Overview

The Department of Psychology at OSU houses a diverse community of scholars doing cutting-edge research in all major areas of psychology. Two of the many areas of excellence in our Department are the Programs in Quantitative and Cognitive Psychology.

All faculty members in these two Programs share the conviction that quantitative methods, formal analyses, and/or computer simulations are indispensable tools for understanding the human mind. Cognitive modeling is particularly well represented, with this program ranking among the leading programs in the USA. This includes models in the domains of perception, action, learning, memory, language, speech, cognitive neuroscience, and cognitive development. We develop models using all major methodologies, including Bayesian models, neural network models, cognitive architectures, stochastic processes, and simulations.

Researchers in Quantitative Psychology are experts in model selection, psychometrics, multivariate statistics, neural network modeling, and judgment and decision making.

The Cognitive group conducts research on topics such as memory, language, attention, simple decision making, cognitive aging, motor control, and auditory and visual perception.

Admission

Admission to the Cognitive and Quantitative programs is selective. Only applicants who intend to pursue the Ph.D. degree are admitted. You need not have an undergraduate psychology degree. Applications must be on file with us on or before December 29 for domestic applicants and November 30 for international applicants. Most successful applicants are guaranteed funding for 5 years.

The Department of Psychology
225 Psychology Building
1835 Neil Avenue
Columbus, OH 43210

Phone: 614-292-1123
Fax: 614-688-3984

www.psy.ohio-state.edu

THE OHIO STATE UNIVERSITY

Cognitive Psychology and Quantitative Psychology
at The Ohio State University
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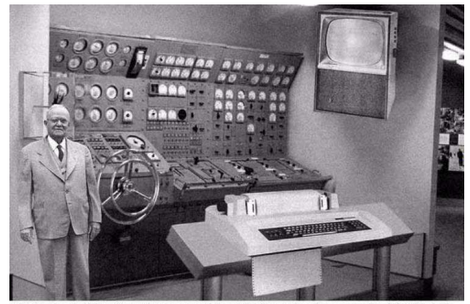
Graduate and Postdoctoral Research

Our research areas provide a wide range of single approaches and combinations of approaches and methodologies including behavioral experimentation, psychophysics, mathematical analysis, computational modeling, electrophysiological recordings (ERPs), eye tracking, and others. The computing infrastructure is excellent and includes access to the Ohio Supercomputer Center.



Scientists from the RAND Corporation have created this model to illustrate how a "home computer" could look like in the year 2004. However the needed technology will not be economically feasible for the average home. Also the scientists readily admit that the computer will require not yet invented technology to actually work, but 10 years from now scientific progress is expected to solve these problems. With teletype interface and the Fortran language, the computer will be easy to use.

A major focus for graduate students is the development of their own individual research specializations. There is considerable flexibility in course requirements, and students are encouraged to obtain interdisciplinary training appropriate for their topic of research. The goal is to train students to be top-notch scientists using the state-of the-art methodologies that address central issues in the field.

The Cognitive and Quantitative Programs maintain close ties to other programs in our department including Behavioral Neuroscience, Developmental, Clinical, and Social, and there are many ongoing collaborations. There is also extensive interaction with The Center for Cognitive Science, The Mathematical Biosciences Institute, and affiliated departments including Computer Science and Engineering, Linguistics, Speech and Hearing Science, Statistics, Public Health, and The College of Optometry.

We especially encourage applications from students with strong quantitative, linguistic, and/or neuroscience backgrounds. But any background is of interest, especially if the student wants to acquire a wide range of skills. Students with undergraduate degrees in computer science, physics, engineering, mathematics, linguistics, etc. are welcome. Prospective applicants should contact a faculty member to discuss the program and the application process.

Research Domains

Memory

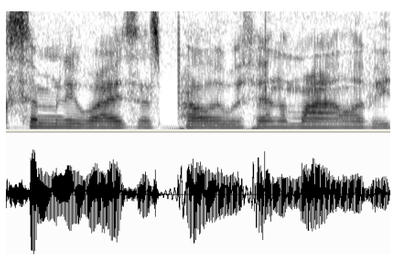
Memory is a component of cognitive architecture that underpins people's ability to perform practically all higher level processing. Within the program, we study human memory using behavioral, neuroscientific and computational modeling methodologies. We focus on short and long term episodic memory, implicit memory, memory for sentences and text. The impact of age and disorders on memory processes is also strongly represented.

Perception and Action

Perception and action have a reciprocal relationship in that perception guides action, which in turn influences perception. Topics of research in this area involving numerous faculty in psychology and engineering include sports activities, vehicular control, the analysis of 3D structure from 2D image data and the recognition of objects and faces. A central theme in all of these areas is to develop computational models that can simulate the essential characteristics of perceptual and motor performance, and to test those models with appropriate behavioral experiments.

Language and Speech

Research at Ohio State spans the spectrum of enquiry, from basic processes of phonetics and phonology, through morphological and lexical phenomena, to the study of syntax, semantics and discourse. Using event related potential laboratories, we investigate the time course of syntactic processing. Using behavioral paradigms, we explore the way in which people recognize spoken words, resolve anaphora and perform inferential processing. Computational modeling and the analysis of language corpora play a central role in our approach to psycholinguistics. In addition, we have strong ties to the Ohio State Linguistics Department, one of the top programs in the United States.



Judgment and Decision Making

In judgment decision and making, faculty & graduate students perform research in such domains as medical, legal, and economic decision making. In addition, several faculty study the cognitive processes involved in making judgments & decisions. Collaborations between faculty in the Cognitive & Quantitative areas as well as collaborations between Department of Psychology faculty and colleagues in the Colleges of Medicine, Law, Business, Social and Behavioral Sciences, Engineering, and Public Health provide a wealth of research opportunities.

Psychometrics

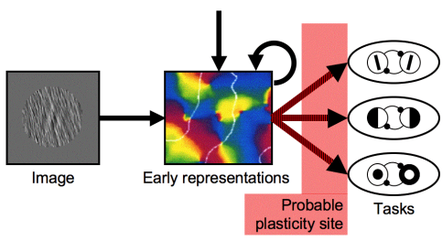
The core areas of research in psychometrics include factor analysis, hierarchical linear models, item response theory, and structural equation modeling. The faculty have active areas of research which extend these core areas to more advanced topics such as dynamic factor analysis, multidimensional item response theory, and nonlinear latent variable modeling. Faculty members have strong ties to colleagues in areas such as education, public health, and statistics.

Cognitive Modeling

Many of the faculty in the Cognitive and Quantitative programs believe that insight into cognitive processes can only be derived through the construction & appreciation of computational models that enforce consistency and reveal the impact of interactions among component processes. At Ohio State, we place a strong emphasis on development, analysis & evaluation of cognitive models across a wide range of domains of enquiry.

Cognitive Neuroscience

A major research interest of our cognitive faculty is to characterize the architecture and computational properties of the human mind/brain. The ultimate goal of cognitive science is to explain how complex cognitive behavior emerges from the coordinated action of the hundreds of billions of neurons in the brain. Models are particularly valuable tools for vertical integration of our theories, spanning multiple levels of analysis. Connectionist and stochastic modeling techniques and electrophysiological and neuroimaging data are especially relevant in that regard.



Cognitive Development

Research in cognitive development focuses on the development of attention, learning, memory, language and concept acquisition, and interactions among these components. Faculty study cognition in infants and young children using preferential looking, habituation, EEG, and microgenetic approaches, as well as traditional experimental techniques and physiological measures.

Faculty

Hal Arkes, Ph.D., University of Michigan
Human judgment and decision-making.

Nancy Betz, Ph.D., University of Minnesota
Measurement, with a focus on classical test theory, psychological testing, measurement and use of personality variables in vocational behavior and decision-making.

Michael W. Browne, Ph.D., University of South Africa
Multivariate quantitative methods.

Wil Cunningham, Ph.D., Yale University.
Affective neuroscience, affective decision making, attitudes/ preferences.

Robert Cudeck, Ph.D., University of Southern California
Applications of structural equation models and random coefficient models to psychological data.

Michael DeKay, Ph.D., University of Colorado
Judgment and decision-making, risk perception, precautionary reasoning, risky decisions.

Simon Dennis, Ph.D., University of Queensland, Australia
Human memory and learning, natural language processing, connectionist models of cognition, information retrieval.

Michael Edwards, Ph.D., University of North Carolina at Chapel Hill. Measurement, with a focus on item response theory and factor analysis.

Richard J. Jagacinski, Ph.D., University of Michigan
Engineering Psychology, behavioral applications of control theory, decision-making in guided dynamic systems, aging, environmental and social effects of technology.

Gail McKoon, Ph.D., University of Colorado
Psycholinguistics, reading, memory, aging.

Jay I. Myung, Ph.D., Purdue University
Cognitive and mathematical psychology, model selection, Bayesian methods, connectionist modeling

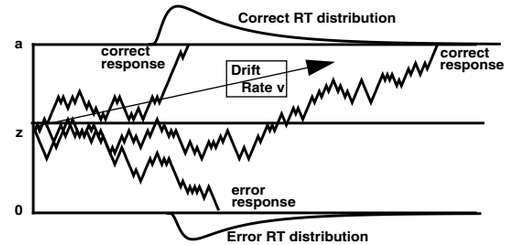
Thomas E. Nygren, Ph.D., University of Illinois
Mathematical & cognitive psychology, mathematical models of decision-making, measurement theory, psychological scaling.

John E. Opfer, Ph.D., University of Michigan
Conceptual development, representation, categorization and induction, mathematical cognition.

Alexander Petrov, Ph.D., New Bulgarian University
Perceptual learning, reinforcement learning, connectionist models of relational structure, analogy, computational cognitive neuroscience, cognitive architectures, spatial vision.

Mark A. Pitt, Ph.D., Yale University
Psycholinguistics, spoken word recognition, mathematical modeling.

Roger Ratcliff, Ph.D., University of Auckland, NZ
Mathematical modeling of memory and cognitive processes,: simple decisions and reaction time, aging and reaction time, neural modeling of single cell recordings.

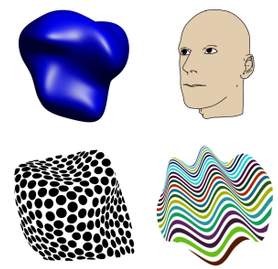


Vladimir Sloutsky, Ph.D., University of Moscow
Higher-order cognition, including categorization, reasoning, and problem solving, and interrelationships between cognition and language.

Harvey G. Shulman, Ph.D., University of Michigan
Memory, attention, human performance and human factors, attention & cognition, memory & emotion, divided attention.

Julian Thayer, Ph.D. New York University
Physiological and psychological effects of stress on anxiety, depression and heart disease.

James T. Todd, Ph.D., University of Connecticut
Visual perception and cognition, perceptual-motor coordination, computational modeling of sensory processes, computer graphics.



Trisha Van Zandt, Ph.D., Purdue University
Mathematical models of simple decision making in memory and cognition, quantitative methods.

Laura Wagner, Ph.D., University of Pennsylvania
Language Acquisition, event representation, pre-linguistic concepts, connections between linguistic and conceptual development.