of assessing leadership behavior and with specific experimental methods of improving it in the primary grades. In the second 2-year phase, attempts will be made to encourage leadership behavior by the systematic introduction into the curriculum of learning experiences designed to increase leadership behavior. These learning experiences will be drawn from experiments carried on in the first phase and from procedures described in research and educational literature. The children will be studied in various membership combinations and under various group task situations in order to discover the relevant relationships between leaders and followers and the characteristics of the situation in which they are placed.

ROBERT F. DEHAAN, Chairman, Department of Psychology, Hope College, Holland, Mich.

Project No. 697.
Duration: 2 years.
September 1959–August 1961.

The Associative Basis of the Creative Process

Problem.—This study attempts to elaborate an associative theory of creative thinking.

Major objectives.—The objectives are (1) to construct a test which will measure creativity at the high school level, (2) to identify the variables that are effective in influencing the creative process and (3) to refine a theory of creative thinking.

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Procedures.—A pool of 400 test items has been developed and administered to a group of 2,000 high school students in the Ann Arbor area. Through item analysis, 200 items will be selected and cross-checked for internal consistency with an additional sample of students. From the 100 most discriminative items, several alternative forms of a creativity test will be developed. The criterion validity of the test will be obtained by correlating the test scores with the ratings of individuals on tasks requiring creative performance. The construct validity will be determined by comparing high scores and low scores on as many disparate dimensions as possible. The test will also be correlated with Guilford's creativity battery. If both the criterion and the construct validity of the test are promising, a number of substudies of high and low creatives will be conducted to explore the relationship between levels of creative talent and the general effectiveness of creative functioning as indicated by variables such as speed of association, cognitive style, perseverance in tasks, social pressures toward conformity, reaction of the teacher to the creative student, and related variables. The data obtained will be used to modify a theory of creative thinking.

MARTHA T. MEDNICK, Research Associate, Institute for Social Research *and* SARNOFF MEDNICK, Assistant Professor of Psychology, University of Michigan, Ann Arbor, Mich.

Project No. 1073.
Duration: 3 years.
August 1960–August 1963.

Differential Cognitive Abilities

Problem.—This project explores the nature of the functions that underlie an imbalance in children's mental abilities.

Major objective.—The objectives are (1) to identify the personality traits associated with different patterns of cognitive functioning and (2) to discover some of the perceptual tendencies which mediate between personality traits and cognitive abilities.

Procedures.—One thousand fifth-grade children will be administered the Thurstone Primary Mental Abilities Test; six groups of 20 children each will be chosen for the sample on the basis of their scores (high, medium, and low) on the verbal, space, and number sections of this instrument. The six groups will be similar on general intelligence scores. Measures of personality will be obtained from (1) ratings by teachers; (2) sociometric devices, such as the Peer Nominations Inventory, which provides measures of aggression, dependency, and withdrawal; and (3) self-report questionnaires. Movie sequences dealing with various kinds of subject matter, some with affectively loaded interpersonal situations and some dealing with nonpersonal

subjects, and auditory devices which exposed the subject to a delayed auditory feedback of his own speech will be used to obtain measures of differential sensitivity to a range of cues.

ELEANOR E. MACCOBY, Associate Professor of Psychology *and* LUCY RAU, Assistant Professor of Psychology, Stanford University, Stanford, Calif.

Project No. 1040.
Duration: 2 years, 1 month.
September 1960–September 1962.

Prediction and Understanding of the Effect of Children's Interests on School Performance

Problem.—This study seeks to predict school performance from objective interest and motivation measures.

Major objectives.—The objectives are (1) to describe the basic motivation structure in children; and (2) to determine whether the variance in school performance accounted for by interest tests is in addition to that associated with abilities and general personality dimensions.

Procedures.—One hundred and fifty boys and an equal number of girls aged 10 years will form the sample. These children will be administered an interest, a primary ability, and a personality battery of tests and at the same time records will be obtained of academic achievement and school performance, including social adjustment. A factor analysis of the interest test components will be made, and the ability, personality, and interest test scores will be correlated with the performance measures and with each other.

RAYMOND B. CATTELL, Research Professor in Psychology, University of Illinois, Urbana, Ill.

Project No. 701.
Duration: 2 years.
September 1959–August 1961.

Leisure Activities and Interests of Teenage Youth

Problem.—This project inventories the leisure activities of youth in an effort to determine how goals and values are formed and choices regarding leisure activities are made.

Major objectives.—The objectives are (1) to assemble data concerning the leisure activities of youth which will be useful to school systems and other agencies and (2) to ascertain to what extent the leisure activities and interests of teenage youth are determined by their association with formal and informal groups.

Procedures.—A brief form of an extensive questionnaire on leisure activities will be administered to nearly all students in grades 8 through

12 in the Washington, D.C., area. The content will be divided among four sets of questions, each set filling about three pages. Each student will receive a random combination of two of these four sets of questions and will also be asked to fill out a 1-page data sheet calling for information on area residence, age, sex, grade level, cultural level of parents, educational plans, use of a car, spending money available per week, social participation, and school standing. From these data, basic tabulations will be made for about 27 types of areas based upon socio-economic status, degree of urbanization, and adequacy of leisure-time facilities. The tabulation will be further subdivided into five population groupings. Scores or indexes will be computed on the basis of percentage of youth participating, frequency of participation, and interest in participation. The findings will be validated by a post-study interview of a sample of 300 of the students.

HAROLD C. HOFFSOMMER, Head, Department of Sociology, University of Maryland, College Park, Md.

Project No. 748.
Duration: 1 year, 1 month.
September 1959–October 1960.

Measurement of Curiosity in Elementary School Children

Problem.—This study seeks to explore the possibility of developing instruments or techniques to measure the curiosity of elementary school children.

Major objective.—The objective is to determine which of a number of paper-and-pencil test items will be most likely to yield a valid measure of curiosity.

Procedures.—A number of different types of test items will be developed and tried out in five intermediate elementary classes. These will include preferred-behavior items, hidden-picture items, finding-the-answer items, story-satisfaction items, memory-for-incomplete-story items, questions-and-seeking-information items, breadth-of-information items, attitude-toward-curiosity items, and others. The usable items will become part of a preliminary test form which will be administered to five intermediate classes. The reliability of the instruments will be calculated by appropriate methods, and the criteria for a validity check will consist of teacher, peer, and self-judgments. After the validity and reliability coefficients have been determined, and the item analyses have been performed, a more refined instrument will be developed and administered to 25 additional intermediate classes.

WALLACE H. MAW, Associate Professor, School of Education, University of Delaware, Newark, Del., *and* ETHEL W. MAW, Lecturer in Education, Bryn Mawr College, Bryn Mawr, Pa.

Project No. 801.
Duration: 2 years.
January 1960–December 1961.

Motivational Factors Underlying Achievement of Eleventh-Grade Students

Problem.—This investigation explores the relationship between motivational factors and the overachievement or underachievement of eleventh-grade students.

Major objectives.—The objectives are (1) to explain observed differences in motivation between the over- and underachieving student, and (2) to attempt to develop an objective measure of motivation which will predict over- and underachievement.

Procedures.—A validation and crossvalidation sample of approximately 800 Michigan public high school students will be divided by sex and over- or underachievement. A number of instruments will be administered, including the Generalized Situational Choice Inventory (a motivational scale), the Preferred Job Characteristics Scale, the Preferred Teacher Characteristics Scale, the Word Rating List, the Human Trait Inventory, and the Perceived Parental Attitude Inventory. The data analysis will identify items which discriminate between over- and underachieving students for each sex. With these items, an instrument will be developed to predict academic grades.

WILLIAM W. FARQUHAR, Associate Professor, College of Education, Michigan State University, East Lansing, Mich.

Project No. 846.
Duration: 2 years, 1 month.
December 1959–December 1961.

Factors Associated With the Educational Utilization of Human Talents

Problem.—As a continuation of project 025, this study seeks to determine the interrelationships between the societal environment and early learning experiences of young people, their mental and emotional traits manifested inside and outside the classroom, their educational history when teaching and guidance are similar for all boys and girls, and talents observed during and subsequent to the period of study.

Major objective.—The objective is to test the hypothesis that within certain measurable limits the ability of a person to perform significant and socially valued acts is a function of (1) his potential educability, (2) his motivational orientations, and (3) planned variations in teaching and guidance.

Procedure.—Sample populations of 150 boys and girls in the seventh grade of junior high schools located in four Texas communities are

being used, thus providing two experimental and two control groups. In addition to continuing the work of project 025, this study is designed (1) to test the effects of placing relatively "dependent" and "autonomous" boys and girls in classrooms with "traditional" and "modern" teachers, (2) to study the consequences of taking family background and age-mate acceptance into account in managed grouping, (3) to provide program consultants and a professional counselor to work with school people in each community to stimulate program changes and evaluate their effects, and (4) to provide parent-teacher consultation to determine whether or not family influences are inhibiting the progress of students.

CARSON MCGUIRE, Professor of Educational Psychology, The University of Texas, Austin, Tex.

Project No. 742.
Duration: 2 years, 2 months.
July 1959–August 1960.

Trends in Post-High School Plans Over an 11-Year Period

Problem.—This study compares the educational and vocational plans of 1961 Minnesota high school seniors with the plans of the Minnesota seniors of 1950.

Major objectives.—The objectives are (1) to compare the proportions of 1950 and 1961 high school seniors who plan to attend college, to obtain other types of training, and to seek employment; (2) to compare the relationships between family, social, and economic status and post-high school plans for the two groups; and (3) to study intensively those high schools which have shown large increases in the proportion of seniors planning to attend college.

Procedures.—Approximately 47,000 public and private high school seniors in Minnesota will be administered a questionnaire concerned with their educational plans, the economic, educational, and cultural status of their families, and other social and psychological variables. Scores on a college aptitude test and a high school percentile rank in achievement will be obtained for these students. Their post-high school plans will be studied and compared with those of a comparable group of 1950 seniors. Particular emphasis will be placed on comparisons of seniors in the upper 20 percent in intelligence of these two groups. A small sample of high schools showing large increases in the proportion of seniors planning to attend college will be investigated by questionnaire and personal interview to obtain information on the school programs and the communities.

RALPH F. BERDIE, Director, Student Counseling Bureau, University of Minnesota, Minneapolis, Minn.

Project No. 951.
Duration: 3 years.
August 1960–July 1963.

A Study of Values as Determinants of Educational-Vocational Choices in Hawaii

Problem.—This study seeks to investigate the role of values in the selection of educational programs by public school and university students.

Major objective.—The objective is to study occupational and educational choice as a means of improving curricular offerings and promoting the optimum utilization of human resources.

Procedures.—A questionnaire will be administered to a sample of 75 percent of all sixth-, ninth-, and twelfth-grade public school pupils in Hawaii and at a land-grant university at freshmen and senior levels. The instrument will collect data on each student's background and personal characteristics, and on responses to three checklist questions concerning values, external influences, and interests which help to determine educational and post-educational choices. Variables will be compared in terms of the proportions responding in a given manner among various educational, national-ethnic, and socioeconomic groups, using appropriate tests of significance.

ARTHUR A. DOLE, Director, Bureau of Testing and Guidance, University of Hawaii, Honolulu, Hawaii.

Project No. 757.
Duration: 1 year.
October 1959–September 1960.

The Relationship of Child Perceptions to Achievement and Behavior in the Early School Years

Problem.—This study explores the relation between the child's perceptions of self and of his world and his current behavior and achievement in school.

Major objectives.—The objectives are to determine (1) whether or not changing perceptions of self and the world are accompanied by changes in behavior and achievement and (2) whether or not behavior and achievement can be predicted from a knowledge of the child's perceptions of himself and his world.

Procedures.—This study will use a group of approximately 60 kindergarten children, who will be subjected to an intensive program of observation and testing designed to enable the investigator to draw inferences about each child's perception of himself and his world and to provide objective data on the child's achievement and behavior. These data will be subjected to correlation analyses to determine the interrelationships of perception, behavior, and achievement.

ARTHUR W. COMBS, Professor of Education, University of Florida, Gainesville, Fla.

Project No. 814.
Duration: 2 year, 6 months.
January 1960–June 1962.

Relation of Self-Image to Achievement in Junior High School Subjects

Problem.—This study attempts (1) to identify the nature of the self-images which a sample of seventh-grade students hold of themselves as learners, (2) to determine the relationship between various types of self-images and current achievement in several school subjects, and (3) to identify the other persons who are significant to the students in shaping their self-concepts as learners.

Major objectives.—The objectives are to determine (1) to what extent the relevant self-images of seventh-grade students as learners are generalized to all school subjects and to what extent they are specific to particular subjects, (2) to what extent the self-images of seventh-grade students as learners differ by IQ, sex, and family background; (3) to what extent the self-images differ by achievement, with sex, IQ and family background controlled; and (4) to identify the significant people to whom seventh-grade students relate themselves as learners.

Procedures.—Sex, IQ, school achievement, and family background data will be obtained on the seventh-grade pupils in one or more large school systems. On the basis of these data, students will be classified by sex, family background, and achievement in relation to IQ. Four groups of boys and girls from distinctly different family backgrounds will be selected for the study of self-images and significant others. The four groups which are based on expected achievement in relation to IQ are (1) over-achievers (low IQ and high achievement), (2) under-achievers (high IQ and low achievement), (3) high achievers (high IQ and high achievement), and (4) low achievers (low IQ and low achievement). The approximately 160 boys and 160 girls thus selected will respond to a self-concept questionnaire and will be interviewed to explore the dynamics of self-image development and interaction with significant other persons. Analysis will be made of the variations in self-images and the images of significant others among the several categories of students.

WILBUR BROOKOVER, Director, Bureau of Educational Research, Michigan State University, East Lansing, Mich.

Project No. 845.
Duration: 1 year, 6 months.
January 1960–June 1961.

The Self-Concepts of Elementary School Children in Relation to Their Academic Achievement, Intelligence, Interests, and Manifest Anxiety

Problem.—This study attempts to describe the relation of the self-concepts of elementary school children to their academic achievement, intelligence, interests, and manifest anxiety.

Major objectives.—The objectives are (1) to determine what significant grade and sex differences exist in the self concepts of fourth and sixth graders and (2) to relate the differences, if any, in self concepts to the academic achievement, intelligence, interests, and manifest anxiety of these children.

Procedures.—From a school system in which there are 10 or more schools representing different socioeconomic groups, three schools will be selected at random. The fourth- and sixth-grade pupils in these schools will be administered the Stanford Achievement Test, an interest inventory, the Primary Mental Abilities Test, the Michigan Picture Test, a trait-descriptive adjectives test, and the Manifest Anxiety Scale for Children. Data from cumulative records will also be available. Descriptive statistics will be employed to present frequency distributions, measures of central tendency, measures of variability, and measures of relationship. Estimates of parameters and *t*-tests of differences in means will also be used in the analysis of the data.

JOSEPH C. BLEDSOE, Professor of Education, University of Georgia, Athens, Ga.

Project No. 1008.
Duration: 2 years.
September 1960–August 1962.

The Development of Basic Attitudes and Values Toward Government and Citizenship During Elementary School Years

Problem.—This project explores the young child's perceptions of government and the role of the individual citizen and will investigate the developmental changes in these perceptions during elementary school years.

Major objectives.—The objectives are (1) to study the child's conceptions of figures in the world of government and politics during the elementary school years, (2) to determine the child's emerging conceptions of the symbols, terms, and labels of government and its institutions, (3) to explore the child's emerging conception of himself as a member and citizen of a democratic society, and (4) to examine the role of the school and the family as socializing agencies.

Procedures.—Over 13,000 children from the Far West, the Midwest, the South, and the Northwest will constitute the sample for this study. To obtain this sample two schools from lower-class neighborhoods and two from middle-class neighborhoods will be selected from each of two urban areas within each region. Two classes each from grades 2 through 8 will be administered a questionnaire designed to elicit a child's perception of governmental figures, such as the President or a senator; his perception of other authority figures, such as his parents or teachers; his attitudes toward national institutions, such as the Congress and the Supreme Court; his conception of law; and his feelings about similar items. Questionnaires will also be administered to a sample of teachers and parents who will be asked to complete them as they think the children should. Supplemental information will be obtained from school records. Analysis of variance will be used to examine differences among regions, urban areas, socioeconomic levels, schools, and sexes. Individual item analysis and associated indices of dimensions derived from grouping individual items will be used to evaluate changes associated with age.

ROBERT D. HESS, Associate Professor of Human Development and Education *and* DAVID EASTON, Professor, Department of Political Science, University of Chicago, Chicago, Ill.

Project No. 1078.
Duration: 3 years.
January 1961–December 1963.

RESEARCH ON:

II. TEACHERS

The Training of Teachers

Classroom Adjustment of the Unaccepted Child Through Changes in Teachers' Attitudes and Behavior

Problem.—This study is designed to determine what effect an in-service child-study program for teachers has on their attitudes, beliefs, and classroom behavior.

Major objective.—The objective is to determine whether an inservice program which stresses the study by a teacher of a single socially unaccepted child leads to a desirable change in the attitudes, beliefs, and classroom behavior of the teacher.

Procedures.—The experimental group will consist of 50 classroom teachers in six counties; one unaccepted child in each of the classrooms will be chosen for intensive study by the teacher. The teachers in the experimental group will form a special inservice study group under the direction of the experimenters and, in addition, they will be involved in conferences dealing with child-rearing techniques, parent-teacher conferences, and other special techniques. A control group of 50 matched teachers will be chosen but will not participate in the experimental inservice program. To determine the effects of the in-service training program, the California Achievement Test and the California Test of Personality will be administered to all children in both the experimental and control groups. Changes in the social structure within each classroom will be determined by sociometric techniques. The experimental and control teachers will be compared on the basis of the Minnesota Teacher Attitude Inventory and the Purdue Teachers' Examination. Also, data will be kept on each teacher's ability to expect and deal with children's unacceptance of others.

G. R. Boyd, Dean, Troy State College, Troy, Ala.

Project No. 672.
Duration: 1 year, 5 months.
July 1959–November 1960.

A Study of the Factors Operative in the Selective Retention of Students in Teacher Education

Problem.—This study seeks to determine the factors which operate to produce selective retention of students in teacher education.

Major objective.—The objective of the study is to compare students who persist in teacher education with those who do not, using biographical, academic, and test data, including data which will describe the development of intellectual skills and abilities in the population.

Procedures.—This is a continuation study of Project 174 which will extend the previous research and add new data. The procedure is to collect data concerning all students who enter a college of education regardless of curriculum or previous academic work. Four criteria have been established to determine successful persistence in teacher-education: (1) Completion of the junior year; (2) entrance into student teaching; (3) success in student teaching; (4) entrance into the teaching profession. Students who persist beyond these points are compared in each of several areas with those who do not. The new research will collect all of the biographical, academic, and test data previously collected on a new sample of 2,500 students entering the junior professional sequence in 1959–60. In addition, test data will be gathered to determine the educational development of students in English usage, science, mathematics, and the social sciences. These tests will be measures of how students use what they have learned, not measures of scholastic aptitude.

WALTER W. COOK, Dean, College of Education, University of Minnesota, Minneapolis, Minn.

Project No. 686.
Duration: 4 years.
July 1959–June 1963.

Effects of a Summer Institute in Guidance and Counseling on the Use of Tests by Teachers

Problem.—This project investigates the factors which influence the use of test results by teachers, counselors, and other school personnel.

Major objective.—The objective is to study the effects of an intensive summer institute in guidance and counseling on (1) the procedures employed by teachers in working with individual pupils, (2) the teachers' use of test results in the classroom, and (3) the attitudes and perceptions of the teachers' coworkers.

Procedures.—This research is a continuation of project 509. Former participants in a summer institute on guidance and counseling will be compared with a control group of nonparticipants composed

of (1) teachers with little or no training who work in the same schools as the institute enrollees, (2) teachers with little or no training who work in other schools, (3) teachers with some of the same or related training, and (4) teachers with training in testing and counseling equal to or greater than that of the enrollees. Data will be collected by instruments that have been devised to measure a teacher's knowledge of testing procedures in guidance and counseling. Analysis of variance and other appropriate techniques will be used to determine whether or not the summer institute had any effect on the subsequent behavior of the enrollees and their colleagues.

J. THOMAS HASTINGS, Director, Unit on Evaluation, College of Education, University of Illinois, Urbana, Ill.

Project No. 702.
Duration: 1 year, 9 months.
May 1959–January 1961.

Interpersonal Perception: The Effect of Training in Perceptual Theory, Observation, and Analysis of Behavior Upon Accuracy of Prediction of Children's Self-Reports

Problem.—This study seeks to determine whether teachers can be trained to observe and infer children's perceptions with accuracy.

Major objective.—The objective is to test the hypothesis that training college students in self-perception theory, in observing child behavior, and in analysis of behavior from a perceptual orientation increases their ability to infer from behavior records a child's statements about himself.

Procedures.—An experimental group of 60 students and two control groups of 50 students each will constitute the sample. The experimental group will be composed of undergraduate education majors enrolled in a junior-level course in human development. The one control group will consist of students who have not yet taken any human development course; the other group, of students who have taken a previous human development course which included observation but did not emphasize perceptual theory or the analysis of an individual on the basis of observation. From detailed observation made of seven pupils in grades 3 through 12, a primary, an intermediate, and a high school student will be selected for this study. Behavior records will be compiled on each of these students, and all subjects in the experimental and control groups will be asked to complete a self-rating scale as they believe each of three pupils would have completed it, using the three behavior records as the source of their information. After completing the course in human develop-

ment, the subjects will be asked to complete the self-rating scale a second time. Differences in the groups will be determined by correlating the pupils' own self-ratings with those of the experimental and control subjects.

IRA J. GORDON, Professor of Education, University of Florida, Gainesville, Fla.

Project No. 813.
Duration: 1 year, 6 months.
January 1960–June 1961.

Changes in Schools Which Do and Do Not Send Staff Members to Training Institutes in Counseling

Problem.—This study continues the work begun under projects 509 and 702 to provide a picture of the test practices and staff attitudes toward test practices prevailing in Illinois high schools.

Major objectives.—The objectives are (1) to obtain followup control data for a summer institute study, 702, which will enable the investigators to evaluate more fully the effect of the institute on test practices and attitudes found in schools, and (2) to examine the stability of attitudes and practices concerning testing which were studied under project 509.

Procedures.—A sample will be drawn of 50 Illinois public high schools, including schools which sent no member for training in counseling anywhere and others which sent members for training to places other than the Illinois Summer Institute of 1959. Portions of the questionnaires used in projects 509 and 702 will be sent to all administrators and counselors in the 50 schools. In schools with less than 35 faculty members, questionnaires will be sent to all teachers; in larger schools, to about half of the teachers. Data will be analyzed with data collected under previous contracts and tests of differences will be made between the "experimental" samples and the control samples, as well as between the pretest and posttest samples.

PHILIP J. RUNKEL, Assistant Director, Unit on Evaluation, College of Education, University of Illinois, Urbana, Ill.

Project No.: 939.
Duration: 1 year.
June 1960–June 1961.

The Preparation of Teachers for Schools in Culturally Deprived Neighborhoods

Problem.—The primary problem is to find ways of more effectively preparing teachers to work in schools in culturally deprived neighborhoods.

Major objectives.—The objectives are (1) to explore through curriculum experimentation and psychological testing the classroom problems, the intellectual resources, and the learning potentials of underprivileged children, and (2) to determine the implications of the findings for changes in a teacher-education program.

Procedures.—Three recent graduates of the Queens College Department of Education will teach about 90 seventh-grade students (mostly Negro) selected randomly and grouped into three classes. The classes will be average in size, will exclude the mentally retarded, and will cover the required syllabus, though not necessarily in the prescribed order. A coordinating teacher will have the dual function of supervising the experimental teachers and keeping records of classroom behavior. Instructional methods and classroom activities will be developed during the experiment. Criteria for evaluating change will include results from achievement testing, psychological testing, statistics on truancy, evidence of new student interest and participation, and incidence of disorderly behavior. During the 3-year period, a rotation plan will allow all members of the secondary education staff to visit the schools involved and other "difficult" schools. These visits and observations made during the study will serve as a basis for possible modification of content in the college program.

LEONARD KORNBERG, Assistant Professor,
Queens College, Flushing, N.Y.

Project No.: 935.
Duration: 4 years.
February 1961–January 1965.

Attitude Formation and Initiation Into the Teaching Profession in the Student Teaching Program

Problem.—This research focuses on hypothesized changes in the student teacher's perceptions and attitudes that result from student teaching.

Major objectives.—The objectives are (1) to describe the process by which professional attitudes are transmitted to student teachers, and (2) to determine whether or not the differences in attitudes which distinguish between beginning teachers and experienced teachers decrease largely during student teaching and shortly thereafter.

Procedures.—A sample of 100 student teachers and 100 experienced teachers will be selected for this study. Interviews with student teachers, their diaries, and classroom observations will provide data concerning the process by which professional attitudes are transmitted to student teachers. An attitude measurement device will be constructed

to measure attitude differences between experienced teachers and student teachers and will be administered to both groups before and after the student teachers complete their student teaching.

LAURENCE IANNACCONE, Assistant Professor of Education *and* HENRY WARREN BUTTON, Instructor, Graduate Institute of Education, Washington University, St. Louis, Mo.

Project No. 1026.
Duration: 1 year, 5 months.
September 1960–January 1962.

A Research-Oriented Elementary Teaching Program

Problem.—This project attempts to determine the extent to which a rational, systematic approach to teaching can be fostered in teachers through a special student teaching experience that emphasizes an experimental, research-oriented approach to the problems of teaching.

Major objective.—The objective is to compare students in a research-oriented student teaching program with students who are in a more traditional student teaching program on the basis of research knowledge, attitudes toward children, ability to analyze problems logically, ability to make decisions, critical thinking, and related measures.

Procedures.—A group of 33 superior senior elementary education majors will be identified through grade-point averages, scores on the College Qualification Test, and rankings by instructors. These students will be randomly assigned to an experimental group and two control groups. The members of the experimental group will spend one-half of each school day in a student teaching experience, and during a part of this time they will serve as research assistants to their cooperating teachers. In the latter role, they will identify, design, and carry out a research project in the classroom. Their half-day college program will include a research activity also. The two control groups will be given variations of a more conventional student teaching program. Data will be gathered on the groups in the areas of (1) research understanding, attitudes and activity; (2) status and growth of problem solving, critical thinking and/or analytical ability related to teaching situations; and (3) status in selected personality, values, and knowledge dimensions. Cognitive and attitude inventories developed at the University of Illinois will be used to assess knowledge of and attitude toward research. Research activity will be assessed through interviews. Thinking will be measured by the Watson-Glaser Critical Thinking Test, some of Guilford's measures, Buswell's general problem solving tests, and through a content analysis of structured interviews. Personality will be assessed through the Edwards Per-

sonal Preference Schedule, the Allport-Vernon-Lindzey Study of Values, the Minnesota Teacher Attitude Inventory, and similar instruments. The three groups will be compared on the basis of the measures described above.

GEORGE W. DENEMARK, Dean, School of Education, University of Wisconsin, Milwaukee, Wis.

Project No. 1091.
Duration: 3 years.
September 1960–August 1963.

THE ROLE OF TEACHERS

The Schoolteacher: Social Values, Community Role, and Professional Self-Image

Problem.—This study will attempt to assess the effects of initial commitment to teaching, the influences of peer groups and professors during undergraduate education, and the social experiences of teachers on the professional self-images of teachers.

Major objectives.—The objectives are (1) to identify a hard core of dedicated professionals among teachers and to discover the basic values which make up their professional self-image, (2) to measure the commitment of other teachers to these values, and (3) to ascertain correlates of these values by examining the professionalization process from the time of career choice to the job and community behavior of veteran teachers.

Procedures.—On the basis of a pilot study in various types of schools, questionnaires will be designed and administered to education majors in all 4-year white and Negro colleges and universities in North Carolina which agree to cooperate, to samples of students majoring in other fields in these institutions for comparison with education majors, and to approximately 5,000 white and Negro school teachers in North Carolina and in one or two metropolitan areas outside North Carolina. Data will cover initial career orientation, undergraduate experiences, on-the-job experiences, off-the-job influences affecting teachers' professional self-images (independent variables), and values and beliefs of education majors and teachers pertinent to the teaching role (dependent variable). Also 200 or more follow-up interviews will be administered to check the accuracy of responses, to probe into areas where probing seems desirable, and to sample the attitudes of nonrespondents so as to assess the bias due to nonresponse to questionnaires.

RICHARD L. SIMPSON, Assistant Professor of Sociology, University of North Carolina, Chapel Hill, N.C.

Project No. 906.
Duration: 4 years, 5 months.
May 1960–September 1964.

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Teacher Perceptions of Administrator Behavior

Problem.—This study explores the factors that influence the teacher's perceptions of administrator behavior.

Major objectives.—The objectives are (1) to determine whether homogeneity in perceptions of administrators is greater among teachers who report frequent contact with their superintendents than it is among teachers who have little or no contact with them, and (2) to assess the influence of friendship groupings and school district size on the teacher's perception of the superintendent's behavior.

Procedures.—A sample of approximately 30 teachers, stratified by teaching level, will be selected from about 20 school systems of varying sizes. A modification of Halpin's Leader Behavior Description Questionnaire developed by Hunter will be administered to obtain the teachers' perceptions of the superintendents' behavior and a measure of the frequency of their contact with the superintendents. An instrument designed to measure the teacher's orientation to his work and Srole's anomie scale will be administered to obtain an indication of the teacher's orientation to the school system. To determine the effect of school size on the teacher's perception, a high school and several elementary schools will be selected from one or more school systems. All full-time teaching personnel in each school will be asked to respond to questionnaires or will be interviewed to obtain information on their perceptions of the superintendent's behavior, the frequency of their contact with the superintendent, and the other variables indicated above. The Teacher Contact Questionnaire will be used to measure the degree of intimacy involved in reported contacts with other teachers. Analysis of variance, *t*-tests, and nonparametric tests will be used to analyze the data.

WERRETT W. CHARTERS, JR., Associate Professor, Graduate Institute of Education, Washington University, St. Louis, Mo.

Project No. 929.
Duration: 1 year, 5 months.
September 1960–January 1962.

Explorations in Teacher Role

Problem.—This study continues the work of project 371 in investigating the role of the public school teacher: its determinants and its effects both on the performance of teachers and on the behavior of others in direct contact with teachers.

Major objectives.—Whereas the emphasis on the original study was the assembling of a description of the role of the public school teacher, the objective of the present project will be to develop and

test a number of hypotheses related to factors such as social class, community type, the attitudes of teachers and others toward education, the size of the school, the need structures of teachers, the adequacy of role conflict perception by teachers and others, and the teachers' methods of role-conflict resolution.

Procedures.—The first phase of the study involves a further analysis of the field-study data gathered in project 371, to determine further independent-dependent variable relationships. The second phase of the research will be directed toward the identification of types of role conflict existing for school teachers and the measurement of perception and role conflict resolution by teachers. The identification of role conflict will be established by the administration of a questionnaire to community members, using items developed from the findings of the previous study. A sample of teachers will also fill out questionnaires providing personal and school characteristics, indications of their perception of role conflict, and reports of their own behavior in conflict areas. In the third phase an effort will be made to assemble a systematic picture of the propositional structure of role theory by (1) annotating and cataloging propositions in role theory which have received empirical tests in other studies, and testing them, where possible, in the present study; (2) annotating and cataloging other propositions tested in the present study; and (3) organizing all of the confirmed propositions into a tentative logico-deductive structure.

BRUCE J. BIDDLE, Associate Professor of Psychology and Sociology, University of Missouri, Columbia, Mo.

Project No. 1082.
Duration: 1 year.
August 1960–August 1961.

THE EFFECTIVENESS OF TEACHERS

Student Reactions in Public Elementary and Secondary Schools

Problem.—This study investigates student reactions to teachers as a means of evaluating teacher merit.

Major objectives.—The objectives are (1) to determine the means used by administrators and parents in assessing the merits of teachers; (2) to determine to what extent improvement in teacher effectiveness as judged by students can be brought about through the use of written student reactions; and (3) to determine whether students' opinions of former teachers change as the students grow older.

Procedures.—This research will be conducted in five phases. In the first phase, a minimum of 30 administrators will complete a questionnaire to determine the methods usually employed in arriving at conclusions concerning the merit of teachers. They will also be asked to keep a diary on one new teacher. In the second phase, 30 parents of children in each of grades 1 through 12 will answer a similar questionnaire to determine parents' methods of assessing teacher merit. In addition, approximately 30 parents will be asked to keep a diary recording comments and observations which may have a bearing on their opinions of the teacher. In the third phase, student reactions to a group of about 100 teachers will be obtained and summarized for the teachers, who will later answer questionnaires concerning the effect of the ratings by their students on teaching. As a control, a second group of 100 teachers will be rated but not given the information concerning how they are rated. In the fourth phase, high school teachers will be rated by senior students; the 15 with the highest and the 15 with the lowest ratings will be selected for followup rating by their students after the students' freshman year in college to determine whether opinions change as students grow older. The final phase will be a comparative study of the test performance of students in chemistry classes where the teacher has been rated by the students "good" compared to classes where the teacher has been rated "poor."

ROY C. BRYAN, Professor of Education, Western Michigan University, Kalamazoo, Mich.

Project No. 668.
Duration: 3 years.
September 1959–August 1962.

Characteristics of Teachers Which Affect Students' Learning

Problem.—This study attempts to identify the characteristics of teachers which affect students' learning.

Major objective.—The objective is to determine the relationship between teaching effectiveness and (1) the pattern of interaction between teacher and student; (2) the classroom climate created by the teacher; and (3) various mental abilities of the teachers, such as ideational fluency, flexibility, ability to elaborate, sensitivity to problems, and ability to restructure.

Procedures.—Application forms for participation by teachers and schools were sent to every superintendent in the State in September 1958 and 1959. The applicants were classified according to measures of teacher qualification and population of the community. All of the most highly qualified applicants were selected and random choices

were made from each of the other categories. This resulted in a sample of 120 mathematics teachers in grades 7–12. The Sequential Tests of Educational Progress (STEP) in mathematics, the School and College Ability Tests (SCAT), for students below grade 9 and the Differential Aptitude Test (DAT), for students at grade 9 or above will be used to compute regressions of student gains on aptitudes as a measure of teaching effectiveness. About 20 classes will be selected for intensive direct observation and interaction analysis. The Minnesota Classroom Climate Index (MCCI) will be administered to students in all participating classes. This instrument consists of 5 scales designed to measure teacher attractiveness, attractiveness of classwork, fairness of reward and punishment, student independence of teacher, and lack of anxiety. Finally, a test will be developed and administered to measure associational fluency, spontaneous and associative flexibility, ability to restructure, and other mental abilities.

PAUL C. ROSENBLOOM, Professor of Mathematics, University of Minnesota, Minneapolis, Minn.

Project No. 1020.
Duration: 2 years, 8 months.
August 1960–October 1962.

Teacher Leadership Styles in Relation to Productivity, Morale, and Achievement Among Seventh- and Eighth-Grade Pupils

Problem.—This project analyzes the influence of certain modes of teacher behavior on pupil morale, productivity, and academic achievement.

Major objective.—The objective is to determine whether or not there are significant relationships between the modes of teacher behavior exercised in the classroom and three measures of teacher effectiveness: pupil productivity, morale, and academic achievement.

Procedures.—Forty teachers and their approximately 1,400 heterogeneously grouped pupils will constitute the sample for this study. Reports from the pupils and trained observers and interviews with teachers will provide descriptions of teacher behavior, using such items as classroom seating arrangements, pupil mobility, range and content of the activity, emphasis on tasks and quality of task performance, delegation of responsibility for decisions, and division of labor to differentiate various modes of teacher behavior. Academic achievement in arithmetic, reading, and language will be measured by a standardized achievement test which will be administered at the beginning and end of the school year. Final raw scores will be adjusted to take into account each child's intelligence. Ratings of

pupil productivity will be obtained directly from the pupils by administering a class inventory to each class at the end of the school year. This inventory will yield a self-initiated-work score as well as a required-work score. An index of morale will be determined from pupils' responses to those questions in the inventory which are concerned with liking the teacher, school, and fellow students. Data on each child's socioeconomic background and his personal characteristics will be available from the school system's cumulative records. The relationship between modes of teacher behavior and the measures of teacher effectiveness will be determined.

C. WAYNE GORDON, Associate Professor of Education and Sociology, *and* JOHN D. MCNEIL, Assistant Professor of Education, University of California, Los Angeles, Calif.

Project No. 1084.
Duration: 1 year, 6 months.
September 1960–February 1962.

RESEARCH ON:

III. TEACHING AND LEARNING

PROGRAMS, METHODS, AND MATERIALS

Determining an Effective Educational Program for Children of Migratory Workers in Wisconsin

Problem.—To design and test a system of providing education for the children of migrant workers outside their home communities.

Major objectives.—The objectives are (1) to develop procedures to predict the arrival of specific children (from Texas) in specific areas of Wisconsin at specific times; (2) to develop educational programs appropriate to the needs of migrant children; and (3) to determine whether such programs are financially feasible.

Procedures.—A survey will be conducted to obtain information on the number of migrant children in the State, when they arrive, how long they stay, and areas and school districts affected. A form will be developed which will be sent to the Texas Employment Agency so that a crew leader who has signed a labor contract for work in Wisconsin will be asked to list the names, home school, and other data concerning children of the crew. These forms will be used to classify children by type of home school. A form seeking a short educational assessment will be sent to the home school. When a regularly established program is in existence, a report of activities in a Wisconsin migrant school will be sent to the home school in Texas. Predictive scales will be developed on the basis of findings of the research phase of the program.

DONALD R. THOMAS, Assistant Professor of Education, University of Wisconsin, Madison, Wis.

Project No. 674.
Duration: 1 year.
September 1959–August 1960.

The Preparation and Evaluation of Inter-Language Testing Materials

Problem.—This project proposes to study and revise existing educational testing materials and to create new materials in parallel English and Spanish editions.

Major objective.—The objective is to produce a new battery of tests which are simultaneously constructed in both Spanish and English editions.

Procedures.—A new series of parallel tests in English and Spanish will be created, including areas of general ability and reading. Manuals, norms, and accessory material will be developed to make the tests useful in either language alone or in situations where a comparison of abilities in the two languages is desired. A staff of Spanish-speaking and English-speaking members will formulate and test the measures developed in the United States, Puerto Rico, and Mexico. The regular procedures of test writing, editing, and tryout will be used; item analyses will be made to determine the discrimination value of the test items.

HERSCHEL T. MANUEL, Professor of Educational Psychology, University of Texas, Austin, Tex.

Project No.: 681.
Duration: 2 years.
September 1959–August 1961.

Improvement of Motor Development and Physical Fitness in Elementary School Children

Problem.—This study compares the outcomes of a program of vigorous physical activity based on the exercise of inherent patterns of motor coordinations with available measures of motor development and physical fitness.

Major objective.—The objective is to determine whether or not a vigorous program of physical education which concentrates on inherent motor patterns will result in (1) improved performance records in the run, jump, and throw; (2) improved coordination patterns of motor performance in the same skills; (3) increase in strength in selected muscle groups; and (4) indications of the age level at which the school program can profitably be directed toward improvement of specific motor patterns.

Procedures.—All children in the first, third, and fifth grades in a selected elementary school will be exposed to an experimentally de-

veloped program of motor activities as part of a physical education curriculum designed to challenge the child. Performance measures in the standing broadjump, the 30-yard dash, the overarm throw, the pullup, and the shuttle run will be taken at the beginning of the study and at the end of the first and second year. Additional measures will be taken on a random sample of 25 boys and 25 girls from each of the three grades. The control groups will consist of all children in an elementary school whose performance scores were recorded from September 1953 to June 1958. The means and measures of variability of the experimental group will be compared with those of the control groups and with national physical fitness standards.

RUTH B. GLASSOW, Professor of Physical Education, University of Wisconsin, Madison, Wis.

Project No. 696.
Duration: 2 years, 2 months.
July 1959–September 1961.

Evaluation and Followup Study of Thayer Academy's Summer Advance Study Program in Science and Mathematics

Problem.—This study inquires into the consequences of a summer program for about 60 promising science students.

Major objectives.—The objectives are (1) to evaluate the stated purposes of an advanced summer program in science and mathematics; and (2) to determine the effect of such a program on the behavior of students in mathematics and science classes during the ensuing year and on their future career decisions.

Procedures.—The three instruments used to evaluate student gains during the summer program will include (1) a measure of student ability to identify and define scientific problems and to deal with scientific methodology; (2) an assessment of developed mathematical concepts, abilities, and other mathematical skills; and (3) a test of the student's understanding of science as an institution and of scientists as an occupational group. The significance of the difference between pretest and posttest (administered 10 weeks later) means will be tested to evaluate the student gains. Personality measures will be used to compare the students in this program with those in a 5-year study of the career development of scientists. Assessment of the effects of the program on the behavior of students will be made through questionnaires and visits to the students' home schools.

WILLIAM W. COOLEY, Instructor and Research Associate in Education, Harvard University, Cambridge, Mass.

Project No. 715.
Duration: 1 year.
July 1959–June 1960.

Development of Mathematical Concepts in Children

Problem.—This study seeks to describe the development of mathematical concepts in young children and to explore the character of this development in terms of modern learning theory.

Major objectives.—The objectives are (1) to analyze the mathematical character of the space and number concepts of children aged 4 through 9; (2) to determine the proper age for the introduction of nonarithmetical mathematical topics; (3) to apply modern learning theory, particularly stimulus sampling theory of discrimination, to the study of the formation and learning of mathematical concepts by children.

Procedures.—This research will be conducted in two separate but related phases. In the first phase, longitudinal studies will investigate how early the verbal skills connected with deductive reasoning can be introduced. Subjects for this investigation will be drawn from a current program in the teaching of geometry in the first, second, and third grades. Control groups will be selected from comparable elementary classes in nearby school districts. The second phase of the study will be concerned with fundamental experiments in the learning of mathematical concepts. Subjects will be drawn at random from a population of children aged 4 through 9 in the Palo Alto area, and a specific mathematical model drawn from the general notions of statistical learning theory will be developed. Statistical methods appropriate to stochastic processes, particularly Markov processes, will be used.

PATRICK SUPPES, Professor, Stanford University, Stanford, Calif.

Project No. 727.
Duration: 3 years.
July 1959–June 1962.

An Investigation of Differential Binaural Stimulation in the Teaching of Foreign Language

Problem.—This study seeks to determine whether or not differential binaural stimulation can be used effectively to improve pronunciation in foreign language teaching.

Major objective.—The objective is to determine the effect that hearing simultaneously the teacher's voice in one ear and his own voice in the other will have on a student's ability to compare the differences in pronunciation.

Procedures.—Two groups of 20 first-semester freshmen college students without previous training in Spanish will serve as subjects.

They will receive general language instruction in Spanish from the same teacher but will be given different types of language laboratory training. The experimental group will be given differential binaural stimulation, hearing themselves in one ear as they hear the taped stimulus material in the other. The control group will be given the same stimulus material but will hear it in both ears along with their own voices. Testing materials will be administered to both groups at the end of 3 consecutive months of twice-a-week language laboratory training. With pronunciation errors used as a basis, an analysis of variance and the statistical significance of the differences will be computed.

CHARLES VAN RIPER, Director, Speech and Hearing Clinic, Western Michigan University, Kalamazoo, Mich.

Project No. 739.
Duration: 1 year, 1 month.
September 1959–October 1960.

Observational Study of School Classroom Behavior From Diverse Evaluative Frameworks: Developmental, Mental Health, Substantive Learning, and Group Process

Problem.—This study seeks to determine what common and unique elements of classroom behavior are present in observations made from diverse observational frameworks.

Major objective.—The objective is to determine how different classroom behavior will appear when it is viewed from four evaluative frameworks: (1) developmental, (2) mental health, (3) substantive learning, and (4) group process.

Procedures.—This research is divided into six stages. The first stage will be devoted to the development of four schedules for use in simultaneous observation of the same sample of classroom behavior. In stage 2 representatives from education, psychiatry, psychology, and sociology will meet and clarify the positions to be studied. In the third stage, graduate students will be trained in observational techniques and will collect observational data in elementary and secondary school classrooms. During stage four an analysis of these data will be made, and the observational schedules will be revised for utilization in stage five, which will be a duplication of stage three. The final stage will consist of an analysis of the new data and preparation of the final report.

WILLIAM C. MORSE, Professor of Educational Psychology, University of Michigan, Ann Arbor, Mich.

Project No. 753.
Duration: 2 years.
October 1959–September 1961.

Student-Teacher Interaction as a Determiner of Effective Teaching

Problem.—This study investigates the relationship between the personality interaction of students and teachers and the effects of this interaction on teaching effectiveness.

Major objectives.—The objectives are (1) to determine whether personality interaction between a student and his teacher influences the degree to which that particular teacher is effective with that particular student; and (2) if personality interaction is found to be a determiner of teaching effectiveness, to reveal along what personality dimensions the interaction occurs.

Procedures.—Two hundred male junior and senior college students in two relatively large departments of Iowa State University and their teachers in these departments will constitute the sample for this study. Students and teachers will be given a temperament survey and a life-history questionnaire; each student will be asked to indicate preferences for teachers within his major department, and this information will be related to the number of contact hours between particular teachers and each student. In the first step of the analysis the results of the inventories obtained from the teachers will be used to locate general differences between those who were nominated frequently as outstanding teachers and those who were nominated infrequently. In the second step the analysis will determine the student characteristics which are related to their nominations of effective teachers. The overall purpose of the analysis is to determine whether or not the degree of similarity between student and teacher personalities is a factor in the student's opinion of the effectiveness of a teacher.

EDWIN C. LEWIS, Assistant Professor, Department of Psychology, Iowa State University, Ames, Iowa.

Project No. 763.
Duration: 1 year.
September 1959–June 1960.

Systematic Observation of Verbal Interaction As a Method of Comparing Mathematics Lessons

Problem.—This study investigates various patterns of verbal interaction between pupils and teachers in classrooms where four types of mathematics lessons are employed.

Major objective.—The objective is to determine whether or not significant differences exist in the amount of verbal interaction displayed in four different types of mathematics lessons.

Procedures.—Twelve senior high school and/or freshman college mathematics classrooms will constitute the sample for this study. The four types of mathematics lessons are (1) a lecture method using rigorous treatment of subject matter and a postulational basis, (2) a lecture method using a less rigorous treatment and nonpostulational basis, (3) a guided discovery method followed by deductive proof and a rigorous treatment of subject matter with a postulational basis, and (4) a guided discovery with a less rigorous treatment and a nonpostulational basis. The single lesson period will be used as the unit of observation. An observer will view and classify behavior in each of three frames of reference: content, process, and attitude. A time-sampling technique will be used, alternating 15-second periods of observation with 15-second intervals for classification. Each class room will be visited for 10 periods. Each lesson observed will be classified as one of the four types or as a combination type, and raw score totals for each of the types will be obtained for each of the three frames of reference for both pupils' and teachers' behaviors.

E. MURIEL WRIGHT, Assistant Professor of Mathematics and Education, Washington University, St. Louis, Mo.

Project No. 816.
Duration: 1 year, 6 months.
December 1959–June 1961.

The Effect of Classroom Conditions on the Strength of Self-esteem, Achievement Motivation, and Work Output of Elementary School Children

Problem.—This project directed toward the discovery of how, in the classroom situation, children's self-esteem, achievement motivation, and anxiety about achievement are related to other personality variables and to conditions within the classrooms.

Major objective.—The objective is to determine the relation between a number of characteristics of the teacher's handling of a class and various characteristics of the children in the class.

Procedures.—Extensive measures of teacher behavior and classroom procedures made at the beginning and end of an academic year have already been obtained from 10 different teachers in three elementary schools in reasonably homogeneous neighborhoods in Palo Alto. Seven of the 10 classrooms are at the fifth- and sixth-grade level and three are at the first- and second-grade level. Among the measures obtained were (1) teacher interaction with children, including their use of rewards and punishments, teaching techniques, and communication; (2) peer interaction; (3) measures of social environment; and (4) teacher attitudes. Measures of the characteristics of the 295 children who were members of these classes have also been collected.

These include mental and physical measures; measures of the children's motives, preferences, self-concepts and reputations; and measures of achievement and creative ability. The data for both teachers and children have been punched on IBM cards, and the data analysis will be directed at the various relationships that exist between the teacher variables and the characteristics of the children.

PAULINE SEARS, Associate Professor of Education, Stanford University, Stanford, Calif.

Project No. 873.
Duration: 2 years, 5 months.
May 1960–September 1962.

Standardization of the Third Revision of the Stanford-Binet Intelligence Scale on Negro Elementary School Children in the Southeastern United States

Problem.—This study provides norms for Negro children in the Southeastern United States on the Third Revision of the Stanford-Binet Intelligence Scale.

Major objectives.—The objectives are (1) to standardize the Stanford-Binet Intelligence Scale on a large representative sample of Negro elementary school children in the Southeast, (2) to validate this test by comparison with simultaneous measures of scholastic aptitude, with standard achievement tests, and with teacher ratings and grades, and (3) to collect from the subjects and their teachers certain biographic and demographic data which will lead to an adequate description of the population and allow comparisons with other normative data.

Procedures.—A representative sample of approximately 1,800 subjects will be drawn from Alabama, Georgia, Florida, South Carolina, and Tennessee. In each of these States three county school systems of various sizes will be selected that encompass rural and urban areas, various socioeconomic levels, and a range in the quality of educational programs and facilities. About 20 students from each of grades 1 through 6 will be selected from each county and administered the Third Revision of the Stanford-Binet Intelligence Scale. Each child will be administered the California Achievement Test or a similar test battery. In addition, grades and teacher ratings will be obtained from the schools and biographic and demographic data from the parents. An item analysis will be made in order to determine the appropriateness of items at each age level, and correlations between the demographic and biographic data and the intelligence and achievement measures will be obtained.

WALLACE A. KENNEDY, Assistant Professor of Psychology, Florida State University, Tallahassee, Fla.

Project No. 954.
Duration: 1 year, 4 months.
September 1960–December 1961.

The Use of Case Histories in the Development of Student Understanding of Science and Scientists

Problem.—The purpose of this study is to evaluate an instructional method employing materials drawn from the history of science to teach students about the nature of scientific inquiry, about science as an institution, and about scientists as people.

Major objective.—The objective is to determine whether or not there are significant differences in the understanding of science and scientists between students who have studied with case history materials and students who have not.

Procedures.—Participants will be solicited from nationally distributed groups of science teachers to obtain approximately 100 classes of high school biology, chemistry, and physics to take part in the experiment. Each participating class section will be randomly assigned either to the experimental (those using the new instructional method) or to the control group, resulting in approximately 50 science classes in each group. Pretest and posttest batteries will be administered to both groups, and the several test scores will be subjected to a 2-way analysis of covariance, with stratification according to course type. The pretest battery will include a test of general intelligence and the Test on Understanding Science, a specially-designed instrument which measures student understanding of the methods and aims of science, the scientific enterprise, and the characteristics of scientists. The posttest battery which will be administered approximately 5 months after the pretests will include the Test on Understanding Science and a standardized science test in the area covered by the course. Questionnaire data will be used to supplement the statistical analysis.

WILLIAM W. COOLEY, Assistant Professor of Education, *and* LEOPOLD E. KLOPFER, Research Associate, Harvard University, Cambridge, Mass.

Project No. 896.
Duration: 1 year, 4 months.
April 1960–August 1961.

Selection and Training Programs for Vocationally Talented Pupils

Problem.—This study will explore selection procedures and training programs for vocationally talented youth and the trends in occupations and in technology which have implications for selection procedures and training programs.

Major objectives—The objectives are (1) to review the present and anticipated needs of business and industry for vocationally talented

and trained youth, and (2) to describe the way in which secondary schools are identifying vocational talent, selecting youth for vocational programs, and guiding youth in vocational choices.

Procedures.—An analysis will be made of existing nationwide State and local studies of occupations and technology, and of related needs for vocationally talented youth and training programs. In a nationwide sample of 60 schools, interviews will be conducted with the guidance and pupil-personnel staff to determine what orientation programs are provided for prospective vocational students, what tests are given, what school records are kept, what placement services are provided, and similar information. Principals, selected teachers and students, and superintendents also will be interviewed, and classroom observations will be made to supplement the information obtained from the guidance staff.

W. DONALD WALLING, Director, Division of Field Studies and Research, Rutgers University, New Brunswick, N.J.

Project No. 1038.
Duration: 1 year, 3 months.
October 1960–December 1961.

Abilities of First-Grade Pupils to Learn Mathematics in Terms of Algebraic Structures, by Means of Teaching Machines

Problem.—This study explores the use of automated devices in teaching basic algebraic structures to first-grade children.

Major objective.—The objective is to compare first-grade children who have been taught algebraic structures by means of an automated teaching device with control groups of first- and fourth-grade children. An oral test of the understanding and application of algebraic structures will be used for this comparison.

Procedures.—A representative sample of 100 first-grade children will be selected for the experimental group in this study. An 18-week unit in mathematics will be developed and presented to this group for one semester, using autoinstructional devices. For a large part of the unit, the child will be supplied with a set of colored rods of varying lengths. Some problems presented by the teaching machine will require only the use of these rods; other problems will require application of the concepts learned with the rods. In this way the associative law, the commutative law, the distributive law, and other mathematical concepts will be presented. A control group of 100 first graders, matched with the experimental group on the basis of age, sex, parent occupation, and intelligence, will be used to control for the effects of maturation and typical experience. A second control group of 100 fourth graders will be used to discover what elementary children

learn about basic mathematics through a typical arithmetic program in the first four grades. All subjects will be given an intelligence test. As a pretest for first graders and a posttest for all children, an individual oral standardized interview will be conducted to measure the ability of subjects to solve problems involving algebraic structures.

EVAN R. KEISLAR, Associate Professor of Education, University of California, Los Angeles, Calif.

Project No. 1090.
Duration: 1 year.
August 1960–August 1961.

THE LEARNING PROCESS

A Basic Research Program on Reading

Problem.—This study proposes to develop an experimental program of research on the reading processes of children.

Major objectives.—The objectives are (1) to described in detail the preschool child's language and (2) to determine empirically as well as to predict theoretically the kinds of change in linguistic structure that learning to read and write impose on the child.

Procedures.—This research will employ mainly experimental techniques and careful description and will develop in the laboratory "miniature" situations analogous to real ones. A number of specific projects will be conducted, namely (1) an analysis of children's language; (2) a study of the psychological aspects of children's speech at various age levels; (3) an experimental study of how children learn language irregularities; (4) a study of the relation of perceptual learning to communication; (5) an experimental study of the development of the ability to discriminate visual forms of the type used as written symbols; (6) a study of discrimination learning; (7) an investigation of the process by which visual symbols become equivalent to a sequence of heard sounds; (8) a theoretical analysis of the reading-writing parts of a communication cycle; (9) an anaylsis of the processes involved in the perception of similarities and differences in visual stimuli; (10) a study designed to test the measurement of individual differences in the development of perceptual skills; (11) a study of the relationship between reading and writing; (12) an experimental study of the development of preferences for sensory modalities in children; and (13) a study of the importance of contextual cues in children's word recognition.

HARRY LEVIN, Associate Professor, Cornell University, Ithaca, N.Y.

Project No. 639.
Duration: 3 years.
July 1959–June 1962.

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Investigations of Variations in the Properties of Self-Tutoring Learning Sequences

Problem.—This study seeks to identify those program characteristics which produce maximum learning with self-tutoring devices.

Major objectives.—The objectives are (1) to investigate the effects of various methods of analyzing the behavior said to reflect knowledge of a subject and (2) to determine what variations in the properties of the learning-sequence elements are necessary to establish the desired behavior to an optimum degree.

Procedure.—To achieve the first objective, knowledge matrices will be used to analyze a wide range of verbal material and to suggest the order in which interverbal connections might be strengthened. The matrix elements will be ordered in terms of intermatrix path, intramatrix path, and submatrix orderings. The second objective will be achieved by introducing systematic variations in the stimulus variables (such as size of the step, use of prompts, and amount and spacing of the review) and in the response variables (such as method of responding and effect of varying the probability of success). Program variations will be evaluated either by standard achievement tests or by specially constructed ones. Intraprogram behavior will be analyzed in terms of total errors and correlations between posttest scores and intraprogram errors.

ROBERT GLASER, Associate Professor of Psychology, *and* LLOYD E. HOMME, Assistant Professor of Psychology, University of Pittsburgh, Pittsburgh, Pa.

Project No. 691.
Duration: 2 years.
July 1959–June 1961.

Analysis of Processes in Paired Associate Learning

Problem.—This study seeks to determine whether associations are ever formed in an all-or-none fashion rather than by a process of gradual repetition.

Major objectives.—The objectives are (1) to define and isolate the basic processes involved in paired-associate learning; (2) to specify the important variables related to these processes and the conditions under which each becomes important; and (3) to define and assess the importance of the association formation process in paired-associate learning tasks.

Procedures.—The research program will involve three consecutive phases. In the first phase a paired-associate learning task will be

developed in which the "association formation" process has been isolated. In phase II the Rock paradigm as modified by the investigator will be used to investigate the role of repetition in learning the paired-associate task or tasks which have been developed in phase I. A list consisting of two sets of stimulus-response pairs will be used. All pairs of one set, the control set, will be retained in the list on all learning trials. Pairs of the experimental set will be retained in the list only if the correct response is given; otherwise they will be replaced in the list by new pairs which have not previously been seen. If, as the investigator anticipates, the results of phase II indicate that association formation is not an all-or-none process, an attempt will be made to determine whether there are any conditions under which it is so "all-or-none" that repetition is relatively unimportant.

WILLIAM F. BATTIG, Assistant Professor of Psychology, University of Virginia, Charlottesville, Va.

Project No. 730.
Duration: 2 years.
September 1959–August 1961.

The Development of the Perception of Musical Sounds by Children in the First Six Grades

Problem.—This study seeks to determine differences in the way in which elementary children perceive and respond to the presentation of musical sounds.

Major objectives.—The objectives are (1) to identify the levels of auditory perception which exist within grades and between grade levels and (2) to provide evidence of growth patterns to be used in developing programs of music reading readiness.

Procedures.—Approximately 400 children in grades 1 through 6 will constitute the sample for the first part of the study, which will investigate the auditory perception of tonal configurations. Two tests will be devised after a detailed analysis of representative song materials for elementary school children. Tonal configurations which occur with the greatest frequency, including chromatics, major and minor scale figures, and major and minor chord figures, will be selected as test items presented to the subjects by means of a tape recorder. The two tests will be similar; however, the second one will contain a greater number of items, which will be presented to the subject only once. The second part of the study will deal with the auditory perception of more complete musical ideas as they appear in the musical phrase; 200 additional children will be tested during this part of the study, using the same tonal configurations as in the first part.

All tests will be administered individually, and comparisons will be made to ascertain similarities and differences between age, grade, level of accomplishment, and other factors such as sex and previous training.

ROBERT GEORGE PETZOLD, Associate Professor of Music and Education, University of Wisconsin, Madison, Wis.

Project No. 766.
Duration: 10 months.
September 1959–June 1960.

Effects of Motivational Factors on Perceptual-Cognitive Proficiency of Children Who Vary in Intellectual Level

Problem.—This study seeks to obtain a greater understanding of the determinants of quantitative and qualitative variations in intellectual functioning, of optimal learning conditions, and of the impact of motivational and emotional processes on the development and utilization of cognitive abilities.

Major objectives.—The objectives are (1) to determine the effects of selected motivational conditions on the range and efficiency of cue utilization in both perception and learning tasks, and (2) to ascertain the extent to which differences in intellectual level are associated with differences in the effects of these motivational conditions on perceptual-cognitive efficiency.

Procedures.—Children of varying intellectual levels within a chronological age range of from 8 to 10 years will be selected for study. These children will be classified into three intellectual groups: bright (125 to 140 IQ), normal (100 to 115 IQ), and dull (75 to 90 IQ). Selected perceptual and learning tasks involving complex form recognition, perceptual span, incidental learning in concept formation, and pattern acquisition will be administered under task-oriented instructions considered to be relatively neutral and under achievement-oriented instructions designed to increase the child's achievement motivation. Matched control subjects will receive only task-oriented instructions in both test sessions. Measures of the range and effectiveness of cue utilization will reflect the level of performance. The performance scores of the groups will be compared. The relationships between selected measures of personality and perceptual-cognitive functioning in children will also be determined.

CHARLES D. SMOCK, Associate Professor of Psychology and Child Development, Purdue University, Lafayette, Ind.

Project No. 790.
Duration: 2 years, 7 months.
February 1960–August 1962.

An Analysis of Laboratory and Classroom Group Functioning

Problem.—This study attempts to analyze group functioning in two contexts, the laboratory and the elementary school classroom.

Major objective.—The objective is to examine the effects of several individual and group variables on the effectiveness and efficiency of classroom groups.

Procedures.—The laboratory study will use a sample of several hundred elementary school pupils as subjects. The subjects will work either as individuals or as members of 3-person groups. Half the groups will contain one pupil of high ability and two of average ability; the other half will be composed of three average-ability pupils. The independent variables will be (1) ability, (2) status, (3) ascendancy, (4) orientation (social or task), and (5) discrepancies in personality needs and social roles. The individuals and groups will be given problems in social studies and arithmetic, and tests of effectiveness and efficiency will be administered. Effectiveness will be measured by a standardized achievement test and efficiency, referring to the satisfaction of each member with his group experience, by self-report. An analysis of variance and of covariance will be employed to provide statistical tests of significance. Approximately 40 upper elementary school classes will constitute the sample for the classroom study. Each of 20 elementary school teachers will be asked to identify one highly efficient and effective class and one inefficient and ineffective class. Measures for independent variables, such as pupil perception of the leader behavior of teachers, pupil influence, pupil ability, and pupil need for achievement, affiliation, and power will be subjected to a multiple-correlation analysis to determine the overall prediction of the dependent variables of efficiency and effectiveness.

BRYCE B. HUDGINS *and* LOUIS M. SMITH, assistant professors, Graduate Institute of Education. Washington University, St. Louis, Mo.

Project No. 798.
Duration: 2 years, 4 months.
February 1960–May 1962.

Communication of Information in the Elementary Classroom

Problem.—This study assesses the ability of children and teachers to communicate meaningfully with each other. The broad purpose is to identify some of the major factors responsible for the failure of children of normal intellectual endowment to profit from education.

Major objectives.—The objectives are (1) to determine the extent to which information is successfully communicated orally in elementary classrooms, (2) to analyze the types of communication breakdowns

which occur among lower and middle-class groups of children and their teachers, (3) to determine the range of the active vocabulary shown in continuous oral speech samples of elementary school children, (4) to determine similarities and differences in content which characterize the speech samples of lower and middle-class groups of children, and (5) to correlate the measures of vocabulary with the ability of the different groups of children to communicate successfully with each other and with the teacher in the classroom.

Procedures.—The sample for this study will consist of 250 pupils from two first-grade classes and two fifth-grade classes in each of three New York City schools. The sample will be divided into two groups, one of intellectually deprived children, primarily of lower socioeconomic backgrounds, and another of children who have not lacked intellectual stimulation in the home. Responses to a standardized interview scale will be used to assess the pattern of verbal stimulation in the home. The Cloze technique will be used to determine the amount of information successfully communicated from the teacher to the two groups of children. This technique uses a verbatim sample of the continuous speech of the teacher from a tape recording of verbal instruction given in the classroom. The material will be transcribed and every n^{th} word (usually every fifth word) will be deleted. The children will be asked to fill in the missing words, using three forms of the material: mimeographed sheets, slides, and tapes. Appropriate motivational techniques will be used to obtain similar samples of the children's speech for administration to teachers and other children. The responses will be analyzed for (1) accuracy of prediction, (2) the variability of the frequency distribution of responses given by the various groups, and (3) differences in the types of responses given by the different groups. Further analyses will be carried out on the complete continuous speech samples of all children in order to estimate and compare the range of vocabulary and other characteristics of the speech of the lower and middle-class groups of children.

MARTIN DEUTSCH, Codirector, Institute for Developmental Studies, New York Medical College, New York, N.Y.

Project No. 908.
Duration: 2 years.
April 1960–April 1962.

Evaluation of Machine Teaching: Motivational Characteristics of the Learner, His Responses, and Certain Learning Outcomes

Problem.—The purpose of this study is to reveal the relation of the motivational characteristics of the learner to his responses and to certain learning outcomes of machine teaching.

Major objectives.—The objectives are (1) to determine whether the reinforcement value of seeing that one's answer is correct is more effective in facilitating learning among high achievement-oriented students or low achievement-oriented ones, and (2) to investigate the effectiveness of various forms of learner response in promoting recall of meaningful material.

Procedures.—Three to four hundred college of education juniors enrolled in a psychology course will be randomly assigned to teaching machines that require three different types of responses. Achievement motivation, grade, and IQ will be controlled either experimentally or statistically. Part of B. F. Skinner's program on science and human behavior and similar materials will constitute the learning materials. Learning outcomes will be measured by items written to fit some of the categories of Bloom's *Taxonomy of Educational Objectives:* knowledge, comprehension, application, analysis, synthesis, and evaluation. Analysis of variance and *t*-tests probably will be used to determine the significance of differences among treatments (response types) and levels (achievement motivation).

GABRIEL M. DELLA-PIANA, Assistant Professor of Educational Psychology, University of Utah, Salt Lake City, Utah.

Project No. 864.
Duration: 1 year, 8 months.
June 1960–September 1961.

The Nature of Analysis and Synthesis, and Classroom Conditions Which Facilitate or Retard These Cognitive Processes

Problem.—This study investigates factors which underlie individual differences in ability to analyze and synthesize and the role of analysis and synthesis in college success. It will also explore classroom conditions which facilitate or impede analysis and/or synthesis in thought and perception.

Major objectives.—The objectives are (1) to determine the factorial structure of tests measuring analysis and synthesis in thought perception and personality, their specificity or generality, their relation to performance in the physical sciences, social sciences, engineering, language-literature, and to performance on objective and essay examinations; and (2) to determine the effects of stress and nonstress, individual and group and authoritarian and democratic conditions on analysis and synthesis in thinking.

Procedures.—About 800 freshmen, 200 each with majors in physical science, social science, engineering, and literature-language will be given the following tests: The Denny Doodlebug Problem, the Witkin Embedded-Figures Test, the Perceptual Synthesis Test, and

the Rigidity and Dogmatism Scales. Data will also be obtained on all or part of the sample on grades obtained on objective and essay examinations. The test data will be related to academic grades and will be factor analyzed. Other comparisons on analysis and synthesis measures will be made for various college subgroups, such as changes in majors and dropouts from college. In a separate substudy, experiments will be conducted with the Denny Doodlebug Problem under conditions of stress and nonstress, individual and group problem solving, authoritarian and democratic group atmosphere, to determine the effects of these conditions on analysis and synthesis.

MILTON ROKEACH, Professor of Psychology, Michigan State University, East Lansing, Mich.

Project No. 879.
Duration: 5 years.
July 1960–June 1965.

Training in Problem Solving

Problem.—This study will seek to determine to what extent students can be trained in solving problems requiring elementary arithmetic and problems requiring principles not formally learned in school.

Major objective.—The objective is to determine whether or not the problem-solving effectiveness of high school students improves as a result of practice.

Procedures.—All students of a metropolitan high school with IQ's of 110 or higher will be asked to volunteer for this study. From those who do, approximately 50 subjects will be selected in pairs, with each member of the pair matched in terms of IQ and initial problem-solving ability. The members of each pair will be randomly assigned to experimental and control groups of 25 subjects each. Two sets of instruments, series A and series B, will be employed in the practice sessions. Series A presents with each problem some basic information. A number of questions which provide information to be used in solving the problem are presented on cards in a display folder. The answer to each question is on the back of the card. Each subject may draw as many cards, one at a time, as he wishes. The problem is terminated when the subject feels he has the solution. The problems in series B place no restrictions on the questions that the subject may ask but require him to construct his own answers. For example, a subject is presented with a geometric design and asked to locate a predetermined area or part of the design by questions permitting only yes or no answers. Problems varying in the number of alterna-

tive choices, in the type of profitable clues to be used, and in other characteristics have been constructed. The data will include sequences of questions, frequency of each question, patterns of questions, time to completion, and related measures. Each subject in the experimental group will be given 12 training sessions; the student and experimenter will discuss the student's performance after each one. At the beginning and end of the 6-month experimental period, all subjects will take a test of arithmetic comprehension and a test of comprehension of reading material from which learning curves will be developed to characterize individual and group performances.

HORACIO RIMOLDI, Director, Loyola Psychometric Laboratory, Loyola University, Chicago, Ill.

Project No. 1015.
Duration: 1 year.
October 1960–September 1961.

The Development of Textual Behavior and Its Function in Communication

Problem.—This study explores the development of textual behavior (verbal behavior controlled by written or printed stimuli) and its function in communication.

Major objectives.—The objectives are (1) to explore the use of operant conditioning techniques in training preschool children in textual behavior and (2) to investigate the function of textual behavior in the development of word meaning in early childhood and its function in children's communication.

Procedures.—This study will be conducted in three phases. The first phase, primarily methodological in nature, will be designed to test the appropriateness of methods and procedures developed in other areas and with older subjects. An experimental group of children will be reinforced for discriminating between word pairs which are the same and pairs which are different. A control group will not receive this training. Then all the children will receive textual training on the same words individually presented to determine the effects of the previous discrimination training. A second methodological study will determine the effects of different reinforcers and different methods of presenting them on the conditioning of textual responses. In the third phase, the procedures developed in the first two studies will be used to ascertain the possibility of producing textual behavior in preschool children through the use of operant conditioning principles. A control group will be used to obtain comparisons of progress on reading and other tests. In the fourth phase of the project, textual behavior will be produced in one

group of preschool children and not in a control group. The function of the textual behavior in the transfer of meaning through reading will be studied in two experiments.

ARTHUR W. STAATS, Associate Professor of Psychology, CAROLYN K. STAATS, Assistant Professor of Sociology and Psychology, *and* RICHARD E. SCHUTZ, Assistant Professor of Education, Arizona State University, Tempe, Ariz.

Project No. 1048.
Duration: 2 years.
September 1960–September 1962.

Auditory Perception of Musical Sounds by Children in the First Six Grades

Problem.—This study explores the differences in the ways in which children at each of the first six grade levels perceive and respond to the auditory presentation of musical sounds.

Major objectives.—The objectives are (1) to study the musical development of first-, second-, and third-grade children by retesting them each year until each group reaches the sixth grade and (2) to compare the performances of children in grades 1 through 6 on selected perceptual tasks.

Procedures.—This project will be conducted in two phases. The first phase will utilize the random sample of 200 first-, 200 second-, and 200 third-grade children drawn for an earlier study (project 766). Data will be collected annually on the auditory perception of melodic and rhythmic elements of music until each group of subjects reaches sixth grade. In the second phase of the study, a random sample of 300 students, stratified by grade and sex, will be selected from grades 1 through 6. Data will be collected on the auditory perception of melody, rhythm, timbre, and harmony; musical elements will be considered both individually and in combination. Each year this phase of the study will emphasize a different element or combination of elements and will utilize a different sample of subjects. The several tests to be developed for both phases will be tape recorded, and the subjects will be tested individually throughout the investigation. All responses will be taped to permit accurate and detailed analysis. Comparisons will be made to ascertain similarities and differences among age groups, grades, levels of competence, sex, and levels of previous musical training and experience.

ROBERT G. PETZOLD, Associate Professor of Music and Education, University of Wisconsin, Madison, Wis.

Project No. 1051.
Duration: 5 years.
August 1960–July 1965.

Patterns of Discrimination Learning Set in Preschool Children, Fifth Graders, College Freshmen, and the Aged

Problem.—This study explores patterns of discrimination learning set in preschool children, fifth graders, college freshmen, and the aged.

Major objectives.—The objectives are (1) to study the development of discrimination learning set in the four age groups indicated above and (2) to seek consistencies in each group's manner of attacking problems.

Procedures.—The subjects for this study will be selected from nursery school children, fifth graders in public school, college freshmen at the University of Buffalo, and aged adults in community centers and homes for the aged. The subjects will be selected in a random manner from the 5th grade and college populations, and all available subjects will be used in the nursery schools, homes for the aged, and community day centers. A series of 10 problems per day will be presented to each subject. Each problem involves a pair of stimuli; the subject is to learn which of the two stimuli is correct. He will be allowed four trials on each problem, and the shift from one problem to the next will be made without comment from the experimenter. The training will continue until the subject has reached a criterion of five successive problems in which no more than one error is made on trials 2, 3, and 4. The data will consist of records of correct and incorrect responses for each subject in each test session until the criterion is reached.

An analysis will be made of the frequency of a particular kind of error and the frequency of correct responses as a function of the number of previous problems that have been experienced by the subject. This analysis will provide an indication of the development of learning set. A second analysis of the frequency of correct responses and certain of the errors on the within-problem trials will reveal the development of specific habits as opposed to the generalized set. Comparisons of the frequency of errors and correct responses in the different age groups will provide information about the effects of age on the development of learning set and on the learning of specific habits.

BILLEY LEVINSON *and* HAYNE W. REESE, assistant professors, Department of Psychology, University of Buffalo, Buffalo, N.Y.

Project No. 1059.
Duration: 9 months.
August 1960–April 1961.

Concepts of Over- and Underachievement

Problem.—This study explores the concepts of over- and underachievement.

Major objective.—The objective is to develop a thorough yet clear and understandable critique of the concepts of over- and underachievement and of procedures for appraising them.

Procedures.—The procedures for carrying out the study will be threefold. Conferences will be held with interested and knowledgeable people who have written about the subject; a review will be made of the educational literature dealing with the problem; and from data gathered through conferences and a review of the literature, a careful exposition of the problem will be developed. The report will probably include sections on the historical development of the problem, some of the common fallacies found in research designs in this area, and the statistical and logical rationales which underlie the concepts of under- and overachievement.

ROBERT L. THORNDIKE, Professor of Education, Teachers College, Columbia University, New York, N.Y.

Project No. "D".
Duration: 1 year.
June 1960–June 1961.

RESEARCH ON:

IV. ADMINISTRATIVE PROBLEMS

The Administrator

Role of the Elementary, Junior High, and Senior High School Principal

Problem.—This study proposes to investigate the role of the principal in public education.

Major objectives.—The objectives are (1) to develop the theoretical structure and hypotheses for the research; (2) to collect and examine a body of preliminary data related to central problems of the inquiry; (3) to develop research instruments and the sampling procedure; and (4) to obtain the cooperation of school systems in the research.

Procedures.—This is a one-year pilot study to determine the feasibility of obtaining a sample and developing the instruments to be used in a long-range study. Previously collected data from six Massachusetts school systems related to the principal's role will be examined for their implications for this study. Information from principals, teachers, superintendents, and others will be gathered to explore problems related to the theoretical and empirical problems of the research. Role-concept systems will be examined for their implications. Finally, instruments and interview schedules will be pretested. The precise population and sampling procedures will be determined and an assessment made of the willingness of school systems to participate in a long-range study.

Neal Gross, Professor of Education, Harvard University, Cambridge, Mass.

Project No. 714.
Duration: 1 year.
July 1959–June 1960.

Procedures for Identifying Persons With Potential for Public School Administrative Positions

Problem.—In this study an attempt is made to develop better procedures than are now available for identifying persons who have the characteristics and potential abilities needed to serve effectively in administrative positions in public schools.

Major objectives.—The objectives are (1) to describe a number of personality, social, and cognitive factors common to administrators and (2) to supplement them with characteristics of administrative jobs in order to develop a battery of instruments that will distinguish between effective and ineffective administrators.

Procedures.—In this first phase of an anticipated long-range project, a small group of effective and ineffective administrators will constitute the sample. The subjects will be administered the Life History Questionnaire and will be interviewed for 3 or 4 hours to determine what the symbolic meaning of educational administration is for each and to trace its development. On the basis of information obtained from the questionnaire and the interview, a battery of instruments will be collected to measure interpersonal needs and values, cognitive orientations and abilities, and job characteristics. The battery will probably include measures such as the Test of Type Indicators, the Fundamental Interpersonal Relations Orientation-Behavior (FIRO–B), and the Taxonomy of Situations. The analysis will determine how well the measures differentiate effective and ineffective administrators.

EDGAR L. MORPHET, Professor of Education, University of California, Berkeley, Calif.

Project No. 677.
Duration: 1 year, 4 months.
September 1959–December 1960.

Education for Innovative Behavior in Executives

Problem.—This study attempts to identify the determinants of innovative administrative behavior and to determine whether such behavior can be encouraged through education.

Major objectives.—The objectives are (1) to determine the relationship of personal factors and organizational climate to innovative administrative behavior, (2) to develop experimental educational programs designed to stimulate innovative administrative behavior, and (3) to assess the differential effects of these programs upon the performance of administrators drawn from distinct organizational climates.

Procedures.—A sample of 150 to 200 persons at grade levels from GS 11 to GS 17 will be drawn from 15 to 20 Federal agencies in the Washington and Chicago areas. An attempt will be made to achieve an adequate range and distribution of types of agencies (e.g., defense, nondefense, headquarters, field, security), grade levels, years of service, age, and education. Data on aptitude and personality factors and perceptions of organizational climate will be collected in testing sessions of approximately 6 hours for each subject. The Positional Performance Inventory, which contains 30 items, each describing a personal characteristic or type of administrative situation, will be administered to an immediate superior of the subject and to a coworker. Nelson's Leadership Practices Survey, each item of which describes a management problem and the alternative practices for attacking the problem, will also be administered to each subject, who will be asked to select the practice which would be most typical in his organization. The data obtained from this instrument will be used to determine the effects of aptitude and personality factors and perceived organizational climate upon innovative behavior. Some of the above tests will be given to new samples immediately before and six months after a training program designed to stimulate innovative administrative behavior. Standard correlational and analysis of variance techniques will be used for analysis of the data.

BERNARD JAMES, Director, Center for Programs in Government Administration, University of Chicago, Chicago, Ill.; *and* HAROLD GUETZKOW, Professor of Psychology and Sociology, Northwestern University, Evanston, Ill.

Project No. 975.
Duration: 2 years.
August 1960–July 1962.

Role of the Elementary, Junior High, and Senior High School Principal

Problem.—This study continues the work of project 714 in examining the role of the principal in public education.

Major objectives.—The objectives are (1) to determine the distinguishing and common elements in the roles of the elementary, junior high, and senior high school principals as viewed by principals and occupants of related positions, (2) to investigate the degree to which the role performance of principals conforms to their definition of professional standards for their behavior, (3) to isolate the role conflicts to which principals are exposed and the methods used to resolve them, (4) to investigate determinants and consequences of differential role definition and consensus on the principal's roles,

and (5) to investigate determinants and consequences of variable role performance by the school principal.

Procedures.—A stratified random sample of approximately 500 elementary, junior high, and senior high school principals will be drawn from communities with a population of 50,000 and over in the United States.

The major data-collection technique will be the interview, through which data will be gathered on role definitions, role behavior, role consensus, role conflicts, job satisfaction, level of aspiration, and age, sex, and other personal data. Records of school systems and census records will provide information on such items as job history, professional training, socioeconomic composition of the community, and per pupil support. The data analysis will utilize tests of significance, scaling techniques, partial and multiple correlations, and regression analysis.

NEAL GROSS, Professor of Education, Harvard University, Cambridge, Mass.

Project No. 853.
Duration: 3 years.
July 1960–June 1963.

Procedures for Identifying Potential School Administrators

Problem.—This study, a continuation of project 677, attempts to develop better procedures than are now available for identifying persons who have the potential characteristics and abilities needed to serve effectively in administrative positions in public schools.

Major objectives.—The objectives are (1) to develop a theoretical framework for educational administration, based on research on interpersonal behavior, on community structure, on the sociological influences on behavior, on the psychology of cognitive style and factors of intelligence, and on the impact of early childhood events on adult behavior; and (2) to develop a battery of tests that is compatible with the theory for use in selecting persons for positions in educational administration.

Procedures.—In project 677 the Fundamental Interpersonal Relations Orientation (FIRO) Theory was expanded and modified for use in educational administration. Several hypotheses have been formulated from the theory, and these will be tested in the present study. For example, the investigators will test the hypotheses that (1) attitudes of administrators toward educational philosophy and educational administration are positively correlated with behavior and attitudes toward people; and (2) an administrator's compatibility with salient present figures (teachers, board members, and others) is positively correlated with his administrative effectiveness.

To test hypotheses such as these, several tests were selected or constructed and pretested in the previous project. A battery was selected which discriminates between good and poor administrators. In the present project this battery will be administered to about 11,700 people, including 1,200 administrators, 5,000 teachers, 5,000 parents, secretaries, community leaders, and members of boards of education; and 500 graduate students in educational administration. Among the measures to be used are the FIRO-Behavior, the Meyer-Briggs Test of Type Indicators, an intelligence test, COPE (defense mechanisms), the Life Interpersonal History Enquiry, a measure of educational values, and various measures of effectiveness. The measures of effectiveness will be correlated with the other measures to test hypotheses and modify the theory accordingly.

EDGAR L. MORPHET, Professor of Education, *and* WILLIAM C. SCHUTZ, Lecturer and Research Educator, University of California, Berkeley, Calif.

Project No. 1076.
Duration: 2 years, 6 months.
January 1961–June 1963.

FINANCE

Spillover of Public Education Costs and Benefits

Problem.—This project studies the relationship between tax payments for public education and benefits received from public education in any area, such as a school district, a metropolitan area, a county, or a State.

Major objectives.—The objectives are (1) to develop an analytic framework which permits the specification and ultimately the measurement of public education spillover, and (2) to utilize the framework in a case study of St. Louis Co., Missouri.

Procedures.—A framework will be constructed which permits the specification and measurement of school tax receipts, expenditures, and education benefits that flow between areas either because of existing conditions or because of the development of new policies or conditions. The sources and recipients of school taxes will be investigated to determine whether some communities are subsidizing or being subsidized by other communities and to isolate fiscal spillovers. To determine benefit spillovers, an analysis will be made of the extent to which the education expenditures of an area benefit persons in other areas. Regional analyses of input and output factors will be used to estimate indirect and income-induced employment and the output and income effects of local economic activity; these

will be translated into public education costs and tax payments. Extensive use will be made of a previously developed input-output table for the St. Louis area to estimate local employment, output and income multipliers, and interregional consequences of local economic activity on public education.

WERNER ZVI HIRSCH, Professor of Economics *and* BURTON A. WEISBROD, Assistant Professor of Economics, Washington University, St. Louis, Mo.

Project No. 1045.
Duration: 3 years.
September 1960–August 1963.

Revenue Sources for the Support of Public Education

Problem.—This study seeks to determine whether State-administered revenue systems of school support are more effective in meeting the fiscal goals of equality and excellence than systems which rely to a greater extent upon the local district's property tax.

Major objectives.—The objectives are (1) to discover whether a higher proportion of State support results in a lower variability in total property tax rates and per pupil expenditures for current costs of education and (2) to ascertain the extent to which a higher proportion of State support results in lower mean voluntary tax rates and per pupil expenditures above the State-prescribed minimum.

Procedures.—The first step in the study will be to gather enrollment and current expenditure data for the 1958–59 school year for selected districts within selected States. An arbitrary minimum size limit will be set at 1,500 pupils, or 1,000 elementary school students and 500 secondary school students for States with separate elementary and secondary districts. Data will be gathered from all districts that are larger than the minimum. Equalized valuations of taxable property will be gathered where available or developed from assessed valuations, using assessment ratios supplied by the State tax authority. Using district reports to the States, the 1958–59 current operating costs will be reduced by all receipts applicable to current operation except local property tax levies, yielding a net cost of current operation to be borne by the district. This net cost divided by the equalized valuation will provide the levy rate required for current operation. To obtain a measure of voluntary levy any State-mandated levy will be subtracted from the levy required for current operation. Data will also be gathered on State statutes governing education, attendance in nontax supported schools, and limitations on local school board fiscal decisions.

H. THOMAS JAMES, Associate Professor of Education, Stanford University, Stanford, Calif.

Project No. 803.
Duration: 1 year, 3 months.
January 1960–March 1961.

School and Community Relations

Structure and Process of School-Community Relations

Problem.—This study explores the structure and process of school-community relations and the ways in which persons can meaningfully participate in the process.

Major objectives.—The objectives are (1) to examine the factors affecting school-community relations, (2) to ascertain what citizen participation exists relevant to the schools through agencies such as clubs, citizens committees, and school boards, and (3) to explore the informal contacts of citizens in relation to the schools and the informal communication networks for such contacts.

Procedures.—To obtain data on the factors affecting school-community relations, a sample of 180 school districts will be drawn with student enrollments of 150 or more and with probability proportional to the number of students in the district. The Factor Evaluation Inventory, which lists 162 factors commonly associated with either the success or failure of school financial issues, has been prepared for use with informed observers in the local community. These observers will be selected for their roles in school-community relations as superintendents, board members, opposition leaders, mass media representatives, or as leaders of civic groups aiding the schools. A second and similar inventory, which will be developed during the first year of the project, but which will use objective data and observations, will furnish another measure of each factor. Using sample survey techniques, interviewers from the Institute for Communication Research will collect data on citizen participation and informal communication networks from residents of a variety of communities. Citizen participation and informal communication networks from residents of a variety of communities. Citizen participation will be reflected in knowledge of mediating agencies and their functions, perceptions of these agencies, attitudes toward schools, and direct participation in school activities. The informal communication networks will be ascertained by asking who talks to whom, about what, under what circumstances, for what reasons or purposes, and similar questions.

William R. Odell, Professor of Education *and* Richard F. Carter, Assistant Professor, Department of Communication and Journalism, Stanford University, Stanford, Calif.

Project No. 1039.
Duration: 5 years.
July 1960–July 1965.

Resistances to Reorganization of School Districts and Local Governments in Metropolitan Areas

Problem.—This study explores the factors involved in the resistance to reorganization of administrative units in metropolitan areas, including school districts and local governments.

Major objectives.—The objectives are (1) to determine to what extent resistance to reorganization among residents of a metropolitan community is related to their knowledge of, and attitude toward, local school officials and teachers, their level of participation in school and government-related functions, their level of knowledge of the existing government, their attitude regarding the size of the administrative unit, and related measures; and (2) to ascertain to what extent resistance to reorganization among officials of a metropolitan community is related to their vested interest in the status quo, the degree to which they misassess the needs of the area and the desires of the residents, and other items.

Procedures.—This study is limited to States having the township form of government in metropolitan areas, and to States with comparable legislation regarding school district and government reorganization; hence the metropolitan areas will be selected from the midwestern States, New York, and Pennsylvania. A random sample of residents in central cities and the suburbs of metropolitan areas will be drawn from three different population sizes: small (150,000), medium (400,000), and large (800,000). In each class two metropolitan areas will be studied. Interviews will be conducted with 3,000 residents in the central city and the suburban area to obtain information on the demographic characteristics, the migration experience, the intracommunity movement, the level of satisfaction with the schools, the evaluation of school and government officials, the attitudes toward school district and government reorganization, and related measures. In the same six communities approximately 600 school and municipal officials will be interviewed with many of the same questions asked of residents and additional items as appropriate. The statistical analysis of the data will include percentage distributions, chi-squares, critical ratios, and correlations.

BASIL G. ZIMMER, Associate Professor of Sociology, Brown University, Providence, R.I.

Project No. 1044.
Duration: 3 years.
September 1960–August 1963.

Operation of the Schools

An Evaluation of Climate Control as a Factor Contributing to an Effective Educational Program

Problem.—This study evaluates the effect of climate control in a school on the maintenance costs and depreciation of the physical plant, on the quality of educational outcomes, and on certain physical and psychological characteristics of the learner.

Major objective.—The objective is to compare the cost of maintenance and depreciation, the educational outcomes, the incidence of illness, and psychological problems in a climate-controlled school with measures of the same factors in a school without climate control.

Procedures.—Two junior high schools containing the same physical facilities for instruction will be constructed. Each will be designed to accommodate 1,200 students. In the experimental school both temperature and humidity will be controlled; in the other school complete climate controls will not be present. An inspection of each building will be made at periodic intervals to record differences in deterioration, and records of maintenance costs will be kept for each. Data will be collected on the sex, learning potential, previous school achievement, and socioeconomic level of the students; differences in the experimental and control groups will be controlled statistically. Specially constructed achievement tests will be designed to measure the educational achievement of the students in each school. Records will be kept of absences due to illness, referrals for disciplinary or for psychological reasons, and an instrument will be devised to measure the level of student and faculty morale in each school. Standard tests of significance will be used in analyzing the data.

Floyd T. Christian, Superintendent of Public Instruction, Tallahassee, Fla.

Project No. 1067.
Duration: 3 years.
October 1960–September 1963.

Relationship Between School Design and Utilization and Personnel Interactions

Problem.—This study attempts to determine the influence that different types of "school-within-school" patterns of organization have on the perceptions and interactions of school personnel.

Major objective.—The objective is to identify and measure the sociometric and perceptual characteristics of personnel in selected secondary schools that represent various patterns of school-within-school organization and design.

Procedures.—The 24 to 32 schools selected for the study will be limited to senior high schools constructed since 1954 and occupied for a period of not less than 2 years; they will represent four different combinations of building types and patterns of plant utilization. An attempt will be made to equate the different types of schools on the basis of student enrollment, number of professional personnel, socioeconomic characteristics of the community, wealth per pupil, and other characteristics. The instruments to be used include a leadership identification inventory for students, faculty, and administrators; a battery of group interaction inventories; and a set of perceptual scales. Appropriate statistical tests for differences in performance on each of the instruments will be applied for each of the school types.

KARL T. HEREFORD, Associate Professor of Education, Michigan State University, East Lansing, Mich.

Project No. 918.
Duration: 1 year.
May 1960–April 1961.

The Use of Mathematical Programing to Solve Certain Problems in Public School Transportation

Problem.—The purpose of this project is to investigate the use of mathematical programing in solving the transportation problems of public schools.

Major objective.—The objective is to determine whether mathematical programing can indicate within limits the most economical bus routes, the optimum sizes of school buses, and the location of distribution points.

Procedures.—An analysis will be made of existing research and mathematical programing related to transportation. A programing procedure will be developed for a rural, an urban, and a rural-urban school system, with each system reflecting different transportation needs. After the programing procedure has been established, it will be tried out in three additional school systems, and comparisons will be made between suggested and existing routes and sizes of buses.

ROSCOE A. BOYER, Associate Professor of Education, University of Mississippi, University, Miss.

Project No. 783.
Duration: 1 year.
June 1960–May 1961.

RESEARCH ON:

V. HIGHER EDUCATION

STUDENT CHARACTERISTICS

The Impact of a Value-Oriented University on Student Attitudes and Thinking

Problem.—This study explores the effects of a declared institutional goal of value orientation on the values of students.

Major objectives.—The objectives are (1) to determine whether or not a Catholic university experience produces conformity or individualism in students; (2) to investigate the effect of Catholic education on liberal-authoritarian beliefs in students; and (3) to compare the development of critical thinking in students attending a Catholic college with the development of critical thinking in students attending non-Catholic institutions.

Procedures.—Batteries of relevant tests given in the fall of 1959 to 1,000 undergraduate students in a Catholic college and to approximately 600 students from State colleges will be readministered in the spring of 1961. The instruments include a test of authoritarian personality, a test of liberalism and conservatism in political viewpoint, a test of critical thinking in ethics, and a questionnaire on educational expectations. Data will be obtained also on achievement, demographic characteristics, and personal and family background. The analysis will describe differences in pre- and post-test performances of subjects and will compare performances of students from the Catholic institution with those from non-Catholic institutions.

JULIAN F. S. FOSTER, Assistant Professor of Political Science, University of Santa Clara, Santa Clara, Calif.

Project No. 729.
Duration: 2 years.
August 1959–August 1961.

A Study of Esthetic Judgment

Problem.—This study investigates the ability of college students to recognize degrees of esthetic merit in objects of art and the direct trainability of this skill.

Major objective.—The objective is to determine by experimentation some of the factors which may be important in the development of esthetic judgment.

Procedures.—The main study will use a series of experiments, each involving a relatively small number of people for an extended period of time. A sample of male college students will be subjected to several tests of esthetic judgment and sets of students equated on judgment of art will be selected for further study. Each set will be divided at random into various experimental groups, each group required to respond with esthetic judgment to a large number of pairs of art objects presented on slides. Correct judgments will be confirmed with varying frequency and under varying circumstances for different groups of subjects. The judgment made by a subject on each stimulus pair will be counted as right or wrong (by the criterion of agreement with expert judgment), and a number of such counts will be put together to yield a score for a subject's performance at each stage of training. Differences in the average score for each experimental group will be studied as a function of differences in experimental treatment. Individual differences in the scores (and in changes in scores) will be correlated with other kinds of individual differences. Questionnaires and interviews will be used to obtain from each subject relevant information about his background of experience with the arts and his conscious reactions to the training.

IRVIN L. CHILD, Professor of Psychology,
Yale University, New Haven, Conn.

Project No. 669.
Duration: 3 years.
September 1959–August 1962.

Measurement and Evaluation of Change in College Women

Problem.—This project analyzes personality change in college women as measured by personality tests and interviews.

Major objective.—The objective is to determine those changes which have taken place in the personality development, attitudes, values, and opinions of an extensively tested sample of college women.

Procedures.—Six graduating senior classes and six entering freshmen classes, as well as two successive samples of juniors, sophomores and second-semester freshmen at Vassar College have been given a

battery of psychological tests and have been interviewed in depth. The present research proposes to analyze these data in terms of personality changes occurring during the college years; characteristics of special groups, such as those who have left college and those who have visited the college psychiatrist; relationships between interview data and such variables as faculty ratings, grades, choice of major, and post-college plans; and the effects of interviewing on the members of the sample.

MERVIN B. FREEDMAN, Coordinator, Mellon Foundation, Vassar College, Poughkeepsie, N.Y.

Project No. 736.
Duration: 2 years.
July 1959–June 1961.

Why Successful Students of the Natural Sciences Abandon Careers in Science

Problem.—This study seeks to discover any common experiences, perceptions, and expectations of science which characterize those who abandon science careers.

Major objective.—The objective is to determine to what extent students who abandoned careers in science did so (1) because they felt there were limitations on their use of subjective perception and on their freedom of inquiry (2) because they expected greater external rewards, or (3) because they expected science to be more directly concerned with human welfare.

Procedures.—A type of card sort will be given to an experimental group of 75 college seniors and recent graduates who have changed their field of specialization from the natural sciences or engineering to the humanities or social sciences. The card sort will also be given to a control group of 46 highly successful senior science and engineering majors who are continuing their training in science. The sample will be drawn from Brooklyn College, Ohio State University, and Stanford University. Each subject will be asked to sort a set of 32 cards, each of which bears a statement that he is to consider advice he might wish to give a younger student who was seriously considering becoming a scientist. After the card sort each subject will be asked in an interview to discuss the reasons for selecting each of the four cards which he places at the positive and negative ends of the distribution. He will be asked also to indicate the card bearing the best advice and the one bearing the most misleading advice, and his reasons for selecting them. Finally, he will be asked to identify any other pertinent issues not represented by any of the cards. Data on the subject's grade average, the occupational status of his father, and his former and present major will be gathered. The card choices

of the subjects will be examined to identify individuals with a similar point of view (e.g., those who regard a scientific career as providing an inadequate financial reward). These choices will be subjected to dependency factor analysis for evidence as to whether the expected combinations of card choices are the basis for the relationships that produce the clusters. Interviews will be used to establish whether the subjects have understood the cards chosen in a way consistent with the investigator's interpretations of their choices, and to test and expand the implications of the card-choice patterns.

EDGAR FRIEDENBERG, Assistant Professor of Education, Brooklyn College, Brooklyn, N.Y.

Project No. 787.
Duration: 1 year, 6 months.
January 1960–June 1961.

Personality Correlates of Academic Adjustment

Problem.—This study attempts to identify the nonintellective factors related to overachievement and underachievement in groups of high- and low-ability college students.

Major objective.—The objective is to ascertain the extent to which high-ability underachievers differ from low-ability overachievers in their typical modes of adjustment to the academic environment and in their general adjustment level.

Procedures.—Data on freshmen who entered the State University of Iowa in the fall of 1959 are already available from an entrance examination which will be used as the measure of general scholastic aptitude, from grade-point averages to be computed from grades obtained at the end of the first semester and at the end of the year, and from the Minnesota Multiphasic Personality Inventory (MMPI). In addition to the experimental groups of high-ability underachievers and low-ability overachievers, groups of low, average, and high ability will be used to control for differences in ability and the possible nonlinear relationships between personality and achievement. Comparisons will be made between the various experimental and control groups for differences in profile elevation and shape on the MMPI. F-tests will be used to test for the significance of differences in psychometric patterns among various groups. If the F-tests are significant, individual tests will be made to identify personality configurations unique to the underachievers and overachievers. Replications are planned at other institutions that administer the MMPI on a large-scale basis.

LEONARD D. GOODSTEIN, Director, University Counseling Service, JOHN ORR CRITES *and* ALFRED B. HEILBRUN, Assistant Professors of Psychology, State University of Iowa, Iowa City, Iowa.

Project No. 805.
Duration: 2 years.
January 1960–December 1961.

The Psychological Impact of the Public 2-Year College on Certain Nonintellectual Functions

Problem.—This project attempts to determine, through a longitudinal study, whether there are changes in the ideology, personality traits, and values of college students associated with attendance in a 2-year public junior college.

Major objectives.—The objectives are (1) to determine whether or not subjects who have experienced two years of public junior college education differ significantly in ideology, personality, or values from comparable subjects who have not completed junior college, and (2) to assess the influence of different sizes and types of public junior colleges on the ideology, personality, and values of students who attend these institutions.

Procedures.—The sample will consist of all full-time freshmen (about 6,000) entering six public junior colleges in California during the fall of 1960. The sample will be divided into at least three groups based upon the number of semesters of college work the subjects complete. Rokeach's Dogmatism Scale, a modification of Gough's California Psychological Inventory, and Allport, Vernon, and Lindzey's Study of Values will be administered in the fall of 1960 and again in the spring of 1962. Data will be obtained by mail from those students who have dropped out during this period of time. Tests of the significance of the differences of the means of various groups and correlations will be employed in the analysis of the data.

CHARLES W. TELFORD, Professor of Psychology *and* WALTER T. PLANT, Associate Professor of Psychology, San Jose State College, San Jose, Calif.

Project No. 914.
Duration: 2 years, 10 months.
April 1960–January 1963.

Patterns of Development in Thought and Values of Students in a Liberal Arts College

Problem.—This study traces the development in thought and values which occurs in students during four years in a liberal arts college.

Major objectives.—The objectives are (1) to test the degree to which developmental schema, derived from annual interviews with students regarding their educational progress, are reliably observable by others studying the records of these interviews; (2) to identify the major cues used by judges in assessing student development; and (3) to ascertain whether or not equally reliable judgments can be made with condensed reports containing major cues.

Procedures.—In 1954 and 1955 a scale called a Checklist of Educational Views (CLEV) was administered to a group of Harvard and Radcliffe freshmen in October and May. This test is designed to discriminate between dualistic thought-value (associated with either adherence to or opposition to authority) and contingent thought-value (associated with inquiry into circumstance and consciousness of ambiguity) in connection with educational issues. Thirty-one students, chosen for their scores on this measure, were asked to volunteer for interviews in the spring of each of their four years to report on their college experience. These interviews revealed that students who scored differently on CLEV on entrance into college and who exhibited different degrees of change on the retest, reflected these differences in the reports they gave of their college experiences. Protocols of the recorded interviews yielded developmental schema revealing the different responses that students made to aspects of liberal education which require inquiry into contingencies and tolerance of the ambiguities inherent in man's efforts to understand himself and his world.

In the present study the reliability of the schema will be tested by having judges place the protocols along the developmental schema. Also, a second set of data will be obtained from a revised form of CLEV to select an additional 80 volunteers who will be interviewed as they progress through college. The original schema will be tested with this new sample. From both sets of data, condensed student reports will be derived by controlled editing to illustrate a liberal education in process.

WILLIAM G. PERRY, JR., Director, Bureau of Study Counsel, Harvard University, Cambridge, Mass.

Project No. 978.
Duration: 4 years.
August 1960–July 1964.

Social Consequences of the Schools Project: Recruitment and Values of Students at the University of Puerto Rico

Problem.—This project studies the trends in the social composition of the student body of the University of Puerto Rico since 1940.

Major objectives.—The objectives are (1) to obtain descriptive data on the trends in the social composition of the student body of the University of Puerto Rico, (2) to determine the relationships among social characteristics, types of secondary school background, and academic achievement of the students at the university, (3) to study trends in curriculum choice since 1940, and (4) to assess the effects of the freshman-year experience at the University on values, attitudes, and occupational plans.

Procedures.—Data pertinent to the first three objectives will be obtained in two ways. Information from the University's official records for 1944–45, 1952–53, and 1960–61 will be coded concerning the social characteristics, high school training, high school performance, university curriculum, and university performance for all members of the entering classes of those years. If necessary, the data will be supplemented with information from secondary school records. A paper-and-pencil questionnaire yielding data on social characteristics, high school performance, motives for going to the University, and occupational aspirations of high school seniors will be administered. To assess the effects of the freshman year on the values, attitudes, and occupational plans of the students, 12 students representing (1) the various colleges within the University, (2) high and low performers, (3) boys and girls, and (4) differing socioeconomic backgrounds, will be asked to keep diaries throughout the first semester of the 1960–61 school year. Each week, after having read the diaries, an interviewer will interview each student in a nondirective way. A small number of faculty members will also be interviewed. Finally, interviews will be conducted with a sample of 200 students before they enter the University as freshmen in 1960-1961 and again at the end of their freshman year. The interviews will also be conducted with a control group of 50 who are admitted to the University but who do not come.

MILLARD HANSEN, Director, Social Science Research Center, University of Puerto Rico, Rio Piedras, P.R., and LEILA SUSSMANN, Assistant Professor of Sociology, Wellesley College, Wellesley, Mass.

Project No. 1018.
Duration: 2 years.
September 1960–September 1962.

Cognitive Processes in Career Decision Making

Problem.—This study identifies the cognitive processes involved in career decision making and the long-term effects of these processes on career development.

Major objectives.—The objectives are (1) to identify strategies by which an individual can overcome decision-making difficulty, (2) to assess the short-term effects of different causes of indecision and of different strategies on career development, and (3) to predict the long-term effect of indecision and certain strategies on the stability of occupational role acceptance, and (4) to test the validity of the prediction.

Procedures.—Each of the objectives will be achieved by a separate substudy. The first substudy will involve longitudinal case studies of career decision-making in process; 10 male graduate students and 10 male and 10 female undergraduate students will be interviewed and tested for 2 hours every 4 weeks for 28 weeks. The tests will include the Twenty-Statements Test of Self-Attitudes, a semantic differential test, the Allport-Vernon-Lindzey Study of Values, the Ghiselli Self-Description Inventory, and selected questionnaire items. This substudy is designed to identify objective behavioral indices of changes in strategies and other important characteristics of career plans.

The second substudy is designed to test predictions in regard to the short-term effects of different decision-making strategies. Each of approximately 60 students who will enter the Graduate School of Industrial Administration of the Carnegie Institute of Technology in September 1960 and 60 more who will enter in September 1961 will complete a 12-page personal history questionnaire on the state of his career thinking, his past development, his most likely future course, and related items. The same subjects will be tested again at the end of the year and *t*-tests of the significance of changes will be obtained.

In the third substudy, the Personal History Questionnaire given by the author to approximately 300 men and women enrolled in the Harvard Graduate School of Education in 1954 and 1955 will be readministered by mail. Scores on file for a large battery of personality tests, vocational interest inventories, and aptitude tests will be used to supplement the questionnaire data. The statistical analysis will be similar to that of the second substudy.

THOMAS L. HILTON, Assistant Professor of Psychology, Carnegie Institute of Technology, Pittsburgh, Pa.

Project No. 1046.
Duration: 3 years, 1 month.
August 1960–August 1963.

Comparison of Educational Achievement and Aspirations of Undergraduate Married and Unmarried Students

Problem.—This project compares the achievement and aspirations of undergraduate married students with those of undergraduate unmarried students.

Major objectives.—The objectives are (1) to determine to what extent married men and women undergraduate college students differ from unmarried men and women undergraduate students in academic achievement, stated attitudes toward their education and educational-vocational goals, and associated sociopsychological variables, and (2) to ascertain the expressed attitude of women and their husbands toward the future education of both members of the married pair.

Procedures.—A random sample for the study will be drawn from married undergraduate students who are not parents, married undergraduates who are parents, and unmarried undergraduates. The sample will consist of 50 couples from the first two groups and 50 men and women from the third group. A questionnaire will be designed to obtain information on items such as educational goals, attitudes toward education, time for and conditions of study, current financial situation, reasons for deferring marriage or for marrying, recreational activities, socioeconomic level of family of origin, and level of satisfaction with the current situation. Interviews will be conducted with about one-fifth of the sample, university records will be examined for information on academic aptitude and achievement, and Stern's Activities Index will provide a measure of personality. In the analysis the various groups will be compared on the basis of the indicated variables.

CATHERINE S. CHILMAN, Assistant Professor of Family Relations and Child Development, Syracuse University, Syracuse, N.Y.

Project No. 961.
Duration: 2 years.
October 1960–September 1962.

Contributions by Parents to the Cost of Higher Education

Problem.—This project seeks to determine how far in advance parents begin to plan for the education of their children and how they raise the money.

Major objectives.—The objectives are (1) to determine what proportion of parents contribute to the expenses of the college education of their children and the amount they contribute; and (2) to ascertain how contributing parents budget and plan for the education of their children.

Procedures.—A probability sample of 2,500 families will be interviewed in conjunction with a separate on-going research program and will be asked a series of questions on education and the financing of education. Over half of these families are expected to have children under 18 years of age. To add to the sample a group of about 2,500 families with children in college will be obtained from another national study. The interview schedule will include items designed to elicit information on the amount parents contribute to the expenses of their children while in college, funds accumulated prior to enrollment of the student, funds acquired during the period of enrollment, and other pertinent information from parents of enrolled college students. Parents of prospective college students will be asked questions concerning plans for financing their children's college education.

Medians, means, and frequency distributions on the financial variables and sample distributions on replies to other questions will be presented. Multiple regression techniques will be used to analyze expected and actual college attendance.

JOHN B. LANSING, Program Director, Institute for Social Research, University of Michigan, Ann Arbor, Mich.

Project No. 708.
Duration: 1 year, 4 months.
June 1959–November 1960.

INSTITUTIONAL CHARACTERISTICS AND PROGRAMS

Factors Influencing the Recruitment and Training of Intellectually Talented Students in Higher Educational Programs

Problem.—This study seeks to determine what manipulatable incentives are effective in motivating talented students to seek advanced training and to learn what types of college environment are conducive to scientific productivity and intellectual achievements.

Major objectives.—The objectives are (1) to ascertain the proportions of potential college students at given ability levels in the top third of the high school seniors in the Nation and in each State who do not enter college; (2) to evaluate the effects of incentives such as scholarships on the college attendance of these students; (3) to discover the attributes of the students who are most influenced by such incentives; and (4) to determine the effects of different college environments in developing exceptional intellectual talent and in influencing students to enter graduate study.

Procedures.—A 10-percent random sample (30,390 students) will be selected from those students who scored at or above the 66th percentile on the National Merit Scholarship Qualifying Test. State subsamples will be proportionate to the estimated number of high school seniors in each State. The research will be conducted in three stages: (1) College attenders and dropouts will be compared with respect to vocational and educational aspirations, cultural atmosphere of the home, encouragement received from family and counselors, high school preparation, aptitudes, and other personal characteristics; (2) the effects of loans and scholarships and of public recognition on enrollment in college, choice of college, field of study, and continued attendance in college will be determined by comparing students who received loans and scholarships with those who did not; (3) scales will be constructed for assessing college environments and for defining variables of potential value in stimulating student achievement.

DONALD L. THISTLETHWAITE, Lecturer in Psychology, Northwestern University, Evanston, Ill.

Project No. 657.
Duration: 2 years, 6 months.
July 1959–January 1962.

Self-Directed Study: An Experiment in Higher Education

Problem.—This study attempts to develop and evaluate methods of university education in which the student is given greater than usual responsibility for his own education.

Major objectives.—The objectives are (1) to develop methods of instruction that encourage and permit each student to accept greater responsibility for his own education and (2) to determine whether the knowledge, skills, and attitudes of college students can be modified in a positive direction through participation in a program of self-directed study.

Procedures.—Sections of 14 courses in 8 departments have been randomly assigned to either experimental or control group status in an ongoing experiment of self-directed study initiated under other support. In addition, five other courses have been taught with only the self-directed study approach, since control group situations were not feasible. In this earlier phase of the research, generality of knowledge, stream of thought in the classroom, curiosity, the student's hierarchy of educational values, and student cultural and intellectual behavior have been measured by various methods and the data coded and recorded. During the present phase of the research these data will be analyzed for central tendencies and outstanding performances by individuals. The effects of motivational and personality variables will be examined by correlational techniques.

HOWARD E. GRUBER, Associate Professor of Psychology, University of Colorado, Boulder, Colo.

Project No. 761.
Duration: 1 year.
September 1959–February 1961.

Characteristics of Effective College Teaching

Problem.—This study attempts to determine the relationships among a teacher's characteristics, his teaching techniques, and his effectiveness with various types of students.

Major objectives.—The objectives are (1) to devise an instrument to evaluate student achievement in an undergraduate course in psychology and (2) to use the instrument to measure differential outcomes of the course as a function of the interactions among method, teacher personality, and student personality.

Procedures.—Sixteen objectives of an undergraduate general psychology course, confirmed as important by a survey of psychology instructors throughout the country, will be used to develop an

instrument to measure student achievement. Data are available from a previous investigation on the teaching methods used by 30 instructors and the achievement motivation, affiliation motivation, and anxiety of students. In addition, personality measures will be administered to teachers and students, and observations will be made of student and teacher responses in the classroom.

WILBERT J. MCKEACHIE, Associate Professor of Psychology, University of Michigan, Ann Arbor, Mich.

Project No. 850.
Duration: 3 years, 5 months.
January 1960–June 1963.

An Experiment in the Coordination of Teaching and Library Staff for Changing Student Use of Library Resources

Problem.—This study assesses the effectiveness of a new social structure designed to coordinate the work of the faculty, students, and librarians in encouraging students to make greater use of the resources of the library.

Major objectives.—The objectives are (1) to appraise a structure established to attain faculty, student, and librarian coordination; and (2) to explore new methods of relating the library to the instructional program.

Procedures.—This project will be concerned with the work related to library aspects of all three segments of a 3-semester course in social sciences and the last two segments of a 4-semester course in the natural sciences. During the first semester the project staff will work with 14 members of the social science faculty and approximately 700 students enrolled in the social science course. In the second semester the natural science faculty and over 200 students from the natural science course will be added. A coordinator and a librarian will cooperate with the faculty in deciding upon materials to be used and in devising appropriate methods to provide them; graduate assistants will provide a number of bibliographic services. Data of three types will be obtained: (1) Group-observation techniques and interviews will be used to describe the relationship between the library staff and the teaching faculty, the contributions of librarians to curriculum planning, the acceptance of these contributions by the faculty, and the extent to which they were implemented in instruction; (2) the assistants preparing bibliographical material will be asked to note the kinds of materials the faculty were interested in, the kinds of materials they actually used, how and when they decided what to use, and what kinds of library services they used; (3) through observations and

interviews, data will be gathered on the students' experiences in the library.

PATRICIA B. KNAPP, Library Consultant, Monteith College, Wayne State University, Detroit, Mich.

Project No. 874.
Duration: 2 years, 3 months.
April 1960–June 1962.

Higher Education of Southwestern Indians With Reference to Success and Failure

Problem.—This study explores the factors related to the success or failure in higher education of Indians in the Southwest.

Major objectives.—The objectives are (1) to assess the current status of the Indians in higher education institutions; (2) to determine what institutions of higher education in the Southwest are doing in special programs for Indian education, what they plan to do, and what they believe should be done; (3) to determine what various Indian tribes are doing in the area of Indian education, what they plan to do, and what they believe should be done; (4) to ascertain what specific factors should be considered in awarding scholarships to Indian students; and (5) to explore the reasons for withdrawal of Indian students from college.

Procedures.—The status of Indians in institutions of higher education in the Southwest will be ascertained from information already collected by various government agencies, Indian tribes, and others; interviews; and questionnaires from approximately 43 institutions of higher education in Arizona, Colorado, New Mexico, and Utah. Insofar as possible, information on the length of time in college, achievement in college, high school achievement, type of high school attended, future plans, and data from standardized test scores will be obtained for each of the 500 Indian students enrolled in these institutions. Interviews will be conducted with a random sample of approximately 100 students to obtain more detailed information on their background and adjustment to college. Key persons in each tribe and college will be contacted to determine what special higher education programs are offered and should be offered for Indians. Indians who were enrolled from 1958 to 1961 and who have left school will be contacted to find out their reasons for withdrawal. The methods used to award scholarships to Indians will be cataloged and interpreted in the light of factors which this study indicates are reliable predictors of academic success for Indians.

G. D. MCGRATH, Dean, College of Education, Arizona State University, Tempe, Ariz.

Project No. 938.
Duration: 2 years.
September 1960–September 1962.

The Influence of Academic and Student Subcultures in College and University Environments

Problem.—This study explores the press or influence of certain academic and student subcultures in supporting or not supporting the purposes of the institution and the needs of the students.

Major objective.—The objective is to determine to what extent the educational impact of a complex university varies with the proportion of its students who identify with academic and student subcultures that are congruent with or in conflict with the various educational objectives of the university.

Procedures.—A total of 1,000 to 1,200 students from two or more large heterogeneous universities, two small and presumably homogeneous colleges, and two or more institutions representing other points along the homogeneity-heterogeneity continuum will be chosen for this study. They will be selected from various academic subcultures (engineering, humanities, social sciences) and from student subcultures (athletics, publications, fraternities, and sororities), and they will be given the College Characteristics Index (CCI) as a measure of overall environmental press, and the College Characteristics Analysis (CCA) as a measure of subcultural press. A college satisfaction questionnaire will be administered to obtain a self-estimate of progress toward various educational objectives, a measure of the range and intensity of involvement in various extracurricular activities, and various items of background information. College records will provide scholastic-aptitude test scores, cumulative grade-point averages, and measures of personality characteristics. Similar and contrasting groups of students, of colleges, and of subcultures within colleges will be identified on the basis of personality scores for students and environmental press scores for the colleges. Group comparisons will be made to relate the characteristics of students to the characteristics of environments and subcultures and to relate both of these (including the congruence or disagreement between them) to the various criterion indices of grades, satisfaction with college, and sense of progress toward various objectives.

ROBERT PACE, Chairman, Psychology Department, Syracuse University, Syracuse, N.Y.

Project No. 1083.
Duration: 2 years, 9 months.
October 1960–June 1963.

RESEARCH ON:

VI. OTHER ASPECTS OF EDUCATION

Occupational Choice and Mobility in the Urbanizing Piedmont of North Carolina

Problem.—This study attempts to formulate and test hypotheses regarding the social and cultural factors which influence occupational decisions and career patterns.

Major objectives.—The objectives are (1) to explore the orientations of individuals toward groups which influence them, groups with which they would like to be identified, and groups whose approval they desire; (2) to determine the value orientations of these individuals; and (3) to assess the relationship between these value and group orientations and occupational mobility.

Procedures.—Two North Carolina communities will be studied. Within each, block samples of adult white male workers will be drawn and subjects will be interviewed to elicit information on reference-group and value orientations, work histories (career mobility) of the older adults, and occupational choice processes (intergenerational career mobility) of the younger adults. In addition, similar measures will be used with white male high school students in two North Carolina communities and the data related to the occupational mobility of the respondents. Contingency tables will show association between variables such as upward mobility and degree of instrumentalism in value orientation.

RICHARD L. SIMPSON, Assistant Professor of Sociology, University of North Carolina, Chapel Hill, N.C.

Project No. 722.
Duration: 1 year.
August 1959–August 1960.

Development and Analysis of Experimental Designs for Ratings

Problem.—This study proposes (1) to analyze for ratee bias a 4-dimensional matrix where each rater rates each ratee more than

once on each trait and (2) to devise appropriate experimental designs for various situations where it is impracticable for every rater to rate every ratee on every trait.

Major objectives.—The objectives are (1) to determine the various sources of bias in the ratee-rater trait repetition situation, (2) to evaluate numerically each source of bias, (3) to determine which designs remove or minimize the bias either experimentally or statistically.

Procedures.—The first step will be to write each of the eight mean squares involving ratees in terms of the mean within-column variance and seven covariances; thus the mean within-column variance and each of the seven covariances will be expressed as a linear function of the eight mean squares involving ratees. The same procedure will be followed for the mean squares involving raters. From these first steps the nature of various biases and the experimental and statistical techniques needed to minimize them will be deduced. Finally an actual study will be conducted employing the techniques which have been deduced, and the ratings obtained will be compared with the results from other procedures, such as paired comparisons, complete triads, and rankings.

JULIAN C. STANLEY, Professor of Education, University of Wisconsin, Madison, Wis.

Project No. 789.
Duration: 1 year, 5 months.
February 1960–June 1961.

Parents' Education and Income and the Education of Their Children

Problem.—This study attempts to determine the extent to which families with low incomes perpetuate their status in the inadequate education of their children.

Major objectives.—The objectives are (1) to ascertain whether low levels of education and income perpetuate themselves from generation to generation, and (2) to determine the extent to which the present educational system is failing to provide for the children of low-income families.

Procedures.—A representative sample will be drawn from dwelling units in the United States, and interviews will be conducted with the head of each spending unit in the dwelling. This will result in a sample of 3,000 interviews, about 600 of which will be from low-income families. During the interview, data will be collected on the past history of the individual, including his education, his background

during childhood, his recent experience in the labor market, his attitudes toward higher education, and his plans for the education of his children. Since the data will be collected as part of a larger study, an analysis of relationships among education, employment history, and motivation will be possible and should disclose—if it exists—the low-education, low-income syndrome and the reasons for its persistence from generation to generation.

JAMES N. MORGAN, Program Director,
Survey Research Center,
University of Michigan,
Ann Arbor, Mich.

Project No. 812.
Duration: 1 year, 6 months.
March 1960–August 1961.

Mass Communication and Popular Conceptions of Education: A Cross-Cultural Study

Problem.—This study investigates the contributions of mass-produced information and entertainment to the development of public images of education in (1) the United States, (2) a Western European country, and (3) an Eastern European country.

Major objectives.—The objectives are (1) to discover what portrayals of teachers and teaching each national system of communication makes available for mass consumption, and (2) to determine what forces, pressures, controls, and professional relationships affect these portrayals.

Procedures.—Cross-media trend data will be gathered from reference guides and indexes, trade association and industry records. Content data will be obtained through a short period of rather complete monitoring and a longer period of selective monitoring of programs. A review will be made of motion picture scripts, the films themselves, and mass-circulation periodicals distributed in a given period through wholesale distribution. Publicity materials will also be analyzed. A field study will be made of decision-making processes that shape relevant content. Interviews will be conducted with executives, editors, producers, writers, educators, and representatives of professional associations, and data on the decision-making process will also be obtained from trade, professional, and government records.

GEORGE GERBNER, Research Associate Professor, Institute of Communications Research, University of Illinois, Urbana, Ill.

Project No. 876.
Duration: 2 years, 1 month.
May 1960–June 1962.

Alaskan Native High School Dropouts

Problem.—This study investigates a problem which was uncovered in an earlier project, entitled *A Program of Education for Alaskan Natives*: the high percentage (in some schools over 50%) of native dropouts.

Major objectives.—The objectives are (1) to attempt to discover reasons for the large proportion of native students who terminate their education prior to graduation and (2) to determine what schools can do to increase their holding power for native pupils.

Procedures.—The study will draw its sample from approximately 10 high schools in Alaska which enroll 50 percent or more native students; high schools in which native students are in a minority may be considered for comparative purposes. A large percentage of all dropouts in the last 10 years for whom records are available will be sent questionnaires. A purposive sample of 100 students representing the three ethnic groups and several geographical areas will be selected for interviews. Approximately 100 parents of early school leavers will be contacted to determine their attitudes toward school and possible reasons for the students' leaving. School officials will also be interviewed.

CHARLES RAY, Chairman, Division of Education, University of Alaska, College, Alaska.

Project No. 878.
Duration: 2 years.
September 1960–August 1962.

Response Patterns Associated With Group Counseling

Problem.—This study analyzes data collected in an earlier study (project 623) to determine the extent to which certain factors influence interpersonal behavior and growth of clients in groups.

Major objectives.—The objectives are (1) to determine to what extent client growth is related to the topics discussed in counseling sessions and the persons who discuss them, and (2) to ascertain the extent to which the composition of a group of prospective counselors influences their interpersonal behavior in group counseling, and (3) to explore ways in which changes in clients' behavior can be measured.

Procedures.—In project 623 four groups of gifted underachieving ninth graders and four groups of prospective counselors were provided group counseling in separate groups. Tape recordings were made of all of the counseling sessions; the counseling sessions for two of the ninth grade groups were also kinescoped. These recordings and kine-

scopes will supply the data for the current study. To attain the first objective, the interaction of both the ninth graders and the prospective counselors will be classified in terms of affect, referent, and topic, and four psychologists not connected with the project will arrange protocols from a picture-story test in sequence, from pretests to followup tests, for both the ninth graders and the prospective counselors. The next step will be to determine whether or not chance could account for their success in arranging the protocols, which represent a record of client growth. To determine how members influence each other within the counseling group, the interpersonal behavior of the prospective counselors will be classified in the categories of approach, attack, and withdrawal. Analysis of variance, chi-square, and rank-order correlations will be used in analyzing the data.

MERLE M. OHLSEN, Professor of Education, *and* FRED C. PROFF, Associate Professor of Education, University of Illinois, Urbana, Ill.

Project No. 934.
Duration: 2 months.
June 1960–August 1960.

Attitudes Toward Adult Education, by Social Class

Problem.—This study explores the range of attitudes associated with participation and nonparticipation in adult education programs by middle-class and working-class groups.

Major objectives.—The objectives are (1) to identify the segments of the general population disposed to some kind of educational activity, (2) to determine what, if anything, keeps interested individuals from participating, and (3) to assess the role that an educational agency plays in determining the nature of its clientele.

Procedures.—Depth interviews will be conducted with middle-class and working-class participants and nonparticipants of educational or cultural activities to explore their attitudes toward these activities. Ten interviews will also be conducted with educators of adults to explore their attitudes toward educational participation in general and toward working-class participation in particular. Observations will also be made of adult education programs that have been classified as remedial, vocational, cultural, and general. Data from the depth interviews and the observations will be used to construct separate interviewing schedules for participants, nonparticipants, and adult educators. The schedules will be used to interview 200 participants of educational or cultural activities and 400 nonparticipants, middle and working class groups being equally represented; 25 to 30 adult educators will also be interviewed. In addition, extensive interviews of 20

participants and 20 nonparticipants will be obtained to aid in the interpretation of the data gathered with the interview schedules. The interview data and observational material will be coded and analyzed to achieve the stated objectives.

JACK LONDON, Associate Professor of Adult Education, University of California, Berkeley, Calif.

Project No. 1017.
Duration: 3 years.
September 1960–August 1963.

Education as an Instrument of National Policy in Selected Asian Nations

Problem.—This study explores the way in which education is used by Asian nations as an instrument of national policy.

Major objectives.—The objectives are (1) to determine whether education is being viewed as an instrument of national policy in selected Asian nations, and (2) to ascertain how education contributes to the accomplishment of national goals.

Procedures.—From preliminary discussions with the educational leaders of nations such as Japan, Free China, Hong Kong, Philippines, Vietnam, Malaya, Singapore, and Indonesia, four nations will be selected for the sample. Outstanding scholars from the nations chosen will be invited to teach comparative education at Stanford University and to assist in planning for the study. Using interviews and analysis of formal papers, executive orders, speeches, and publications, the investigator will determine the degree to which government officials and leaders in various aspects of national life are in agreement that education should be used as an instrument of national policy. The national goals of economic, social, and political growth will be determined by an analysis of studies conducted by commissions of the United Nations, by the International Cooperation Administration, and by public and private bodies of the host nation. The educational goals will be examined through curriculum publications, education journals, articles in the press, and classroom observations. The organizational structure of the educational system and the history of recent educational endeavors to reach national goals will be studied in a similar way. The material will be analyzed to ascertain the relationships between national goals and educational purposes.

PAUL R. HANNA, Professor of Education, Stanford University, Stanford, Calif.

Project No. 1032.
Duration: 2 years, 5 months.
August 1960–December 1962.

Life-History Correlates of Age Change in Mental Abilities

Problem.—This study explores the relationship between an individual's pattern of living and the retention of mental abilities with age.

Major objective.—The objective is to determine which experimental life-history antecedents are significantly correlated with the better or poorer retention of mental abilities with age.

Procedures.—The sample for this study will consist of the largest possible number of an original group of 127 males who were administered the Army Alpha Examination as college freshmen during 1919 and retested during 1950. Each subject will be administered the Army Alpha Examination (on a standard time and double-time basis), a 200- to 300-item life history form, and a test of organicity, such as the Clock Test or the Bender-Gestalt Test. The test of organicity will be used to identify subjects who show a marked pathology, and this group will be analyzed separately. The allowance of a double-time period will permit evaluation of the relative importance of speed and power in any performance decrement observed. The chi-squared test will be used to determine whether high and low criterion groups (scores on the Army Alpha) differ significantly in response to selected life-history items.

WILLIAM A. OWENS, Professor of Psychology, Purdue University, Lafayette, Ind.

Project No. 1052.
Duration: 2 years.
September 1960–August 1962.

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Trippe, Matthew	Syracuse University	12
Van Riper, Charles	Western Michigan University	53
Walling, W. Donald	Rutgers University	58
Weisbrod, Burton A	Washington University	76
Westcott, Malcolm R	Vassar College	23
Woodward, Mary F	University of Southern California	18
Wright, E. Muriel J	Washington University	55
Zimmer, Basil G	Brown University	78

APPENDIX B

Locations in Which Research Projects Were Initiated During Fiscal Year 1960

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