

INSTITUTE OF  
BEHAVIORAL RESEARCH - IBR  
  
TEXAS CHRISTIAN UNIVERSITY

ANNUAL REPORT  
1979

personality social psychology environmental psychology  
psychophysiology human ecology epidemiology of drug use,  
alcohol use, and mental illness field surveys population  
research family planning research drug abuse, alcoholism,  
and mental health research evaluation of prevention and  
treatment for drug abuse, alcoholism, and mental illness  
organizational research personnel research management  
studies behavior modification social and health program  
evaluation multivariate methods in behavioral research  
aviation and aerospace psychology

## I B R 1 9 7 9

## GOALS

The IBR is a university-based research and consulting organization dedicated to the advancement of scientific knowledge and to the application of the systematic knowledge and methods of the behavioral sciences to human affairs, through laboratory and field research, graduate education, and scientific publication. These goals implement a major principle endorsed by Texas Christian University, that organized research is one of its principal functions, having value both to society and to the educational program of the University.

ORGANIZATIONAL  
STATUS

The IBR was established formally in 1962 as an independent research unit of the University, to provide needed administration and programmatic direction for the behavioral sciences. Since it was founded it has experienced steady growth in staff, budget, and program scope. While providing research opportunities for students and faculty, it has also acquired a full-time staff of research scientists and specialists. In order to recognize the status of these IBR scientific staff members, the University, in 1972, authorized the IBR to include in its budget a number of ranked faculty positions and provided procedures for these faculty members also to serve as teachers and as members of the graduate faculty.

## PROGRAM

The IBR research program is supported principally by research grants and contracts, from Federal agencies and industry, in the areas of personality, social and environmental psychology, psychophysiology, epidemiology and human ecology, organizational and personnel research, social and health program evaluation, and population research. Currently the largest single programs involve research in the areas of drug abuse, epidemiology and treatment evaluation and organizational behavior.

## FACILITIES

Located on the East Campus of Texas Christian University, the IBR occupies four buildings with 15,000 square feet of office and laboratory space. Special features include the IBR LIBRARY with over 3,5000 books, 50 journals, and an extensive file of Air Force, Army, Navy, NASA and other technical report series, the document and computer files of the DRUG ABUSE EPIDEMI-ODOLOGY DATA CENTER, a comprehensive COMPUTER PROGRAM LIBRARY, and extensive DOCUMENT STORAGE facilities. The IBR utilizes the Sigma 9 computer system at the TCU Computer Center, both in batch mode and in real time, by means of remote terminals.

## PUBLICATIONS

IBR reports, a technical report series based on staff and student research completed under grants, contracts, and independent study, are distributed to a regular mailing list and in most cases are condensed for formal publication. TCU PRESS-BEHAVIORAL SCIENCE MONOGRAPH SERIES, founded in 1971, published irregularly as single volumes, includes substantive studies as well as methodological and theoretical contributions to the behavioral sciences. The IBR also publishes MULTIVARIATE BEHAVIORAL RESEARCH, a quarterly journal of the Society for Multivariate Experimental Psychology.

## IBR POLICIES

### Information for IBR Fellows

A major feature of the wide-ranging program of the Institute of Behavioral Research (IBR) is its emphasis on graduate education in conjunction with the various studies in progress. Some of the IBR faculty teach formal courses in the psychology, sociology, and business programs at Texas Christian University, but all assume research training responsibilities in conjunction with ongoing funded research projects. Within this framework, major emphasis is placed on the development of research skills in students, using an apprenticeship model -- as the student progresses from the first to the fourth year of training, the level of responsibility increases in terms of research planning, conducting data analyses, and writing research reports.

The research training program of the IBR is based on high standards of performance that apply to academic work as well as research development. Progress of each student is reviewed twice a year (at the end of the Fall and Spring Semesters) by the IBR Fellow Committee and includes review of formal grade reports as well as written evaluations submitted to IBR Faculty and staff supervisors. The Committee makes recommendations to the Director of the IBR and to the student involved as special action or information is needed. These recommendations involve academic progress, development of research skills, and amounts of fellowship stipends, as described below.

Academic Progress. Although the principal involvement of the IBR with Research Fellows is often viewed in terms of training in research methodology and application, academic counseling and supervision of students by IBR Faculty is an essential part of the training program and is therefore emphasized. Academic counseling with faculty supervisors is important for addressing student career objectives and insuring academic preparation for IBR research assignments. For this reason, each student is expected to consult with his research supervisor prior to enrolling in courses. In addition to appropriate course selections (generally 9 graduate credit hours per semester), grade reports are expected to average B+ or above. Continuation of an IBR Fellowship is contingent in part upon satisfactory academic work and definite progress toward an advanced degree.

Development of Research Skills. The IBR research training program involves a combination of formal coursework and work experience generally on funded research projects. Within the limitations of the nature and requirements of

research projects in progress at any given time, research assignments are made on a basis that seeks to optimize the match between student interests and abilities. As experience and research capabilities grow, student assignments are adjusted accordingly. Efforts are made to introduce students to all phases of research, from problem definition, planning and design to data gathering, management, and analysis, to the writing and ultimate publication of research reports.

Evaluations are normally requested semi-annually by the IBR Fellow Committee to be provided by each student's immediate supervisor(s). These evaluations are open to the student and each supervisor is encouraged to review his or her evaluation with the student. Together with the evaluations based on academic progress, this information is used by the Committee for recommendations concerning continuation or special provisions regarding fellowships.

Amount of Fellowship Stipends. In 1979, IBR Fellowship stipends ranged from \$300 to \$500 per month, plus cost of tuition (costs of student fees were not included). (These stipends will be raised substantially for 1980 and will be consistent with a uniform rate adopted by the University.) The following schedule determined the amount of stipends paid to students. Stipend increments became effective when the qualifications were met for each successive level of graduate training.

<u>Level</u>	<u>Qualifications</u>	<u>Stipends 1979</u>
1st year	Beginning or first year graduate student with less than 15 graduate credit hours.	\$300.
2nd year	Completion of a research Masters degree, or 18 or more graduate credit hours with relevant research experience. Must have completed graduate level coursework or its equivalent in Statistics and Experimental Design. Student must demonstrate satisfactory progress toward either the Masters or Ph.D. degree.	\$375.
3rd year	Completion of two years of graduate study toward the Ph.D. degree. The student will be expected to have completed the Masters degree (or its equivalent or 30 hours of graduate study). This includes successful completion of preliminary evaluations in the relevant academic department.	\$425.

4th Year	Fourth or final year of graduate study. The student will have passed his qualifying examinations and be admitted to candidacy for the Ph.D. degree.	\$500.
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The current IBR Fellow Committee consists of the following members:

Dr. L.R. James  
Dr. G.W. Joe  
Dr. D.D. Simpson, Chairman.

### Faculty Promotion Policy

1. The IBR is a university-based research institute which, by policy, includes students as members of its research staff, and regards training and development of research personnel as part of its mission of contributing to knowledge and understanding of human behavior in modern society. As a consequence, IBR faculty members are expected to be scholars, scientists, writers, lecturers, consultants, and teachers, with substantive as well as methodological expertise in the behavioral sciences. IBR faculty promotion policy is subject to the general policies of Texas Christian University.

2. At the entry level (Assistant Professor), these qualities are judged by perusal of educational records, research reports and publications, letters of recommendation, and interviews in which the entire faculty participate and vote. For evidence of growth, the faculty use various sources of information, as follows:

research: proposals prepared and funded, seminar reports, technical reports, publications accepted by reputable journals, invitations to lecture or report, published reviews, requests for advice and consultation, and the like;

scholarship: theoretical and research papers, references to and citation of work, reputation among colleagues, peers, and students, comments on and reviews of published work, influence on the thought, research, and practices of an area or field, invitations to present colloquia, lectures, and to participate in symposia, and the like;

teaching: quality of students attracted and taught by the professor; scope, level, and reputation of courses, innovative methods and content, and special projects. IBR faculty members are all expected to qualify as members of

the graduate faculty and to teach in a preceptor relationship with students, who function as graduate assistants, and to direct independent research as well as dissertations and thesis. Individual, one-to-one teaching is one of the most important teaching functions for all IBR faculty, although some faculty members have contracts to teach formal courses in one or another department or school.

3. As academicians and professionals and as members of the TCU and IBR faculty communities, IBR faculty members are expected to assume responsibility for participating in professional and service activities to facilitate institutional operations and relationships with the lay and professional constituencies to which they and the University have allegiances. This is a means of enhancing individual and institutional influence and also of promoting the goals of the institution through such individual effort. As a result, IBR faculty are expected to participate as members of faculty committees, to attend University functions as representatives of the IBR, to provide speaking, advisory, and consulting services in the Fort Worth community, to participate in the meetings of the appropriate regional and national associations, to present papers, and to communicate with scholars, scientists, and others in matters related to their academic and professional roles.

4. In evaluating faculty members' performance, evidence of growth in productivity and influence is taken into consideration. Influence includes service activities as well as scholarly and scientific work. No one is expected to excel in all aspects equally, and indeed the responsibilities of IBR faculty members vary to an extent that they differ in opportunities to excel in all aspects during any particular year. However, taking duties, opportunities, and particular situations fully into account, recommendations for promotion to Associate Professor will generally reflect strong evidence of growth from the entry level to a senior level of performance such that the individual can be considered as definitely launched on a significant career with full expectation that interests, areas of specialization and special expertise, and proficiencies demonstrated during the first four or five post-doctoral years will materialize into full fruition, recognition, and accomplishment. Recommendations for Full Professor will be made when the evidence indicates that such career expectations have been largely realized.

## IBR FACULTY

- S.B. Sells      Research Professor and Director  
Ph.D. (Psychology). Columbia University, 1936.  
Interactional theory, environmental psychology, personality and social, stress, organizational behavior, industrial and aerospace psychology, drug abuse and alcoholism treatment evaluation and epidemiology, multivariate research
- Robert G. Demaree      Professor of Psychology and Professor in the IBR  
Ph.D. (Psychology), University of Illinois 1950.  
Drug abuse evaluation research, drug abuse and health problems, epidemiology, personality research, psychometrics, measurement theory, mathematical modeling, computer simulation, multivariate and mathematical psychology
- Steven G. Cole      Associate Professor of Psychology and Associate Professor in the IBR  
Ph.D. (Psychology), Michigan State University, 1970.  
Social psychology, conflict and conflict resolution, drug abuse treatment taxonomy, alcoholism treatment research, family planning and population research, community psychology
- Lawrence R. James      Associate Professor in the IBR  
Ph.D. (Psychology) University of Utah, 1970.  
Industrial and organizational psychology, multivariate methods, measurement theory, causal analysis, leadership, motivation, climate and organizational development
- George W. Joe      Associate Professor in the IBR  
Ed.D. (Research Design) University of Georgia, 1969.  
Multivariate and mathematical psychology, measurement theory, drug abuse treatment evaluation research, community health epidemiology and evaluation research

- D. Dwayne Simpson Associate Professor in the IBR  
Ph.D. (Psychology) Texas Christian University, 1970.  
Drug abuse treatment evaluation research, design, taxonomy of drug abuse patterns, post-treatment followup studies, management information systems, psychophysiology, illness behavior, respiration, smoking
- Roderick Crandall Associate Professor in the IBR  
Ph.D. (Psychology) University of Michigan, 1974.  
Group and interpersonal phenomena, applied social psychology, leisure, environment, quality of life and organizations, professional and methodological issues - measurement, reviewing procedures and ethics
- LaVerne D. Knezek Assistant Professor in the IBR  
Ph.D. (Education and Business Administration) North Texas State University, 1972.  
Epidemiology of drug abuse, computerized information systems, educational planning research, personnel management, regional planning, career planning
- Jack M. Greener Assistant Professor in the IBR  
Ph.D. (Psychology) University of Houston, 1975.  
Industrial and organizational psychology, personnel selection, measurement theory, computer simulation, leadership, motivation

RESEARCH STAFF

B. Krishna Singh, Ph.D.	Research Sociologist
John Hater, Ph.D.	Research Psychologist
Richard Hudiburg, Ph.D.	Research Analyst
Evan D. Stackfleth, Ph.D.	Research Psychologist
L. James Savage, M.A.*	Research Psychologist
David Arno, B.A.*	Research Assistant
Elizabeth Cole, M.A.	Research Associate
John Garland*	Research Analyst
Michael R. Lloyd, B.A.	Programmer
Janice F. Neman, M.A.	Research Associate
Leslie James, B.A.	Research Assistant

DAEDAC STAFF

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Marianne Babitch, M.L.S.	Acquisitions Librarian
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Audrey Vanderhoof, M.A.T.	Information Specialist
Marie Crowe, M.L.S.	Assistant Acquisitions Librarian.
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Urmil Minocha, Ph.D.	Research Analyst
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Linda D. Scherer, M.A.	Retrieval Specialist
Karen M. Kroh	Data Technician
Carol S. Morton, B.S.	Statistical Abstractor
Margaret Rouse, Ph.D.	Statistical Abstractor
Carolyn Atkins, B.A.	Statistical Abstractor
Robin Reger, B.A.	Editorial Assistant

RESEARCH ADMINISTRATION

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Martha G. Webb, M.S.	Tape Librarian
Janet O. White	Tape Librarian

GRADUATE FELLOWS

Walter S. Booth, IV, M.A.*	Graduate Research Fellow
John Bruni, M.A.*	Graduate Research Fellow
Bennett Fletcher, M.A.*	Graduate Research Fellow
Thomas Hilton, M.S.*	Graduate Research Fellow
Alvin Jones, M.A.*	Graduate Research Fellow
Wayne E. K. Lehman, B.A.*	Graduate Research Fellow
Paul Nail, M.S.*	Graduate Research Fellow
Frank Shanahan, B.A.*	Graduate Research Fellow
Marion Young, B.A.	Graduate Research Fellow

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\* Doctoral Candidate

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Lorraine Weaver	Secretary
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\* Doctoral Candidate

Consultants, 1979

John C. Ball, Ph.D. Professor, Dept. of Psychiatry, Temple University	DAEDAC Advisory Committee
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Edward Senay, M.D.  
Department of Psychiatry,  
University of Chicago

DAEDAC Advisory  
Committee

John Wackwitz, Ph.D.  
Denver, Colorado

Research Consultant

## FUNDED RESEARCH - 1979

1979 Expenditures

## SUBSTANCE ABUSE

## GRANTS

National Institute on Drug Abuse (NIDA)

Grant No. 1 H81-DA-01598 (initiated in August, 1974)

Total award to date - \$3,589,109. \$369,421.  
 Post-treatment Follow-up of DARP Cohorts 1, 2, and 3.

Grant No. DA 01765 (initiated in September, 1977)

Total award - \$508,760. 290,694.  
 Social Factors and Drug Use in an Urban Population.

Grant No. DA 01931 (initiated in July, 1977)

Total award - \$315,381. 74,472.  
 Treatment for Drug Abuse: Use of an Integrating Model.

Grand No. 8R01-DA-01400 (initiated in April, 1975)

Total award to June 21, 1979 - \$1,170,428. 107,371.  
 Drug Abuse Epidemiology Data Center (DAEDAC).

## CONTRACTS

Contract No. 271-79-5801 (6-22-79 to 8-31-80)

Total award - \$526,161. 218,712.  
 Drug Abuse Epidemiology Data Center (DAEDAC).

Contract No. 271-78-1304 (5-29-78 to 5-31-79)

Total award - \$53,475. 15,420.  
 Secondary Data Analysis of the DAEDAC Data Base.

Contract No. 271-78-5701 (9-28-78 to 3-31-80)

Total award - \$198,966. 156,983.  
 CODAP and NDATUS Assessment Project (CANAP).

Contract No. 271-79-4710 (9-28-79 to 9-27-80)

Total Award - \$85,479. 14,897.  
 Drug Abuse Indicator Methodology Project.

1979 Expenditures  
Continued

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National Institute of Alcohol Abuse and  
Alcoholism (NIAAA)

Contract No. ADM 281-76-0024 (6-29-76 to  
3-31-79)

Total award - \$177,988. 307.  
Assessment of Combined Treatment for  
Alcohol and Drug Abuse Clients.

INDUSTRIAL - ORGANIZATIONAL RESEARCH

CONTRACTS

Leadership-Organizational Effectiveness in the  
U.S. Navy

Office of Naval Research

Contract No. N001-72-0001 (1-1-78 to 12-31-79)

Total award - \$160,000. 86,483.  
Organizational Characteristics and Personnel  
Effectiveness in the Framework of Social  
System Analysis.

Air Traffic Controller Training Environments

Federal Aviation Administration

Contract No. LGR-8-0262 (9-19-78 to 4-19-80)

Total award - \$83,436. 54,996.  
Identification of Environmental Factors  
Associated with Retention and Success in  
the Air Traffic Control Specialist Training  
Program.

Airline Pilot Selection

American Airlines, Inc.

continuing, since January, 1965 104,936.

Trans World Airlines

continuing, since September, 1978 54,957.

Aerospace Medical Associates, Dallas (for Texas  
International Airlines)

continuing, since March, 1979 3,322.

Airline Mechanic Selection

Eastern Airlines, Inc.

1,938.

Human Factors Research

General Dynamics, Inc.

Total award - \$2,832. 800.

Comparative Study of Pilot Instructor  
Preference for Side-by-Side vs. Tandem  
Seating in Primary Trainer Aircraft.

Total \$1,555,709.

## IBR RESEARCH PROGRAM - 1979

## DRUG ABUSE GRANTS - NIDA

Post-treatment Followup Study of DARP Cohorts 1, 2, and 3.  
Grant 1 H81 - DA 01598, National Institute of Drug Abuse  
 (NIDA)

Initiated 1974. Total award. \$3,589,109. (1979 expenditure - \$369,421.)

Investigators. Dr. Simpson, Mr. Savage, Mr. Lloyd, Dr. Demaree, Dr. Joe, Dr. Singh.

This project, initiated in 1968, has produced more systematic information on the effectiveness of drug abuse treatment and associated problems than any other source and has been widely quoted and referenced throughout the United States and abroad. During 1979 an invited summary report of the research was published by the United Nations in the January-March issue of its Bulletin on Narcotics. That summary was an abridged version of a more extensive paper prepared in response to an invitation from the editor of the British Journal of Addiction, which will appear in the June, 1980 issue.

DARP is an acronym for the initial letters of the Drug Abuse Reporting Program, employed under predecessor contracts between 1969 and 1974 to collect longitudinal, prospective data on clients admitted to federally supported drug treatment centers in order to establish a data base for the evaluation of treatment effectiveness. The total file includes admission (background and baseline) information and bimonthly status (treatment received and outcome) reports on approximately 44,000 clients at 52 widely dispersed centers throughout the United States and in Puerto Rico. These were divided, for purposes of the research, into three admission cohorts (1. 1969-1971, 2. 1971-1972, and 3. 1972-1973). Previous reports have described research through 1977, involving development of the data files, evaluation of the four treatment modalities included (methadone maintenance - MM, therapeutic community - TC, outpatient drug-free - DF, and detoxification - DT), and correlative studies, based mainly on outcomes during the period that clients were in treatment, as well as the initial analyses of post-DARP follow-up data for samples from cohorts 1 and 2.

1979 was a productive year for this project; in addition to completing the field data collection for the post-treatment followup sample of the third DARP cohort (consisting of 1,496 former clients admitted to treatment during 1972-1973 and tracked during treatment up to final termination), the research group working with Dr. Simpson (Mr. Savage and Mr. Lloyd, and also Dr. Joe) completed 11 tech-

nical reports of research studies and five publications in the general literature, as well as five others accepted for publication; these are listed in the bibliography section of this report.

Four of the new studies completed were based on the Cohort 1-2 DARP followup sample (1969-1972 admissions) and six involved initial studies of the Cohort 3 sample (1972-1973 admissions). The manuscript prepared for the British Journal of Addiction was made available in preprint, technical report form, for the use of a special conference of IBR and NIDA staff and distinguished outside consultants, convened by NIDA at Dr. Sells' request to assess the implications of the DARP research program.

This conference was held at TCU on February 15-16, 1979, with Barry S. Brown, Ph.D., Chief of the Services Research Branch, NIDA, as chairman. The other participants were: from NIDA - Pierre Renault, M.D., Division of Research and Fred Altman, Ph.D., Division of Community Assistance; from IBR - S.B. Sells, Ph.D., D.D. Simpson, Ph.D., R.G. Demaree, Ph.D., G.W. Joe, Ed.D., B.K. Singh, Ph.D., L.J. Savage, M.A., and M. Lloyd, M.A.; and invited consultants - Robert L. DuPont, M.D., former Director of NIDA, Edward Senay, M.D., Professor of Psychiatry, University of Chicago, John A. O'Donnell, Ph.D., Professor of Sociology, University of Kentucky, and Carl Akins, Ph.D., Executive Director, National Association of State Alcohol and Drug Abuse Directors. This group endorsed the major results reported in the DARP research and the methodological strategies followed; its report dealt with ways in which the results can be utilized at the Federal and State levels in funding decisions, program planning, and monitoring of treatment programs, and included recommendations for further research both with the DARP data and by new investigations.

Upon completion of the planned research for the first round of followup studies, in 1980, involving further research on Cohort 3 and integrative studies involving all three cohorts, further followup of the DARP population is contemplated. The present studies examined the samples at three to six years after DARP admission to treatment. The next round, which could begin in 1981, will examine comparable samples at 12 to 15 years post admission, for Cohorts 1 and 2 and 10 to 15 years, for Cohort 3. In view of the expectation that approximately 1% of the addict population per year at risk will become abstinent in the "normal" course of their lives, the focus in later followup studies will be more on the life careers of this population and less on treatment outcomes. At the same time, the relation of these careers to earlier recorded treatment outcomes will be of major interest.

Social-Demographic Factors and the Prevalence of Drug Abuse  
in an Urban Population.

Grant No. DA01675. National Institute on Drug Abuse (NIDA) Initiated 1977. Total award. \$508,760. (1979 expenditure-\$290, 694.)

Investigators. Dr. Demaree, Dr. Hudiburg, Dr. Stackfleth, Ms. Neman, Mr. Fletcher, Ms. McCown, Ms. Olsen.

This study was undertaken to develop procedures for estimation of drug use prevalence in urban settings, based on sociodemographic data and selected indicators. The research involved sociodemographic descriptions and indicator rates for census tracts (and neighborhood areas), as predictors, and prevalence estimates derived from a school survey and a household survey in the city of Dallas, as dependent variables.

School survey. This survey was carried out as scheduled, but the household survey was postponed as a result of a cut in the first-year funds. This cut was restored in December, 1978 and plans developed earlier were implemented immediately. The school survey utilized an anonymous questionnaire covering use of tobacco, hallucinogens, amphetamines and stimulants, cocaine, alcohol, inhalants, opioids, marijuana, barbiturates and other sedatives, and a fictitious drug, with five categories of frequency of use during the past year (never, once or twice, three to nine times, ten to 49 times, and 50 or more times). An innovative feature of this instrument was the inclusion of a map to enable respondents to indicate their neighborhood of residence without reporting their specific addresses. This was administered to all students in attendance in grades 7 to 12 in public and private schools. The total number of completed survey forms was 44,521, of which c. 3000 were from private schools. These represented 79% of the average daily attendance for the six-week period during which the survey forms were administered in different schools.

The technical report (IBR Report 79-4, Neman, Demaree, & Stackfleth) reported data on prevalence of drug use, sex and grade level differences, patterns of drug use, a scale of total drug use, and neighborhood differences in drug use. For all respondents, any use during the past year was reported as follows: alcohol-67%, tobacco-43%, marijuana-34%, inhalants-12%, uppers-10%, downers-7%, psychedelics-7%, cocaine-5%, and opioids (including heroin)-3%. The three drugs for which any use was most common were also used most heavily (at least weekly): alcohol-12%, tobacco-13%, and marijuana-10%. Except for uppers, which were used equally by males and females, males reported any use of all other drugs more frequently than females. In general, prevalence of drug use increased with grade level. However, marijuana

use leveled out at grade 1.0 and any use of tobacco, at grade 9. Only 27% reported no use of any drug during the past year, and 37% used multiple drugs, and at least one drug 3 or more times.

The analysis of sociodemographic characteristics of neighborhoods in relation to prevalence of drug use yielded a number of interesting findings. Except for alcohol, relatively little variation in individual drug use was accounted for by neighborhood of residence. Nevertheless, those differences that occurred were predicted accurately by neighborhood characteristics. Overall, the results of this survey were comparable with those of other surveys.

Household survey (youth and adults). Based on the sociodemographic analyses by Hudiburg, Demaree, and Fletcher (Society for Multivariate Experimental Psychology, 1978) and by Hudiburg, Demaree, and Neman (National Conference on Drug Abuse, 1979), a sample of 45 census tracts was drawn for the household survey; the field work was carried out under a subcontract by C.P.I. Associates of Dallas, Texas. A sample of 4000 adults and all youth 12-17 years of age in the 4000 households was sought for a short-form questionnaire, and in addition, a long-form questionnaire was to be completed by 400 adults and 400 youth. Responses were obtained from 3547 adults and 1065 youth; refusals ranged from 6% to 35% per census tract.

In the adult sample, use of alcohol and marijuana was reported more frequently than the use of other drugs; heroin, least often. However, the reported use of drugs differed according to neighborhoods of residence and such differences proved to be substantially correlated with neighborhood characteristics. In particular it was found that census tracts with high residential stability and a relatively large number of husband-wife households and single family detached dwellings, tended to have a lower prevalence of alcohol, marijuana, and cocaine use than did other residential areas. Heroin prevalence, on the other hand, appeared to be associated with neighborhoods which were characterized as being socially disadvantaged, as suggested by a relatively large number of female headed households with children, large households with low income, and poverty. Analyses have been undertaken to elucidate such relationships as the foregoing, and to develop prevalence estimation formulas based on neighborhood characteristics and indicator variables.

As expected, prevalence rates for youth were lower in the household survey (alcohol-47%, tobacco-32%, marijuana-25%) than in the school survey, but were comparable to results of national and other regional surveys. The survey

results supported hypotheses and results of other research in which the drug involvement of youth has been related to the drug behavior and drug-related attitudes of peer and reference groups. The research also supported negative relationships between drug use and variables such as parental influence, religious behavior (e.g., frequency of church attendance), availability of drugs, irregularity in attendance at classes, and non-enrollment in school. Nineteen variables, including age and sex, accounted for 42% of the variance in alcohol use ( $R=.65$ ), 45% in marijuana use ( $R=.67$ ), and 28% in other drug use ( $R=.53$ ). An examination of stages of involvement in drug use supported the idea of a sequence in drug using behavior from licit to illicit drugs and pointed to marijuana as an intermediate step to use of other drugs. The study of the youth sample also addressed perceived positive and negative outcomes of drug use. Technical reports of the adult and youth portions of the household survey are in preparation.

Indicator data. In addition to such data as arrests, admissions to treatment, and overdose deaths, data were acquired for child abuse and neglect, juvenile referrals, and drug-related emergency treatments. Rates for these events by census tract are expected to serve either as explanatory variables or as indirect estimators of drug prevalence.

The major data analyses. Separate prevalence estimates will be constructed for the adult and youth portions of the population in each of the 45 census tracts covered by the household survey. These estimates will then be used as criteria in prediction studies (regression analyses) involving the sociodemographic and indicator variables.

To estimate the prevalence in neighborhoods not covered by the household survey, regression techniques will be employed. For the youth estimates, reliance will be placed on formulas which take school attendance status into account and draw upon the school survey data and sociodemographic profiles as predictor variables.

Although the major analyses will be focused on the prediction of the neighborhood prevalence of drug use from sociodemographic factors and a set of drug, health, and social indicators, the wealth of data acquired in the course of this research will enable the investigation of numerous significant issues in the area of drug epidemiology.

Treatment for Drug Abuse. Use of an Integrating Model.  
 Grant No. DA 01931. National Institute on Drug Abuse (NIDA)  
 Initiated July, 1977. Total award. \$315,381. (1979 expenditure - \$74,472.)  
Investigators. Dr. James, Dr. Crandall, Dr. Hater, Mr. Bruni, Mr. Hilton, Ms. Cole, Dr. Watterson.

This study was initiated in July, 1977 and completed in December, 1979. A request for supplemental funds was made to enable additional analyses of the data. The research completed is to be published as a NIDA services research monograph.

This study addressed the effects of drug treatment program environments on counselor attitudes and performance (Crandall, Bruni, Hilton, James, & Sells, 1979) and focused particularly on relationships between counselors' perceptions of their respective treatment environments and their attitudes and clinical performance. The results obtained were interpreted in terms of implications for program management and for counselor training and supervision.

The research represents an application of concepts and methods from the field of organizational psychology to the study of the environments of drug treatment units. From this vantage, treatment units were viewed as organizations, having premises, facilities, goals, policies, supervisors, staff workers, and clients, just as organizations in any field. Over 60 treatment units located in different regions of the United States were studied by means of questionnaires, interviews, and observation. Data were collected from program unit managers, supervisors, counselors, unit staff members other than counselors, and clients. The inquiry covered treatment goals and philosophy, methods, policies, supervision, perceptions of the situation by counselors and clients, and various outcomes for counselors and clients.

The goals of the research were (1) to understand how drug treatment organizations function as interactive social systems; (2) to measure how the environments of treatment organizations influence counselors' perceptions of their jobs and roles; and (3) to determine how these perceptions interact with counselor characteristics and dimensions of their work situations to influence counselor outcomes, such as morale, retention, performance as rated by supervisors and clients, and satisfaction.

The characteristics of work situations were measured in terms of "psychological climate." As a theoretical construct, psychological climate is defined as "the individual's cognitive representations (perceptions) of relatively

proximal environmental events, expressed in terms that reflect the psychological significance and meaning of the environment to the individual." Psychological climate was represented by scales covering different areas of organizational functioning, such as role characteristics (role conflict, role ambiguity, and overload) job characteristics (challenge and variety, autonomy, importance), leader behavior and leadership style (leader trust and support, leader goal emphasis, emphasis on workgroup cohesiveness, subordinates' influence on leader decisions, and leader influence on upper management), workgroup characteristics (cooperation and friendliness, pride), positive organizational factors (management concern and awareness, organizational identification, and financial rewards) and negative organizational factors (subunit conflict, staff politics, conflicting organizational channels, regulation, and goals). For counselors and other staff members, the scales included reflect employee perceptions of the work environment rather than veridical, objectively measured characteristics. The measures utilized in the present study were based on extensive research on a wide range of civilian and military organizations and represent dimensions that were found consistently across organizational types in those prior studies.

The results were interpreted separately for methadone maintenance and drug free programs, divided according to adaptive and change oriented treatment approaches (MM-A, MM-CO, DF-A, and DF-CO). With few exceptions, there were no differences of practical significance among the treatment group means for either the climate scales or the outcome measures; that is, counselors from different treatment types did not report substantially different climate perceptions, and there were no large differences on counselors' behavioral and attitudinal performance measures. However, there were differences among the four treatment groups in the relationships among these measures that were of major significance. These were summarized and used as the basis for prescription of a number of potentially important interventions that might increase counselor satisfaction and retention as well as program effectiveness. These were outlined in considerable detail in the technical report. Further studies planned involve the effects of program environment on counselor psychological climate and the effects of the total situation, including counselor outcomes, on client outcomes (the measure of program effectiveness).

# DRUG ABUSE CONTRACTS - NIDA

Drug Abuse Epidemiology Data Center (DAEDAC).

Contract No. 271-79-5801, National Institute on Drug Abuse (NIDA)

Initiated June 1, 1979 for 12 months. Total award.

\$526,161. (1979 expenditure - \$218,712.)

Formerly funded under Grant No. 8R01-DA-01400 (NIDA), since 1975.

Total NIDA award through May 31, 1979 - \$1,170,428. (1979 expenditure - \$107,371.)

Combined Grant and Contract expenditure for 1979 - \$326,083. Investigators. Dr. Knezek, Ms. Hopkins, Ms. Vanderhoof, Ms. Scherer, Dr. Minocha.

This unique research archive for drug abuse data and literature was initiated in 1973 as a research grant by the Special Action Office for Drug Abuse Programs (SAODAP) of the Executive Office of the President. In 1975 the grant was transferred to NIDA and continued under sponsorship of the Division of Research until 1979, when for administrative reasons it was converted to a contract under the Division of Scientific and Program Information. The 1979 contract included the work covered by NIDA Contract No. 271-78-1304 (May 29, 1979 - May 31, 1979), Secondary Analysis of the DAEDAC Data Base, which provided for DAEDAC services to NIDA, that were not covered under the grant (see discussion under Contract No. 1304.). The 1979 contract was issued on a "sole source" basis with the understanding that the continuing contract, after its expiration, would be awarded on an open bid, competitive basis, as required by new procurement regulations. This section covers work during the calendar year 1979 under the grant as well as the contract.

DAEDAC is a research and informational archive created for the purposes of: (1) preservation of original data of surveys, research studies, and record files that have utility for further (secondary) analyses relevant to the understanding of the initiation, continuation, discontinuation of use and associated problems in the use and abuse of illicit drugs; (2) compilation of a file of the significant research literature in this area; (3) acquisition, classification, coding for retrieval, and maintenance in separate computer files, of significant original data sets, with associated documentation, and research literature; (4) provision of data sets to members of the research community for further, secondary research and analysis; and (5) provision of bibliographic and analytic services, research, and information reports, based on the file holdings, to NIDA, state and local governments, university groups, and other persons and organizations, charging only the marginal costs of work involved. All original data sets in the DAEDAC files are protected with respect to confidentiality of information; new files are screened carefully prior to acceptance in the

computer file to assure that names, addresses, and other personal identification of subjects have been removed and that the anonymity of persons whose records are included is protected.

DAEDAC is an exemplification of the trend in recent years to establish research archives in important areas of human affairs and knowledge in order to maximize the research and informational potential of data collected and to support further valuable research for which the data are suited. Such research includes studies reaching across individual data sets, enabling analyses of trends over time, comparison of different population samples, regions, and the like, secondary research investigating problems that the data can address that were not studied by the original authors, and studies combining samples from different data sets that enable investigation of problems that the component sets were not appropriate to analyze. By supporting this activity, NIDA has enabled the creation of a data resource that has served its own research and informational needs and also provided a source of data that has been called upon increasingly by university, government, and other organizations concerned with significant informational needs in the drug abuse area. Because of the innovative coding and retrieval systems developed by the DAEDAC staff, data maintenance and retrieval procedures provide rapid response, comprehensive and accurate statistical and summary information, and authoritative coverage of a wide range of topics.

Because of the impressive document file compiled by DAEDAC and the supporting research library of IBR, related to its major drug abuse research, the IBR was selected to receive the library of the Drug Abuse Council which closed out its operations in the Spring of 1979. This library, considered one of the most comprehensive collections of literature on drug abuse in existence, is now an operational component of the IBR.

During 1979 over 1235 publications were acquired and assessed for suitability to be included in the DAEDAC literature file by the IBR Faculty-Staff Review Committee and 1017 studies were entered into this file. Twenty-two original data sets were also acquired for the Original Data File.

The 1979 contract broadened the scope of DAEDAC in two important respects. First, it authorized the inclusion of data files and literature on misuse and abuse of over-the-counter and prescription drugs; previously the file was limited to illicit drugs; and second, it extended the files from coverage limited to the United States to the status of

an international file. These changes were reflected in organizational growth, initially in the addition of a librarian for the international literature and a translator for the most commonly used languages, and in the adaptation of search procedures, review procedures, coding manuals, and processing procedures to the new requirements. By the end of 1979 substantial progress had been made in the acquisition of foreign drug literature and the identification of original data files. Since the literature covered extends back to 1960, the addition of new topical areas requires retrospective as well as current search and it is expected that the foreign literature will require several years before it is fully up to date.

In addition to providing services to DAEDAC users, the staff have participated in professional organizations and activities and contributed to the literature. Dr. Knezek attended the 1979 meeting of the International Association for Information Service and Technology in Ottawa, and Ms. Vanderhoof, the American Society for Information Science, in Dallas. Publications and papers presented are listed in the bibliography section of this report.

At the end of 1979 the DAEDAC bibliography of research reports concerning the social science aspects of licit and illicit drug use contained citations of 6,399 studies maintained in the archive. The classified bibliography, updated monthly, is available on a subscription basis. Of those research reports held by DAEDAC, 4,241 had been entered in the computerized retrieval system by the end of the year. Original (machine-readable) data files available for dissemination to research investigators and administrators totaled 120. DAEDAC offers research services to NIDA and other users on a service bureau basis; this includes literature review and synthesis and data analysis of any files for specific purposes.

#### AWARD OF DRUG ABUSE COUNCIL LIBRARY TO THE INSTITUTE OF BEHAVIORAL RESEARCH, TCU

Early in December, 1979, Texas Christian University announced the formal opening of the Drug Abuse Council Library Collection as part of the permanent holdings of the library of the Institute of Behavioral Research (IBR), adding significantly to the nationally prominent collection of drug abuse literature and data at the IBR. An open house for persons in the North Texas area was held in the IBR South Building on December 12.

A nationwide search was conducted to find a permanent home for the valuable collection when the Drug Abuse Council of Washington, D.C., ceased its operation late in 1978. TCU

was selected in February, 1979, for several reasons. One reason was the IBR's widely recognized research program in drug abuse treatment evaluation and epidemiology. Another reason for TCU's selection was the institute's intention to make resources of the library available to social scientists, analysts, and researchers across the country.

A key TCU-IBR program utilizing the library collection is the Drug Abuse Epidemiology Data Center (DAEDAC), a computerized archive of data relevant to research on drug abuse. DAEDAC, a National Institute on Drug Abuse project, maintains the largest drug use file of coded machine readable data (computer tapes) in the United States.

The Drug Abuse Council, founded in 1972, was a private foundation established to serve on a national level as an independent source of needed research, public policy and program guidance in the areas of drug use and misuse. It was supported by the Ford Foundation, Commonwealth Fund, Carnegie Foundation, Henry J. Kaiser Family Foundation, and the Equitable Life Assurance Society of the U.S.

The collection contains 3,000 books, 7,700 studies, a number of audio-visual materials and 60 volumes in a journal collection.

#### Secondary Data Analysis of the DAEDAC Data Base.

Contract No. 271-78-1304 (5-29-78 to 5-31-79)

Total award. \$53,475. (1979 expenditure - \$15,420.)

Investigators. Dr. Knezek, DAEDAC staff, IBR drug research staff.

Under the grant funding, DAEDAC could perform work requested by NIDA, as for any other user of DAEDAC information services, only if reimbursed for the marginal costs of the services. In the case of NIDA, a federal agency, this required negotiation of a specific purchase order for each assigned task. The result was that many NIDA staff members found the procedure unduly complicated and needed services were frequently not requested. In May, 1979, after considerable study, a service contract was granted to IBR that provided arrangements for DAEDAC services to be provided to NIDA staff members with only minimum formality. The contract provided a single channel within NIDA for communication on service requests that worked reasonably efficiently. Shortly after the contract was let, Dr. Sells, Dr. Knezek, and Mr. Matthews made a presentation to the NIDA staff and this was followed by a series of conferences with groups within each of the NIDA divisions. By the end of 1978 the DAEDAC workload on NIDA-originated information, retrieval, and analysis requests reached a level that confirmed the utility of these services for the agency. The contract was continued until the 1979 DAEDAC contract, which replaced the DAEDAC grant, was approved. The new contract included specific provision of DAEDAC services to NIDA.

CODAP and NDATUS Assessment Project (CANAP).  
Contract No. 271-78-5701 (9-29-78 to 1-31-80).  
Total award. \$198,966. (1979 expenditure - \$156,983.)  
Investigators. Dr. Joe, Dr. Singh, Mr. Garland, Mr. Lehman

This complex and innovative study utilized archival data from two national statistical report series maintained by NIDA and census data to investigate neighborhood, client, and clinic characteristics associated with treatment clinic effectiveness and client outcomes in treatment. Although the source data were designed for management monitoring purposes and not for evaluation research, the data were analyzed following a research model and contributed important new knowledge of clinical as well as management importance.

The CANAP project was initiated by the NIDA Division of Scientific and Program Information (DSPI), which is responsible for the national data systems, CODAP (Client Oriented DATA Acquisition Program) and NDATUS (National Drug Abuse Treatment Utilization Survey). CODAP is completed at admission and at discharge on every person (client) admitted to treatment by every treatment unit (clinic) providing drug abuse treatment under federal funding and includes Veterans Administration and Bureau of Prisons treatment programs as well as programs funded directly by NIDA. The CODAP reports were initiated in 1974 to provide management data and policy-relevant information to NIDA and the states. NDATUS is an annual survey of treatment clinics in the United States developed as a management instrument to estimate treatment capacity, in terms of client "slots" available and utilized, and contains information on the types of treatment provided, facilities, location, staffing, and other relevant items. Having decided (1) that it needed information on clinic effectiveness and clinic characteristics (within treatment modalities) associated with clinic effectiveness, and (2) that such information might be developed through research using CODAP and NDATUS data, DSPI outlined its requirements and issued a call for competitive proposals to pursue this research. The result of the competition was the award of this contract to IBR.

Two parallel studies were carried out, one in which the treatment clinic was the unit of analysis, and the other in which the individual client was the unit of analysis. The treatment modalities of major concern were drug free-outpatient (DFO), drug free-residential (DFR), and methadone maintenance-outpatient (MM). By restricting the data to the first half of 1977, it was possible to obtain reasonably complete treatment data for the then latest available six-month admission cohort of 114,080 clients, admitted to 1860 clinics. For the final analyses, there were 1,124 clinics

with 90,524 clients that met several requirements used in defining the final sample: at least minimal size, located in the 50 states, and in both the CODAP and NDATUS files. The clinic study, for which CODAP were aggregated was a pioneering investigation since virtually all previous research on treatment effectiveness had been at the client level. The comparison of aggregate-clinic data and client data was highly instructive and the clinic data yielded new information that could not have been obtained through the study of individual clients.

Outcome measures of treatment effectiveness, at both aggregate and individual levels, were indices of retention - time in treatment and type of discharge (unfavorable outcomes were indicated by the categories quit or expelled), which had been shown in prior research to be highly correlated with measures of posttreatment effectiveness. Five categories of predictors, representing socioecologic characteristics of neighborhoods from which clients were drawn, sociodemographic and deviance measures for clients, and clinic attributes and clinic staffs and services were related to outcomes by path analysis methods. In the client study, an additional predictor category - individual client characteristics, was added.

Among the major results of the project were the following: (1) The path models utilized in both studies were found to be useful in explaining retention and indicated numerous factors that could be interpreted as causes of treatment effectiveness, (2) Although not anticipated, one of the most important discoveries was that the DFO treatment modality included two distinct treatments - one oriented to the treatment of opiate addicts, and the other to nonopiate users. This development reflects the changing nature of drug abuse treatment and was not perceived in earlier studies involving 1969 to 1973 admissions, although substantial numbers of opiate users were seen in DFO-type clinics in those years, (3) Clinic per capita expenditure, which was assumed to be positively related to outcomes, had a significant negative relationship to retention, but a strong positive relationship to turnover (a measure constructed by dividing the number of admissions during a period by the number of authorized client "slots"). This implied that clinic funds were spent on processing clients in and out of treatment and pointed to turnover as an effective measure to monitor clinic effectiveness, (4) Client characteristics, such as criminality and opiate use, were important determiners of outcome, in agreement with other research.

Drug Abuse Indicator Methodology Project.

Contract No. 271-79-4710 (9-29-79 to 9-27-80)

Total award. \$85,479. (1979 expenditure - \$14,897.)

Investigators. Dr. Demaree, Dr. Hudiburg, Dr. Joe, Dr. Singh, Dr. Stackfleth.

This project was established to aid the Forecasting Branch of the Division of Resource Development, NIDA, in its responsibilities for prevalence estimation of drug use in the United States. The research plan is to obtain suitable data and compute estimates of the prevalence of use of particular drugs in metropolitan areas by a two-stage process of (1) calculating a drug problem index, based on indicators, that is statistics concerning relevant variables, such as admissions to drug treatment, drug related arrests, overdose deaths, and hospital emergency room visits, and (2) converting the problem index to a prevalence estimate by regression on estimates of prevalence that were made independently of the problem index.

Five specific studies are involved, to produce prevalence estimation methodologies for heroin, cocaine, and other drugs. In these studies, the unit of analysis is the Standard Metropolitan Statistical Area (SMSA). The methodology investigated in the present project is modeled after a Heroin Problem Index, that was developed by Person, Retka, and Woodward (DHEW Publication No. 76-367, 1976 and 77-439, 1977), based on 24 SMSA's covered by a reporting program for hospital emergency rooms and medical examiners known as the Drug Abuse Warning Network (DAWN). The present project is intended to extent the methodology both by including additional SMSA's and by including additional indicator variables in the prevalence estimation process.

The initial start-up efforts during the last quarter of 1979, were occupied with (a) procurement and review of published reports and documents containing indicator data; (b) extraction and processing of relevant data; and, (c) inquiries concerning sources of data for independent estimates of the prevalence of heroin and cocaine use during the 1976-78 period.

Data acquisition is continuing, and will include data from the Drug Enforcement Administration on arrests, pharmacy thefts, and drug price and purity; serum hepatitis cases from the National Communicable Disease Center, and population characteristics of SMSA's from Bureau of the Census reports.

Contacts with members of NIDA's Community Correspondents Group concerning sources of data for estimating prevalence have been made and are viewed as being of the utmost importance to the project. These individuals are not only closely attuned to the drug picture in the urban areas they represent, but are highly regarded professionally and constitute perhaps the best source of advice and constructive comment available for the present project.

#### SUBSTANCE ABUSE CONTRACTS - NIAAA

##### Assessment of Combined Treatment for Alcohol and Drug Abuse Clients,

Contract No. ADM 281-76-0024 (6-29-76 to 3-31-79)

Total award. \$117,988. (1979 expenditure - \$307.)

Investigators. Dr. Cole, Ms. Cole, Mr. Lehman.

At the federal level, treatment programs for alcohol and drug abuse clients have been administered separately by NIAAA and NIDA, and organizations that treat both types of clients have been required to obtain separate support and to carry the increased administrative burdens of working with and reporting to two separate agencies. In large cities this has not presented particular problems because the numbers of clients in both categories have generally favored large programs. Many smaller communities, mainly in "middle America" have had ongoing alcohol treatment programs and more recently have experienced a need for drug treatment but were not prepared to initiate separate programs; these communities have frequently included the drug clients in their alcohol programs. Since most of these were not federally funded, the combination of drug and alcohol clients in the same treatment activities was administratively feasible. Meanwhile, a number of experienced therapists have begun to advocate combined treatment for substantive rather than purely administrative reasons, with emphasis on a rationale that focuses on the client and his or her problems rather than on the substance abused. This incipient movement appears to have gained some momentum and leaders in NIAAA and NIDA have shown an interest in obtaining critical information, as opposed to opinion, on the merits of combined treatment. The present project was undertaken at the request of NIAAA and the reports resulting from it have generated wide interest.

The first study, Assessment of Inpatient/Residential Combined Treatment for Alcohol and Drug Abuse Clients (Cole and Cole, IBR Report No. 77-12) involved a sample of five programs that began and continued as combined programs, five

that began as alcohol treatment programs and became combined programs, and five each of separate alcohol and drug treatment programs administered by the same agency. These were all inpatient or residential programs. Subsequently, at the request of NIAAA, this research was repeated on a similarly constituted sample of outpatient combined programs. This resulted in a second report, comparing the inpatient and outpatient results (IBR Report No. 78-5, by Cole, Lehman, and Cole). A report of this research was accepted for publication in the American Journal of Alcohol and Drug Abuse, in 1979.

The methodology of both studies involved field interviewing and completion of questionnaires by agency heads, program directors, treatment staff, and samples of clients at each program. The emphasis was on perceptions of treatment effectiveness; prospective outcome measurement was not feasible within the constraints of time and funds, although such research was strongly recommended as a followup to the present research. The results obtained suggested that the major problem with inpatient combined treatment is the integration of alcohol clients into combined treatment and the integration of all clients into society after treatment. Outpatient treatment was perceived to foster attrition because of the pressures of society and the ease of leaving the program. Combined treatment appeared to require more staff training than separate treatment, but has the potential for effective results. Separate treatment was most preferred by older, white, alcohol abusers.

#### INDUSTRIAL AND ORGANIZATIONAL RESEARCH

##### Assessment of Needs for Human Resource Management and Development of Principles and Guidelines for Management and Development of Enlisted Personnel.

Contract No. N001-72-0179-0001 (1-1-79 to 12-31-79).

Office of Naval Research (ONR).

Total award. \$83,000. (1979 expenditure - \$86,483)

Investigators. Dr. James, Dr. Hater, Mr. Irons, Mr. Jones.

The ONR contract for 1979 involved new phases of organizational research, but predicated on research and development accomplished in prior years. This contract involved research on the measurement of psychological climate and development of theoretical models of optimal "person-environment fit," applying instruments and concepts tested earlier on civilian personnel in industrial settings, to enlisted aircraft maintenance personnel at Naval Air Training Stations in the Southwestern part of the United States.

An objective of this research was to develop principles and guidelines for leaders (e.g., chief petty officers) that could be incorporated in training exercises for the effective management of enlisted personnel.

The data obtained at the Naval Air Training Command were designed to provide information on (1) correlates of supervisor behaviors toward each subordinate, in the context of superior-subordinate dyads, (2) relationships between superior behaviors and subordinate psychological climate perceptions (PC), and (3) relationships between subordinate PC and individual subordinate outcomes (performance, anxiety, satisfaction with job, and intention to reenlist). Analyses of similar data in the prior studies on civilian samples had indicated that (a) supervisors are influenced by the behaviors and attitudes of subordinates in their behaviors toward subordinates, (b) supervisors' behaviors are also related to subordinates' perceptions of the supervisor, and (c) subordinates' perceptions of their own psychological influence (a key PC variable) are important predictors of performance, anxiety, satisfaction, and intention to remain on the job.

Results of a study on 362 subordinates and 107 supervisors in the Air Training Commands demonstrated that the results obtained in the civilian studies were generalizable to Navy enlisted personnel. For example, it was shown that subordinates with high achievement motivation and self-esteem were attentive to opportunities to influence decisions made by their supervisors in both high and low overload conditions (e.g., high versus low pressure for productivity). The same subordinates also employed their perceptions of influence to make behavioral decisions and to formulate affective reactions (e.g., satisfaction with the Navy). In contrast, subordinates with low motivation to achieve and low self-esteem withdrew psychologically from high overload conditions. That is, these individuals were not selectively attentive to the behaviors of the supervisor, nor did they form cognitive contingencies between their environmental perceptions and affective/behavioral reactions. The results of this study suggested that (Navy) supervisors need to be sensitive to differences among their subordinates, and to identify leadership behaviors that are effective for given types of subordinates in given types of situations. Training instruments designed to assist Navy supervisors in the development of these capabilities were constructed, and are being adapted for use by the Human Resources Management Department, Naval Aviation School Command, Pensacola, Florida, under the direction of Lieutenant Commander Ray C. Beach.

A technical report describing the research above is available in IBR Technical Report No. 79-13 (Perceptions of psychological influence: Bridging the gap between situational antecedents and behavioral and affective criteria, by James, Hater, and Jones). Additional technical reports/publications completed in this study were as follows:

- (1) Perceived job characteristics and job satisfaction: An examination of reciprocal causation. (IBR Technical Report No. 79-5, by James and Jones -- to be published in Personnel Psychology, in press);
- (2) Tests of parallelism in subgrouping moderator analysis and sequential moderation (IBR Technical Report No. 79-15, by James, Joe, and Irons);
- (3) Psychological climate: Dimensions and relationships of individual and aggregated work environment perceptions (Jones and James, Organizational Behavior and Human Performance, 1979, 23, 201-250);
- (4) Correlates of psychological influence: An illustration of the psychological climate approach to work environment perceptions (James, Gent, Hater, and Coray, Personnel Psychology, 1979, 32, 563-588);
- (5) A statistical rationale for relating situational variables and individual differences (James, Demaree, and Hater, Organizational Behavior and Human Performance, in press.) (An early report on this subject presented in IBR Technical Report No. 79-1 by Demaree, James, and Hater);
- (6) The unmeasured variables problem in path analysis (James, Journal of Applied Psychology, in press); and
- (7) Psychological climate: Theoretical perspectives and empirical research (James and Sells, in D. Magnusson (Ed.), Toward a psychology of situations: An interactional perspective, Lawrence-Erlbaum, in press).

Identification of Environmental Factors Associated with Retention and Success in the Air Traffic Control Specialist Training Program.

Contract No. LGR-8-0262 (9-19-78 to 4-9-80)

Federal Aviation Administration

Total award. \$83,436. (1979 expenditure - \$54,996.)

Investigators. Dr. James, Dr. Hater, Mr. Irons, Mr. Nail, Mr. Shanahan.

At the request of the Federal Aviation Administration (FAA), this study was undertaken to ascertain whether the Air Traffic Control (ATCS) Training Program provided the

same opportunity for all students, irrespective of minority status or sex. Of particular concern was the identification of environment factors that might assist in explaining the proportionately higher failure rate among females and minorities in the ATCS Training Program. More specifically, the study was designed to investigate differences in the perceived training environment among subgroups of trainees defined by sex and minority-majority status in relation to attitudes (e.g., satisfaction), living conditions during training, personality measures (e.g., self-esteem, achievement motivation, alienation, and internal-external locus of control), and performance in training. During the initial period of this study, in 1978, major effort was devoted to reviews of literature on educational climate, sex differences, race differences, and other studies of air traffic control specialists. Members of the staff interviewed administrators, instructors, and students from the ATCS Training Program and FAA officials in Washington. The information gained from the literature reviews and interviews was utilized in preparation of data collection instruments.

During the first part of 1979, the data collection instruments were constructed, field tested, and finalized after revisions by FAA representatives, including administrators in Washington and at the FAA Academy Training Program for Air Traffic Control Specialists in Oklahoma City. The remainder of 1979 was devoted to collection of data from students enrolled in the ATCS Training Program, at the Academy. A substantive report is due in April, 1980.

<u>Airline Pilot Selection Research</u>	<u>1979 expenditure</u>
American Airlines (continuing, since 1975)	\$104,936.
Trans World Airlines (continuing, since June, 1978)	54,957.
Aerospace Medical Associates, Dallas (for Texas International Airlines (continuing, since March, 1978))	3,322.
<u>Investigators.</u> Dr. Greener, Dr. James, Mr. Arno, Mr. Booth	

The IBR has been involved in airline pilot selection since the early 1960's, when a major study was carried out for Eastern Airlines. Dr. Sells has consulted with American, United, Eastern, and other airlines regularly during the intervening years. The current studies for American and Trans World Airlines have involved full-scale test-battery development and validation and the American study has involved other phases, described below. The testing for Texas International will eventually permit a validation study, but this has progressed on a smaller scale.

### American Airlines - Validation Research

During 1979 validation studies were initiated for two samples of pilots. One sample, consisting of 746 applicants, of whom 325 were hired, was tested with the selection battery developed for American during 1977-1978; this group completed the probationary year in the Flight Engineer position in 1979. The second sample consisted of 1665 applicants, of whom 586 were hired; this sample was tested during 1978-1979 and is expected to complete probation in 1980, and only preliminary performance criteria were available for them during 1979. The data for these samples were used to cross-validate a preliminary predictor composite developed on an earlier sample and also to obtain initial validation of new predictor instruments introduced into the battery since the earlier validation studies.

### American Airlines - Related Studies

Minority testing. Through cooperation of the Organization of Black Airline Pilots (OBAP), the IBR staff has administered the American Airlines selection battery to volunteer members of this organization during meetings in Nashville, San Francisco and New York City. Through 1979 data have been collected on 35 black pilots. Analyses to investigate the "fairness" in the test battery are continuing.

Concurrent testing. A special project, involving the testing of AAL captains and first officers who volunteered to participate, was initiated in 1978. The major purposes of this project has been to obtain normative data on the test battery, to investigate the effects of age and experience on certain variables, and to provide a comparison group for the minority group analyses. During 1979 IBR staff members visited nine major AAL locations and tested 255 pilots (153 captains, 87 first officers, 15 flight engineers). Analysis of these data in conjunction with the minority group is continuing.

### Trans World Airlines

Applicant testing began in June, 1978 with a provisional test battery assembled for this purpose while at the same time research efforts were directed toward the development of an improved test battery for TWA and specific procedures to be used in training and on-the-line to evaluate the performance of flight engineers (pilots) during their probationary year. A revised pilot selection test battery was installed in April 1979, after 94 candidates out of 591 who had been administered the original test battery had been hired. An additional 300 applicants were tested with the

revised battery and 91 additional pilots were hired before the testing program was interrupted in July 1979, when recruiting of new pilots was halted by the company. Validation analyses on the sample of 94 pilots hired who had taken the original battery resulted in the development of a provisional predictor composite for operational use.

#### Texas International Airlines

A testing program for the selection of pilots for Texas International Airlines was introduced in 1978 in cooperation with Aeromedical Associates of Dallas, who conduct the psychological and medical evaluations for Texas International. This program has a small applicant flow and is expected to continue for several years before sufficient data are available to allow for a formal validation study.

#### Airline Mechanic Selection

##### Development of a Replacement Selection Test Battery for Licensed Aviation Mechanics.

Eastern Airlines (Fall, 1979) Total expenditure - \$1937.96.  
Investigators. Dr. Greener, Mr. Booth.

This study was undertaken at the request of Eastern Airlines to obtain replacement tests for Eastern's licensed (airframe & powerplant) mechanic selection battery, previously developed and validated by IBR. This was an urgent requirement since the security of the original battery had been violated. New tests were selected to provide similar measures of the basic components in the original battery and the new tests were normed on a sample of 188 licensed mechanic applicants who received both test batteries.

#### Human Factors Research

##### Comparative Study of Pilot Instructor Preference for Side- by-Side vs. Tandem Seating in Primary Jet Trainer Aircraft.

Contract No. 5-23246 (June, 1978 to April, 1979)  
General Dynamics, Fort Worth Division  
Total award - \$2,832. (1979 expenditure - \$800.)  
Investigators. Mr. Booth, Dr. Stackfleth.

This study was undertaken at the request of General Dynamics to provide a basis for an important decision on cockpit design for a new jet aircraft to be used as a military primary trainer. Relevant literature on cockpit design and instructional aids was reviewed and a number of human factors engineers and instructor pilots were interviewed for

suggestions concerning the critical issues involved. A questionnaire was then constructed and this was completed by 39 senior instructor pilots at Embry-Riddle Aeronautical University (Daytona, Florida) and at Eastern Airlines. The results from the questionnaires indicated that although pilot instruction can be performed in either seating arrangement, the side-by-side configuration was overwhelmingly preferred. The major reason for this preference was the belief that the side-by-side arrangement provides an optimal environment for instructional interaction and evaluation. In addition, there are also more subtle social interactions which can take place when the student and instructor are in the close proximity provided by the side-by-side configuration which, although not directly related to the abilities of the student upon graduation from the program, may be related to other important factors such as job satisfaction among instructors and attrition among student pilots.

## VISITORS TO IBR

January Robert Hopkins, President, and E. Morten Hopkins, Executive Vice President, National Mortgage Corporation of America.  
 Alex Richman, M.D., Professor of Psychiatry, Dalhousie University, Halifax, Nova Scotia.

February James W. Carper, Ph.D. and Paula Miller, Ph.D., CPI Associates, Dallas.  
 Robert L. DuPont, M.D., Former Director, NIDA.  
 Edward Senay, M.D., Professor of Psychiatry, University of Chicago.  
 John A. O'Donnell, Ph.D., Professor of Sociology, University of Kentucky.  
 Carl Akins, Ph.D., Executive Director, National Association of State Alcohol and Drug Abuse Directors, Washington, D.C.  
 Barry S. Brown, Ph.D., Chief, Services Research Branch, Division of Resource Development, NIDA.  
 Pierre Renault, M.D., Division of Research, NIDA.  
 Fred Altman, Ph.D., Division of Community Services, NIDA.  
 Nancy Jennings, Public Archives of Canada, Ottawa, Canada.  
 Curtis Grove, Grove Associates, Dallas.

March Lawrence Chaitkin, Ph.D., Division of Scientific and Program Information (DSPI), NIDA, (CANAP Project Officer).  
 Marshall DeVost and Tim Frank, ONR Office, Austin.  
 Capt. Richard Rahe, USN, MC., Commanding Officer, Navy Health Research Center, San Diego.  
 Robert C. Houston, Ph.D., Director, Training Support, American Airlines Flight Academy.  
 David L. Toole, Manager, Selection, American Airlines, New York.  
 Judy Matthews, Eastern Airlines, Personnel Division, Miami.  
 Willis Brown, First Officer, American Airlines, President, Organization of Black Airline Pilots.

April Maxwell Turner, Bahamas Air, Freeport, Nassau, Bahamas.  
 Robin Bennett, National Mortgage Corporation of America, Dallas.  
 Dave Northcutt, National Mortgage Corporation of America, Dallas.

May Roy Griffin, Texas Area 5 Health Services Agency, Irving, Texas.  
 Benjamin Fruchter, Ph.D., University of Texas at Austin, Editor, Multivariate Behavioral Research.  
 Betty Perot, Perot Foundation, Dallas.  
 Lawrence Chaitkin, Ph.D. and Paul Seder, Ph.D., DSPI, NIDA (CANAP Project Officers).  
 David Rotger, Ph.D., Caracas, Venezuela, Personnel Consultant to VIASSA - Venezuelan Airlines.  
 Peter Chapman, M.D., Medical Director, and H.R. Conwell, M.D., British Caledonian Airlines, London, England.  
 Ralph Rabinowitz, Ph.D., VA Hospital, Dallas.  
 Nancy Coleman, Contracts Officer and Ann Blanken, DSPI, NIDA (DAEDAC Project Officers).  
 Frank Tims, Services Research Branch, NIDA (DARP and Integrating Models Project Officer).  
 Doyle Conine, National Mortgage Corporation of America, Dallas.

June E. Ross Perot, President, Electronic Data Systems, Dallas and Chairman of Governor's Commission on War Against Drugs.  
 Robert and E. Morten Hopkins, National Mortgage Corporation of America, Dallas.

July Robert Anderson, M.D., Medical Department, TWA.  
 Wilton Jewell, Director, Agency on Aging, Fort Worth.  
 Larry Strain, American Airlines Training Corporation.  
 Adel Fouad, M.D., Arab International Airlines, Egypt.

August Kenneth Z. Altshuler, M.D., Chairman, Department of Psychiatry, Southwestern Medical School, Dallas.  
 W.G. Matheny, Ph.D. and B. Matheny, Ph.D., Life Sciences, Inc., Bedford, Texas.  
 Tom Coughlin, DSPI, NIDA.

September Tom Taylor, Personnel Director, National Mortgage Corporation of America, Dallas.  
 Al Roberts, M.D., Associate Dean, and Kenneth Z. Altshuler, Chairman, Department of Psychiatry, Southwestern Medical School, Dallas.  
 Larry Wechsler and Linda Ingraham, Braniff International Airlines, Personnel Department.  
 Peter Vygantas, Ph.D., Senior Vice President, Americana Hotels.  
 David Stonner, Ph.D., ONR, Washington.

October John T. Dailey, Ph.D., Office of Aviation Medicine,  
FAA, Washington.  
Sue Pickens and Harold Van Patten, Texas Area 5  
Health Services Agency, Irving, Texas.  
Jack Franklin, Ph.D., Texas Department of Mental  
Health and Mental Retardation, Austin.  
Sidney Gael, Ph.D., General Electric Corporation,  
New York, Personnel Research.

November Byron R. Boyles, Director, Personnel and Linda  
Solakas, Personnel Resources Division, and  
Robert C. Houston, Director, Training Support,  
American Airlines.

December J. Arthur Woodward, Ph.D. and William McGarvey, Ph.D.,  
Department of Psychology, UCLA.

## IBR TECHNICAL REPORTS

- 79-1      Demaree, R.G., James, L.R., & Hater, J.J. A statistical rationale for relating situational attributes and individual differences, January, 1979, 23 p.
- 79-2      Simpson, D.D., Lloyd, M.R., & Savage, L.J. Follow-up outcomes in the first month after drug abuse treatment, February, 1979, 22 p.
- 79-3      Sells, S.B., & Simpson, D.D. The case for drug abuse treatment effectiveness, based on the DARP Research Program, February, 1979, 35 p.
- 79-4      Neman, J.F., Demaree, R.G., & Stackfleth, E.D. Drug use by school attending youth in Southwestern City, 1978, February, 1979, 88 p.
- 79-5      James, L.R., & Jones, A.P. Perceived job characteristics and job satisfaction: An examination of reciprocal causation, April, 1979, 62 p.
- 79-6      Simpson, D.D., & Lloyd, M.R. Client evaluations of drug abuse treatment in relation to follow-up outcomes, March, 1979, 22 p.
- 79-7      Booth, W.S., IV. A comparison of side-by-side and tandem seating arrangements in primary trainer aircraft, April, 1979, 35 p.
- 79-8      Simpson, D.D., Savage, L.J., & Lloyd, M.R. Outcomes five years after admission to drug abuse treatment. June, 1979, 24 p.
- 79-9      Simpson, D.D., Savage, L.J., & Joe, G.W. Treatment histories of clients treated for drug abuse, May, 1979, 22 p.
- 79-10     Simpson, D.D., & Lloyd, M.R. Alcohol use by opioid addicts during a four year follow-up after drug abuse treatment, August, 1979, 38 p.
- 79-11     Simpson, D.D. Employment by opioid addicts during a four year follow-up after drug abuse treatment, October, 1979, 38 p.
- 79-12     Savage, L.J., & Simpson, D.D. Criminal behavior of opioid addicts during a four year follow-up after drug abuse treatment, October, 1979, 47 p.
- 79-13     James, L.R., Hater, J.J., & Jones, A.P. Perception of psychological influence: Bridging the gap between situational antecedents and behavior and affecting outcome, October, 1979, 35 p.

- 79-14 Simpson, D.D., Lloyd, M.R., & Savage, L.J. Sample Design and data collection for the follow-up study of 1972-1973 DARP admissions, October, 1979, 39 p.
- 79-15 James, L.R., Joe, G.W., & Irons, D.M. Tests of parallelism in subgrouping moderator analyses and sequential moderation, November, 1979, 42 p.
- 79-16 Simpson, D.D., Lloyd, M.R., & Sells, S.B. Nonresponse bias in the follow-up sample of 1972-1973 DARP admissions, November, 1979, 17 p.
- 79-17 Joe, G.W., Singh, B.K., Lehman, W.E., Garland, J.C., & Sells, S.B. Retention outcomes of drug abuse treatment organizations, December, 1979, 122 p.
- 79-18 Crandall, R.P., Bruni, J.R., Hilton, T.F., James, L.R., & Sells, S.B. Perceived organizational characteristics of drug treatment units; overview and preliminary results, December, 1979, 222 p.
- 79-19 Simpson, D.D., & Savage, L.J. Treatment reentry and outcomes among opioid addiction during a four year follow-up after drug abuse treatment, December, 1979, 40 p.

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Sells, S.B., Crandall, R.P., Roff, M., Strauss, J.S. & Pollin, W. (Eds.) Human functioning in longitudinal perspective. Baltimore, Md.: Williams & Wilkins, December, 1979.

#### CONTRIBUTIONS TO BOOKS

James, L.R., & Sells, S.B. Psychological climate: Theoretical perspectives and empirical research. In D. Magnusson (Ed.), The Situation: An Interactional Perspective. Laurence-Erlbaum, in press.

Sells, S.B., & Simpson, D.D. Evaluation of treatment for youth in the Drug Abuse Reporting Program. In G. Beschner and A.S. Friedman (Eds.), Youth drug abuse: Problems, issues, and treatments. Lexington, Mass.: Lexington Books, 1979.

Singh, B.K., & Adams, L.D. The effects of extralegal factors on perceptions of certainty and severity of punishment. In S.E. Zimmerman and H.D. Miller (Eds.) Crossroads in Corrections: Designing Policy for the 80's. Cincinnati, Oh.: Anderson Publishing Co.

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- Cole, S.G., & Cole, E.A. Alcohol and drug abuse treatment: Perceived effectiveness in in-patient combined treatment programs. The American Journal of Alcohol and Drug Abuse, 6, 1979, 109-123.
- Greener, J.M., & Osborn, H.G. An empirical study of the accuracy of corrections for restriction in range due to explicit selection. Applied Psychological Measurement, 1979, 3, 31-41.
- James, L.R., Gent, M.J., Hater, J.J., & Coray, K.E. Correlates of psychological influence: An illustration of the psychological climate approach to work environment perceptions. Personnel Psychology, 1979, 32, 563-588.
- Jones, A.P., & James, L.R. Psychological climate: Dimensions and relationships of individual and aggregate work environment perceptions. Organizational Behavior and Human Performance, 1979, 23, 201-250.
- Sells, S.B., & Simpson, D.D. Implications for evaluation of drug dependency treatment based on data provided by a management information system. Addictive Diseases, 1979, 3, 533-554.
- Sells, S.B., & Simpson, D.D. On the effectiveness of treatment for drug abuse: Evidence from the DARP Research Program in the United States. Bulletin on Narcotics (United Nations), 1979, 31, 1-11.
- Simpson, D.D. The relation of time spent in drug abuse treatment to posttreatment outcomes. American Journal of Psychiatry, 1979, 136, 1449-1453.
- Simpson, D.D., & Lloyd, M.R. Client evaluations of drug abuse treatment in relation to follow-up outcomes. American Journal of Drug and Alcohol Abuse, 1979, 6, 397-411.
- Simpson, D.D., Savage, L.J., & Lloyd, M.R. Follow-up evaluation of treatment of drug abuse during 1969 to 1972. Archives of General Psychiatry, 1979, 36, 772-780.
- Singh, B.K., & Adams, L.D. Variations in self-reported arrests: an epidemiological perspective. Criminal Justice Review, Spring, 1979, 73-84.

Singh, B.K. State characteristics and admissions to drug treatments programs. Journal of Drug Issues, Summer, 1979, 413-424.

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- Simpson, D.D., & Savage, L.J. Temporal patterns of drug abuse treatment reentry and outcomes during a three year follow-up. Archives of General Psychiatry, in press.
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- Singh, B.K. Trends in attitudes toward premarital sexual relations. Journal of Marriage and the Family, in press.
- Singh, B.K. The effects of community structure on aggregated treatment outcomes of methadone maintenance programs. International Journal of the Addictions, in press.
- Watterson, O., Joe, G.W., Cole, S.G., & Sells, S.B. Impression management and attitudes toward marihuana use. Multivariate Behavioral Research, in press.

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- Crandall, R. Drug Treatment organizations: Research and policy questions (Chair.), Symposium at the Annual Meeting of the American Psychological Association, New York, September, 1979.
- Crandall, R., Bruni, J.R., Jr., & Hilton, T.F. Major differences among drug treatments. Perceptions of Outpatient Drug Treatment, S.B. Sells (Chair.), Symposium at the Annual Meeting of the Southwestern Psychological Association, San Antonio, TX, April, 1979.
- Crandall, R. Drug treatment climate: An interactionist approach (Chair.), Symposium at the Annual Meeting of the Texas Academy of Sciences, Arlington, TX, March, 1979.
- Demaree, R.G., & Hudiburg, R. Part-whole effects in Linear Model Analyses. Annual Meeting of the Psychometric Society, Monterey, CA, May 8, 1979.
- Demaree, R.G. Predicted criterion scores which yield an unbiased estimate of the Multiple-R. Annual Meeting of the Society of Multivariate Experimental Psychology, Los Angeles, CA, Nov. 3, 1979.
- Demaree, R.G., & Fletcher, B. A priori examination of predictor variables as a basis for sample selection. Annual Meeting of the Society of Multivariate Experimental Psychology, Los Angeles, CA, Nov. 3, 1979.

- Gent, M.J., James, L.R., & Hater, J.J. Predicting organizational identification: An interactional contingencies approach. Annual Meeting of the American Psychological Association, New York, Sept., 1979.
- Harrison, M.H., Gore, S., & Cole, S.G. Reduction of smoking: Coverant Control and Reinforcement, Annual Meeting of the Southwestern Psychological Association, San Antonio, TX, May, 1979.
- Hornick, C.W., & Demaree, R.G. Monte Carlo comparison of six methods of multiple linear regression. Annual Meeting of the American Psychological Association, New York, Sept. 4, 1979.
- Hudiburg, R.A., Demaree, R.G., & Neman, J.F. Neighborhood Differences in Reported Drug Use by School Attending Youth. National Conference on Drug Abuse, New Orleans, LA, August 26-31, 1979.
- James, L.R., & Sells, S.B. Psychological climate: Theoretical perspective and empirical research. Conference on The Situation in Psychological Theory and Research, University of Stockholm, June 17-22, 1979.
- James, L.R. Psychological climate: The role of environmental perceptions in drug abuse treatment programs. In R.P. Crandall (Chair.), Drug treatment organizations: Research and policy questions. Symposium at the Annual Meeting of the American Psychological Association, New York, Sept., 1979.
- Minocha, U. The Status of Children Born to and Reared by Drug-addicted Mothers, Interdisciplinary Symposium on "The State of the Child 1979," University of Texas at Arlington, October, 12, 1979.
- Sells, S.B. Symposium on selection and evaluation of air traffic controllers. Discussion of Presented Papers. Military Testing Association, 21st Annual Conference, San Diego, CA, Oct. 16, 1979.
- Sells, S.B. Matching clients to treatments. Problems, preliminary results, and remaining tasks. Annual Conference on Addiction Research and Treatment, Veterans Administration Medical Center, Coatesville, PA, Nov. 14-15, 1979.
- Simpson, D.D. Use of the DARP Follow-up Data Book to Report Treatment Outcomes. Invited address to the National Association of State Alcohol and Drug Abuse Directors, Burlington, Vermont, June, 1979.

Singh, B.K., & Sells, S.B. Community structure and community attitudes toward drug treatment programs. Southern Sociological Society, Atlanta, March, 1979.

Singh, B.K., & Adams, L.D. Variations in self-reported arrests, Western Social Science Association, Lake Tahoe, April 14, 1979.

Singh, B.K., Leahy, P.J., & Wilson, R.W. The effects of siblings on educational attainment; some conditional specifications. Western Social Science Association, Lake Tahoe, April 14, 1979.

Singh, B.K. Epidemiological methods in applied social science research. Invited Lecture. Indian Agricultural Research Institute, New Delhi, Sept., 1979.

Singh, B.K. Demographic methodology and sampling of human populations. Invited Lecture. Indian Statistical Institute, New Delhi, Sept., 1979.