

SOCIETY FOR COMPUTERS IN PSYCHOLOGY

**Sixteenth Annual Meeting
Hyatt Regency, New Orleans
Wednesday, November 12, 1986**

As in recent years, we used a two-stage call for papers. In the first stage, topics were solicited from the membership. These topics were then listed as suggestions for papers and symposia in the formal call for papers. We thank those who suggested topics for the conference, as the result is a variety of well-integrated presentations on the program.

We also thank the members of the program committee - Doris Aaronson, Darrell Butler, N. John Castellan, David Eckerman, Tom Hewett, Howard Kaplan, C. Michael Levy, Stephen Link, Bill Palya, Joseph Sidowski, Jonathan Vaughan, and Michael Yost - who reviewed papers for the program and offered suggestions for the papers which will appear in the proceedings issue of *Behavior Research Methods, Instruments, & Computers*.

The Society awards an annual prize for the best submitted paper written by a student. The award includes a cash prize and a one-year subscription to *BRMIC*. The winner will be announced at the conference.

Please note: **Smoking is not permitted in the meeting rooms during the sessions.**

Cyndi McDaniel and
Northern Kentucky University
Program Chairs for 1986

Paula Goolkasian
University of North Carolina, Charlotte

Special Events

Tuesday, November 11

8:00-9:00 pm

Steering Committee Meeting

Wednesday, November 12

8:30 am - 3:30 pm (in front of Poydras Room)

Registration and Software Swap

4:00-5:00 pm Poydras Room

PRESIDENTIAL ADDRESS: Walter Schneider, University of Pittsburgh
Neurally Inspired Models of Cognition, a Paradigm Shift?

5:00-5:30 pm Poydras Room

Members Meeting

7:00-8:00 pm (in front of Peachtree Room)

Software Swap Open House

bring new contributions and speak with contributors

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9:00 am - 10:15 am Peachtree Room
Session: **Writing Instructional and Research Software**
Chair: Tom Perera

9:00-9:15 **Writing and Publishing Instructional and Research Software**
Thomas B. Perera, Montclair State College

Many psychologists who currently use computers in research and instruction will eventually consider developing software of their own. Recommendations for structuring, writing, documenting, and possibly publishing software as well as experiences with publishers, program modifications, and syntax conversions are presented in hopes of stimulating the writing of new software.

9:20-9:25 **Writing Programs on the Apple for the Student Psychology Laboratory**
Douglas B. Eamon, University of Wisconsin-Whitewater, & Darrell L. Butler, Ball State University

We will discuss our experiences writing programs for the Apple II for use in student laboratories. We will consider problems we have encountered and how we handled them, describe some general and specific routines and subroutines others might find useful, and present sources of information on writing programs.

9:40-9:55 **A comparison of Inexpensive Statistical Packages for Microcomputers**
Darrell L. Butler & Steven K. Jones, Ball State University

The purpose of this paper is to describe and compare some inexpensive, software packages that calculate a variety of statistics on a microcomputer. For each package, program capacity, limitations, constraints, accuracy, speed, editing, error handling, and other features are described.

10:00-10:15 **Writing High Quality Statistical Software for Apple II Microcomputers**
Darrell L. Butler, Ball State University, & Douglas B. Eamon, University of Wisconsin-Whitewater

The purpose of this paper is to provide some principles programmers should consider when creating excellent statistical packages. Principles are divided into three major categories: computation and data structure, input/output, and miscellaneous (which includes such topics as error trapping and documentation).

9:00 am - 10:10 am Grand Room
Session: **Simulations of Psychological Models**
Chair: Michael Yost

9:00-9:20 **DMOD: A Computer Simulation Model of Basic Learning Phenomena**
Helen B. Daly & John T. Daly, State University of New York-Oswego

We will present a model of basic learning, which assumes one 3-parameter learning equation. This one equation is applied to learning of different possible goal events: positive events such as food, negative events such as shock, no food when food was previously given, no shock when shock was previously given, etc. Its application in diverse appetitive discrete-trial and free-operant situations and extensions to aversive situations will be described.

9:25-9:45 **Simulation of Motor-Neuronal Networks**
R. Strauss, F. J. Bremner, & M. Yost, Trinity University

Psychologists have done relatively little research on the output systems (motor) of humans when compared to the research done on the (sensory) input systems. What little research there is, has been done by ethologists using lower animals as subjects. With the advent of the fields of artificial intelligence and robotics, both the theoretical models and computer programming strategies for the simulation of both animal and human movement are available. This paper uses a sophisticated spreadsheet to simulate some aspects of the human motor system. The spreadsheet starts with an algorithm which is a general descriptor of a planned motor act and then iterates through a process of adaption as feedback from limb position and muscle contraction is factored in.

9:50-10:10 **A Computer Simulation of the Early Stages of Visual Information Processing**
Lawrence R. Half, Yorktown High School

This project is concerned with the implementation of a computer simulation of the early stages of visual information processing. The first stages of visual information processing deal with changes in light intensity. Evidence has shown that the first steps of image processing occur in the eye, and later steps occur in the brain. The simulations in this project are of those processes that are carried out in the eye and some of the first processes that are carried out in the brain.

10:25 am - 12:00 am Peachtree Room
Session: **Research and Teaching at Computer-intensive Campuses**
Chair: Richard S. Lehman

In the last 2-3 years, a number of colleges and universities have required (or at least strongly urged) that their students purchase personal computers and have also made them readily available to faculty. This symposium presents the experiences of several individuals who teach and do research in such computer rich environments.

10:25-10:40 **The Computer as Tool: Students as Software Architects**
Thomas T. Hewett, Drexel University

I describe the assumptions and structure of a psychology course where students use the microcomputer as a tool in software design. However, programming is not required. Rather, application programs provide a context in which the student has freedom to explore course content without being constrained by the mind-numbing minutiae involved in programming a rigid, inflexible tuttee.

10:45-11:00 **A Microcomputer-Dependent Statistics and Design Course**
Richard Lehman, Franklin & Marshall College

A one semester course in statistics and research design is described. All computations are carried out by a Macintosh computer. No hand calculation is expected of the students, and little class time is spent on by-hand computational procedure. The course covers much more statistical content than is the norm of a one semester course, and student understanding of the logic of the material and its application is enhanced.

11:05-11:20 **The Macintosh as a User-Friendly Laboratory for Perception and Cognition**
Jamshed J. Bharucha, Blake Meike, & John C. Baird, Dartmouth College

Software which transforms a microcomputer into a user-friendly laboratory enhances a curriculum in perception and cognition. We present a Macintosh program, MINDLAB, which enables students to put together and run experiments quickly and conveniently, and may also be useful for advanced research in certain areas. MINDLAB's forte is its ability to display, in real time, stimuli either created using other user-friendly picture and text programs or digitized from real pictures.

11:25-11:40 **Effects of Availability of Microcomputers on Student and Faculty Research**
David M. Lane, Rice University

The effect of the widespread availability of Macintosh computers on research is discussed. Student projects include computerized testing of aptitude and testing recognition memory using digitized images. The ability to digitize, edit and play speech under program control has benefited faculty research.

11:45-12:00 **Computers and the Liberal Arts Curriculum: Challenge to Psychology**
James W. Mills & Edward A. Dombor, Drew University

Three years ago Drew University began a campus-wide effort to integrate microcomputers in courses across the entire liberal arts curriculum. This presentation summarizes the results of 14 studies which have assessed student and faculty responses to this effort, and concludes by suggesting some implications of these studies for Psychology.

10:30 am - 11:45 am Grand Room
Session: **Models and Methods in Psychological Research**
Chair: Frederick Bremner

10:30-10:45 **Establishing Probability Limits in Neuropsychological Research**
Alyson Gill, Michael Yost, & Frederick Bremner, Trinity University

This study determined the change in heart electrophysiology needed to yield a significant difference between baseline and experimental responses and whether it would be reasonable, ethical, and safe for subjects to perform at these limits. A single-subject longitudinal (42 trials) design was used. The t-test equation was algebraically factored and solved for the .01 and .05 level experimental means. The equations and calculations in this study were done in a spreadsheet program on a PC.

10:50-11:05 **Evoked Potentials and Stages of Information Processing: Methods of Analysis**
Jonathan Vaughan, Hamilton College

The first method described uses Principal Components Analysis and Analysis of Variance to extract within-subject differences in evoked responses during cognitive tasks of the "additive factors" design. The second method linearly contracts or expands the time dimension of evoked response data to minimize trial-to-trial differences within subjects.

11:10-11:25 **A Parallel But Not Necessarily Connectionist's Model of the Auditory System**
F. J. Bremner, School of Aerospace Medicine, M. Yost, & L. Sullivan, Trinity University

The basic processing elements (the neurons) in the brain operate in the millisecond range and are about a million times slower than a computer. In order to make up for this lack of computation speed, the brain must use a parallel multisynaptic method to transmit information. This paper presents a parallel processing model of the auditory system which accounts for the frequency and the sound localization information.

11:30-11:45 **Why Connectionism?**
Garrison W. Cottrell, University of California-San Diego

Parallel Distributed Processing (PDP) models do a better job of simulating humans than information-processing, or *symbolic* models, and should be the "paradigm of choice" for psychologists. PDP models employ a "neurally inspired" computational architecture, are a better notation for expressing insights into what Rumelhart has called "the microstructure of cognition".

1:00-2:10 pm Peachtree Room
Session: **Understanding Programming**
Chair: Cyndi McDaniel

1:00-1:15 **No IFs, ANDs, or ORs: A Comparison of Database Query Languages**
Sharon L. Greene, Louis M. Gomez, & Susan J. Devlin, Bell Communications Research

Two very different data base query "languages" were compared to evaluate differences in their difficulty. A standard database query language, SQL, was compared to a second means of expressing queries that only required subjects to be able to make use of tables representing sample databases. Clear differences emerged in subject performance. Regression techniques demonstrated an association between performance and a set of cognitive skills.

1:20-1:35 **The Influence of Structure on Computer Program Comprehension**
Sandra L. Newsome, Rensselaer Polytechnic Institute, & Irvin R. Katz, Carnegie-Mellon University

The influence of structure on computer program comprehension is examined using an anticipation technique that requires subjects to use previous lines of a computer program to anticipate subsequent lines. Structured context facilitated correct anticipations more for a relatively long complex program than for a short straight-forward program.

1:40-1:55 **The Life Sciences Laboratory: Integrating Computer Use Across the Psychology Curriculum**
J. W. Whitow, Rutgers University

A multi-use Life Sciences Laboratory, designed to provide a user-friendly environment for students with varying amounts of computer expertise from a wide range of psychology courses will be described. The presentation will emphasize 1) the use of Z-Basic to develop machine-independent software, 2) the use of a paired-associate model to teach programming, and 3) the use of WordPerfect to teach students to write APA style research papers.

2:00-2:10 **Computer-Based Interactive Video Systems**
Linda C. Petty, Hampton University, & Ellen F. Rosen, College of William and Mary

Computer-controlled interactive video computer aided instruction provides an instructional technique which overcomes many of the shortcomings of the computer alone as an instructional device. Students who have used interactive video modules have been shown to retain the material presented better and at the same time to enjoy the course more.

1:00-1:50 pm Grand Room
Session: **Computerphobia**
Chair: Larry Rosen

Over five years of research has demonstrated that a substantial number of college students are "computerphobic". These students either exhibit anxiety reactions, negative attitudes or negative thoughts when faced with computer interaction. This symposium will present the results of 7 studies of over 500 students. A federally-funded "Computerphobia Reduction Program" will be described and preliminary results will be reported.

1:00-1:20 **Computerphobia, Androgyny and Experience**
Larry D. Rosen & Deborah C. Sears, California State University-Dominguez Hills

1:30-1:50 **The Computerphobia Reduction Program: Year 1 - Program Development and Preliminary Results**
Michelle M. Weil

2:15-3:50 pm Peachtree Room
Session: **Microcomputer Research Tools**
Chair: Howard Kaplan

2:15-2:30 **Software Timing of Events in Cognitive Psychology Experiments**
David Dorfman, Villanova University

Real-time systems for controlling cognitive psychology experiments typically use hardware clocks. However systems using software clocks have comparable reliability, accuracy, and resolution and advantages of lower cost and hardware simplicity. Types of software clocks are described and evaluated. Data showing the accuracy and reliability of software clocks are presented. Problems, along with their solutions, in implementing software clock systems are described. A software clock system is described.

2:35-2:50 **BIBSEARCH: A UNIX-based General Purpose Research Tool**
Brian Watts, New York University

A UNIX-based program (BIBSEARCH) is described. Among features of the program which are described are the following: the downloading of bibliographic data from a remote host computer; the establishment of a personalized UNIX-based data base which can be interactively searched; the automatic printing of bibliographies and the maintenance of an "overlapping category" file system.

2:55-3:10 **TurboLab: An Alternative Approach to Real-time Control of Operant Conditioning Experiments**
Jonathan Schull & Evan M. Kaminer, Haverford College

We describe some programming "tools" for real time monitoring and control of digital laboratory devices. These create an interrupt-driven event buffer which logs switch closures. Other simple commands (e.g., "TurnOn") take a line number and a time argument as parameters; they are automatically executed at the time specified. Applications to operant conditioning are discussed.

3:15-3:30 **MacLaboratory for Psychology Controller: A Simple Switch Interface Between Macintosh and Peripheral Psychological Apparatus**
Douglas L. Chute, Darryl Gaemon, Mark Goodman, & Terry Ziegler, Drexel University

We have developed a simple-to-use, readily edited application (requiring no programming skills) that operates a Macintosh-based interface permitting millisecond control of timing and event recording for up to 255 devices. The MacLaboratory for Psychology Controller is a complete, self-contained device, that uses the RS422 modem port of the Macintosh to communicate to an on-board computer that operates, or senses the operation of, a configuration of relays. Peripheral apparatus like Skinner boxes, T-scopes, slide projectors, reaction timers, video recorders and players, and so forth can then be controlled and events monitored directly from the Macintosh. Data are saved as tab-delimited files directly accessible to spreadsheet, graphics, data base and word processing software.

3:35-3:50 **Design Decisions in a Pascal-based Behavioral Toxicology System**
Howard L. Kaplan, Addiction Research Foundation

The Scheduled Measurement System allows relatively short Pascal subprograms to access task-scheduling, analog input, screen display, and record-formatting routines and thereby measure drug effects on attitude, physiological signs, and performance. A modular design allows for the efficient development, recompilation, and testing of the system components.

2:10-3:45 pm Grand Room
Session: **Using Computers in Applied Settings**
Chair: Paula Goolkasian

2:10-2:25 **Behavioral Assessment of Eating Patterns and Blood Glucose in Diabetes Using the Self-monitoring Analysis System**
David G. Schlundt & Crystal Bell, Vanderbilt University

The Self-Monitoring Analysis System is a set of microcomputer programs that were developed to remove clinical judgment from the task of behavioral assessment using self-monitoring diaries. The program and its uses are described. Data from a patient with diabetes is presented as a case study illustrating the system's utility.

2:30-2:45 **A Psychosocial Comparison of Computer-Mediated and Face-to-face Language Use Among Severely Disturbed Adolescents**
D. Patrick Zimmerman, University of Chicago

This study compares the computer-mediated communications among 18 severely disturbed adolescents with their small-group, face-to-face discussions. A content analysis was performed to explore psychological, interpersonal, and expressive differences between the two communication modes. The findings suggest that computer-involvement diminished communication deficits in those areas.

2:50-3:05 **Computer Controlled Assessment of Static and Dynamic Spatial Reasoning**
James W. Pellegrino, University of California-Santa Barbara, Earl B. Hunt, University of Washington, Ronald Abate, University of California-Santa Barbara, & Simon Farr, University of Washington

We will describe an integrated software package for the presentation of static and dynamic spatial reasoning tasks. The software presents 10 separate tasks and includes programs providing detailed performance analyses. Results from a large-scale validation study will also be summarized relative to psychological and psychometric research and theory.

3:10-3:25 **Adaptive Rating Scales in a Sequential Decision Task**
Bruce G. Berg, Indiana University

The benefits gained through the use of a computer-controlled procedure as compared to a "paper-pencil" procedure in a sequential decision task exceed the expected gains of efficiency and standardization. Computers extend the scope of the decision making paradigm by enhancing (1) the strength of experimental design, (2) reliability of measurement, (3) procedural flexibility, and (4) single subject data analysis.

3:30-3:45 **Computer-Based Selection Testing in the Royal Air Force**
David R. Hunter, Army Research Institute, & Eugene Burke, Science-3 (RAF)

This paper describes efforts conducted to implement computer-based selection testing for officers (aircrew and aircraft controllers) in the Royal Air Force. This history leading up to the decision to computerize the selection testing is recounted, along with the procedures used to develop computer-based tests equivalent to the existing electro-mechanical based tests. The development and validation of a battery of computer-based tests for the selection of RAF aircraft controllers is also described. The present status of computer-based selection testing in the RAF is discussed along with future directions of inquiry.

8:00-9:50 pm Peachtree Room
Session: **Macintosh Techniques**
Chair: David Lane

8:00-8:15 **PsychLib: A Library of Machine-Language Routines for Controlling Psychology Experiments on the Apple Macintosh Computer**
David M. Lane & Brad Ashby, Rice University

The hardware and system software of the Apple Macintosh computer are described and their implications for conducting psychological research is discussed. A library of machine-language routines for presenting auditory and visual stimuli and recording response latencies is presented.

8:20-8:35 **Demonstration Experiments in Perception and Cognitive Psychology for the Macintosh Computer**
Loy A. Anderson & David M. Lane, Rice University

A package of demonstration programs of psychology experiments widely cited in perception and cognitive psychology textbooks is described. The experiments are suitable for laboratory research projects and in-class demonstration. Iconic memory, memory scanning (using the additive factors approach), lexical decision, target detection, picture recognition/picture memory, and Stevens' Law can be demonstrated.

8:40-8:50 **Facial Perception Studies Using the Macintosh**
Dean G. Jensen, Rice University

Research on how people perceive human faces has benefitted from recent advances in microcomputer technology. The present paper describes techniques that can be used to prepare and present facial stimuli on a Macintosh computer and the advantages of computer presentations of such stimuli.

8:55-9:10 **Editing Digitized Sounds on the Macintosh Computer**
Janel M. Gibson, Rice University

Hardware/software packages for the Macintosh computer that allow researchers to digitize and edit auditory materials are discussed. Features and benefits of these packages are discussed in terms of their application to psychology experiments.

9:15-9:30 **Enhancing and Degrading Visual Stimuli**
John O. Brooks, Rice University

Several assembly language routines are described for use with MS-BASIC on the Apple Macintosh computer in perceptual identification experiments. One routine involves stimulus clarification in which a mask is gradually removed to reveal the stimulus behind it. Another routine for stimulus materialization displays the stimulus on the screen in a piecemeal fashion.

9:35-9:50 **Fragmenting Pictures on the Macintosh Computer for Experimental and Clinical Applications**
Joan Gay Snodgrass, Bradford Smith, New York University, & June Corwin, New York VA Medical Center

A set of programs written in MS Basic is described which creates fragmented versions of pictures scanned into the Macintosh, stores them as resource files, and presents them in a computerized memory test. The memory test will be demonstrated and results from the task with adults briefly presented.

8:00-9:35 pm Grand Room
Session: **Computer Systems for the Visually Impaired**
Chair: Doris Aaronson

8:00-8:15 **Computer Use by the Visually Impaired**
Doris Aaronson, New York University, & Paul Gabias, University of Wisconsin-Milwaukee

Recent developments have made computers accessible to the blind and partially sighted: hardcopy (paper) and softcopy (raised pins) braille output, magnified high-resolution characters, and synthesized speech. We will report survey data on (a) these user's computer education, tasks and goals, (b) their hardware and software preferences, (c) their complaints and "wish lists".

8:20-8:35 **Effect of Artificial Voice Feedback Delay in Typing and Its Implications for the Blind User**
Joseph R. DiLorenzo, The Lighthouse and Pace University, & Aris Arditi, The Lighthouse

Artificial voice output has recently become an inexpensive and effective means of access for blind users of microcomputers. We report the results of a study of voice feedback delay on typing skill. The data are relevant to the design and use of such systems, especially in teaching blind individuals to type.

8:40-8:55 **The Challenge of Rationality in Computer Access for the Visually Impaired**
Robert M. Lambert, Concordia University

Problems of computer access created by software, firmware and hardware deficiencies are discussed. It is proposed that solutions for these problems be sought through broader producer consultation with visually impaired computer users, and through the establishment of industry-wide standards for product development.

9:00-9:15 **Overcoming the Limitations of Speech Synthesizers**
Emerson Foulke, University of Louisville

Often, some of the text appearing on a monitor screen cannot be directed to a computer's plug-in speech synthesizer. This happens because application programs modify or bypass the computer's disk operating system. Hardware solutions will be discussed in which a virtual image of the screen is created in memory external to the computer.

9:20-9:40 **Open Discussion**

7:00-8:00 pm **Software Swap Open House**

Bring your latest public-domain software finds for the IBM, Apple //, or Macintosh.

See software and talk with contributors.

PROGRAM SUMMARY

9:00-10:15	Peachtree Room Writing Instructional and Research Software
9:00-10:10	Grand Room Simulations of Psychological Models
10:25-12:00	Peachtree Room Research and Teaching at Computer-intensive Campuses
10:30-11:45	Grand Room Models and Methods in Psychological Research
1:00-2:10	Peachtree Room Understanding Programming
1:00-1:50	Grand Room Computerphobia
2:15-3:50	Peachtree Room Microcomputer Research Tools
2:10-3:45	Grand Room Using Computers in Applied Settings
4:00-5:00	Poydras Room <i>PRESIDENTIAL ADDRESS</i>
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8:00-9:50	Peachtree Room Macintosh Techniques
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