Chair’s Report

For our department, two major events occurred since the last newsletter was published. During the months of May, June, and July, most of our department moved from several different places on campus to the newly renovated Psychology Building, formerly the Physics/Astronomy Building. Our Behavioral Neuroscience group had moved the previous year to renovated labs and offices in Giltner Hall which is adjacent to the Psychology Building. As in any construction project, we are now engaged in “debugging” various problems, but I believe that the general consensus is that we now occupy attractive space that houses our various units quite comfortably. The Clinic is located in the first floor Annex to our building. It is adjacent to the faculty and graduate student offices which was never true in the past, but has a separate entrance and provides a reasonable degree of privacy. Moreover, we have ample daytime and evening parking for Clinic clients and community participants in research projects. There were significant lab and furniture improvements in all areas of the department. There are several pictures of the new space in various parts of this newsletter, but we hope those of you who are in the area or visit East Lansing on occasion will stop by to see this new space.

One thing we did not manage to provide for in the new building was common space for informal meetings or conversation. One possible summer and fall space for such activities would be a rooftop area off the third floor of the building. With outdoor furniture, this would be a very attractive space to meet, have lunch, and foster cross interest area conversation and ideas. Renovation of this area including patio blocks and a safety railing will require that we raise about $32,000, so the project is on hold.

The second major event of the spring and summer was the external review of our department and the subsequent report of the review committee. As I mentioned in my report last spring, the department faculty spent considerable time and effort in preparing the self study that provided the external team (Dr. William C. Howell of Arizona State and Rice University, Dr. John Jonides,
University of Michigan, and Joan H. Liem, University of Massachusetts-Boston) the background for their two

day visit to our campus and their subsequent report. Perhaps the best characterization of their report is the

following statement taken from their report: “the Department…merits a “top-25” quality ranking. The four
designated “signature programs”—Industrial/Organizational, Behavioral Neuroscience, Ecological/Community
and Cognitive—clearly rate among the strongest programs in these areas nationally in terms of external support,
research productivity, student credentials, and accomplishments, and placements. And, in their respective
communities, they are so regarded….Clinical is making a well-advised shift from the traditional large, practitioner-
oriented program to a much smaller, research-oriented model, and has made great strides in that direction. The
S/P faculty consists predominantly of a cadre of recently hired—but exceptionally talented assistant professors
whose collective performance foretells a very bright future for this area.”

The review also noted that our most serious problem was lack of adequate graduate student teaching assistantship
stipends. They also encouraged the department to work toward more collaboration among our interest areas
including common coursework across interest areas at the graduate level, reactivation of a Graduate Curriculum
Committee, support of a department colloquium series, and provision of more formal and informal opportunities
for discussion of common curricular and research concerns. We will be working this fall to produce a response
to this external review.

During the past year, with the help of the Radiology Department (Dr. Potchen) and the MSU administration, we
have also put together the resources for a FMRI research facility; you can read more about this effort elsewhere
in this newsletter. We have also added four new faculty members (Dr. Alex Burt, Clinical; Dr. Zaje Harrell,
Ecological/Community; Dr. Robin L. Miller, Ecological/Community; and Dr. Joseph Nunez, Behavioral
Neuroscience). Dr. Daniel Greenberg has joined us as Director of the Psychological Clinic. This fall we have
welcomed over 1550 Psychology majors of whom 122 are members of the Honors College and 23 new graduate
students. We are looking forward to a productive year and hope we will see or talk to many of you at some point
during the year.

Direct Giving Now Possible

Higher education faces a fiscal crisis and MSU is no exception. Now, more than ever, we need the financial
support of our friends and alumni. If you visit our web page (http://psychology.msu.edu), you will see a new
link for Direct Giving. When you click this link, you will be on your way to a secure, encrypted, University
Development page that will allow you to make a credit card donation to the Psychology Department at
MSU. You can give to the department or to one of the six new funds to support a specific interest group.
These funds are described in more detail on the Direct Giving page.

Thanks for your generosity.
We’ve Moved !!

Earlier this summer, the rest of the department began packing and moving to our newly remodeled building. The Psychology Department now occupies two adjacent buildings.

The building went through a major renovation lasting over a year and has now been renamed from the Physics-Astronomy Building. We are now all settled in and feeling comfortable in our new home – the Psychology Building.

Completing the consolidation, the Psychological Clinic moved from Olds Hall to its new quarters in the Psychology Building.

The Behavioral Neuroscience group had made their move in September 2002 to Giltner Hall.
How does the wrinkly 3-pound mass of neurons that sits between our ears generate such fundamentally human characteristics as speaking, thinking, imagining, and consciousness? The new Facility for Functional Brain Imaging, formed by the Department of Psychology, the interdisciplinary Cognitive Science Program, and the Department of Radiology, with additional funding from the university administration, provides investigators at Michigan State University with the cutting-edge tools needed to help solve this complex mystery.

Functional MRI (fMRI) provides detailed pictures of neural activity related to mental events as they unfold within the brain. When the brain is active, neurons and supporting structures require oxygen and nutrients to provide energy for optimal brain function. To supply that oxygen, blood flow increases to brain areas used for specific actions such as attending, seeing, speaking, and solving problems. By measuring and visualizing differences in blood flow across different situations or across different groups of individuals, it is possible to get a picture of how different brain areas work together to generate complex mental activity. For example, MSU researchers can look at brain activity when a person is and is not listening to someone talking in order to understand how the brain works to comprehend language. Similarly, differences in brain activity between the young and the elderly can provide important insights into the nature of the neural bases of cognitive problems such as memory loss associated with aging.

The Facility for Functional Brain Imaging provides MSU scientists a high-field magnetic resonance imaging (MRI) scanner and associated support staff to help researchers study the mind and brain in action. The facility was created with generous support from Dr. James Potchen, Chair of the Department of Radiology, who procured for the Facility a 3.0 Tesla MRI scanner from the General Electric Corporation. The Department of Radiology has a long history of excellent interaction with GE, allowing MSU to maintain cutting-edge imaging facilities. The Facility also received important support from the Provost’s office and the Office of the Vice President for Research and Graduate Studies, designating the imaging group as one of a few Core Analytical Facilities on campus. Finally, the Dean of the College of Social Sciences also contributed substantially to creation of the facility.
As a new Assistant Professor in the Psychology department I am planning to use functional MRI as a primary method for assessing regional brain function in a number of interrelated projects examining emotional processing in healthy individuals and those with mood or anxiety disorders. First, I hope to follow up on work I recently completed examining the time course of amygdala activation in response to fear-relevant stimuli. The amygdala is a structure deep in the brain that has been shown to be related to fear. In this previous fMRI study I found that spider phobics’ responses to pictures of spiders were differentiated from nonphobics responses by the speed of onset of amygdala activation, but not by magnitude of amygdala activation. Furthermore, phobics showed faster onset of amygdala activation in response to pictures of spiders compared to those depicting other negative, but nonphobia-related stimuli. This suggests that the timing of activation of particular brain structures, not just how strongly they are activated can play an important role in dysregulation of emotion and psychopathology. In future work I would like to identify the specificity of this finding to pathological fear states vs. a more general reaction to emotionally-salient stimuli. Specifically, I would like to assess whether the speed of onset of amygdala activation can be hastened in response to newly salient stimuli (e.g., in the acquisition phase of classical conditioning) and subsequently slowed as the stimulus loses its salience (e.g., extinction) even using stimuli and subjects which are not associated with pathological fear. Along a similar vein, using subjects with a specific phobia, I hope to examine the degree to which exposure therapy, the repeated presentation of the feared stimulus, is associated with a slowing of the amygdalar response. While the aforementioned studies all focus on the amygdala (and as such, would call for imaging just slices around the amygdala to increase temporal resolution) an important aspect of this line of work is the role that other brain regions play in response to fearful or salient stimuli, particularly relations between the amygdala and prefrontal regions known to be involved in regulating affective processes.
The Brain Basis of Skilled Performance

Thomas H. Carr

Thomas H. Carr (in collaboration with current graduate students Laurie A. Carr, Andrea Ploucher Francis, and Thomas Wagner, and recent graduates Catherine M. Arrington now at Vanderbilt University, Sian L. Beilock now at Miami University of Ohio, and Bruce D. McCandliss now at Cornell Medical School)

In my laboratory, we study the cognitive, motivational, and emotional processes that underlie task performances of various types at various levels of practice and expertise. Issues at stake include how skills are learned, how excellent performance is achieved as a result of practice, and why performances succeed or fail under stress. Functional Magnetic Resonance Imaging (fMRI) gives us a tool for pursuing these issues in the brain. fMRI measures brain function in real time while a person carries out various mental activities. By measuring where in the brain the supply of oxygenated blood is increasing and where it is decreasing during one activity compared to another, we can gain a picture of the relative involvement of different brain regions. One of the beauties of this technology is that it encourages – indeed, it requires – interdisciplinary collaborations. All of our fMRI research has this flavor. What have we learned to date?

In a collaboration led by Rudy Bernard of MSU’s Department of Physiology, we’ve found that even with a very simple, repetitive movement – clenching and extending the fingers of one hand in time to a signal – controlling the action oneself involves much more brain tissue, with much greater bilateral activation, than does passively following along with a movement created by an experimenter who is manipulating the hand. Thus while it is true that the muscles of each hand are directly enervated by a small area of motor cortex on the opposite side of the brain, it turns out that to control the hand willfully and accurately in accord with a specific task’s requirements, much more of the brain needs to get involved.

In a collaboration led by Alan Beretta of the Department of Linguistics, we’ve found that during speech production, generating an “exceptional” plural or past tense that violates the “rules of inflectional morphology” (saying “geese” rather than “gooses”, or “gave” rather than “gived”) involves more brain tissue, with greater bilateral activation, than does producing “regular” plurals
The Brain Basis of Skilled Performance.... continued

or past tenses for words that “follow the rules”. This holds for German just as much as for English, despite extremely different patterns and frequencies of exceptional versus regular words in the two languages. We’ve found a similar brain response during reading in work done in collaboration with Jie Huang and Yue Cao of MSU’s Department of Radiology and Lucia Colombo from the University of Padova in Italy. Much more brain tissue, with greater bilateral activation, is activated when reading words with exceptional mappings between spelling and pronunciation than when reading words with regular mappings that follow the default patterns – the so-called “rules of phonics.”

Finally, working with Steven Rao at the Medical College of Wisconsin, MSU graduate Catherine Arrington found that focusing visual attention on a specific object in the environment involves more brain tissue than does focusing on a general region of space regardless of where an object might be located. This could be another example of the most general principle shared by the preceding findings: When a task becomes more difficult and requires more precision in its execution, then the brain must work harder.

Directions we are pursuing in the near future build on what we have learned so far. One project, in collaboration with Andrea Francis, Jie Huang, and Lucia Colombo, is designed to find out how much the brain’s activity during reading changes depending on whether one must read aloud or silently. A second project, in collaboration with MSU graduate Bruce McCandliss, is trying to rise above the single word by examining the brain processes that support reading passages of text. A third project concerns the cerebellum’s role in controlling the timing of task performance and of switching attention from one task to another, and whether deficits in these cerebellar functions might play a part in Attention Deficit Hyperactivity Disorder. This will be the dissertation research of Laurie Carr, who has a National Research Service Award predoctoral fellowship to conduct this project as an expansion of a study of ADHD directed by Joel Nigg, John Henderson, and Fernanda Ferreir. A fourth project focuses on mathematical problem solving, investigating how brain processes differ as a function of experience and accomplishment. In this work, first-year student Thomas Wagner and I are collaborating with Mark Ashcraft at Cleveland State University, John Jonides at the University of Michigan, and Rafael Martinez-Planell at the University of Puerto Rico Mayaguez.
Since joining MSU in Fall 2002 I have established a developmental cognitive neuroscience laboratory that uses both cognitive and fMRI techniques to address the fundamental question of how the child cognition and brain develop into an adult stage. Although pediatric fMRI is a very recent research area, it has already proved quite successful in deepening our understanding of brain development and plasticity. My fMRI research, carried out in collaboration with the MSU Department of Radiology, can be broadly divided into three interrelated areas: I examine the development of the neural bases of face and face emotion processing, the development of attention and working memory, and the development of expertise (www.msu.edu/user/passarot/researchN.html).

The ability to attend to and process socially important stimuli such as faces and face emotions is fundamental for normal development, and failure to master these skills may be associated with developmental syndromes such as autism. One of my fMRI projects was among the first to examine face emotion processing in 7 to 16 year olds and adults. My findings showed that the contribution of each brain hemisphere to face processing keeps evolving up to the late teen ages, and that as the brain matures more localized neural networks carry out this type of processing. Moreover, children and teens differ from adults in functional patterns of cortical and sub-cortical brain activation, and some of these differences are modulated by the emotional content of a face.

In another fMRI study I examined the development of the cognitive and neural bases of attention and working memory processes, cognitive functions that are essential for schooling as well as many aspects of a child’s social life. Confirming that neural development of brain areas involved in attention and working memory extends into the second decade of one’s life, I found that children and adults differ in hemispheric specialization and functional patterns of activation, especially in frontal and parietal regions, depending on selective attention and working memory demands.

I am currently working on an fMRI project that examines brain and cognitive functions before and after the development of expertise for a certain task, as a special instance of cognitive development and brain reorganization. In 2004 I presented my fMRI research at national and international conferences. I am looking forward to new exciting research at the new MSU Brain Imaging Facility.

fMRI session with a child, in a 1.5 T Siemens MRI Scanner at the Thornton Hospital, University of California, San Diego
Cheryl Sisk was recently elected President-elect of the Association of Neuroscience Departments and Programs. She will assume this position Nov 2004, and will be President Nov 2005-06. ANDP is an organization of member departments and programs from academic institutions in North America; its goal is to advance education and research training in academic neuroscience programs by disseminating information about neuroscience education and providing a forum for discussion of issues in training and research at both the institutional and national levels.

In 2004-05, faculty members in Psychology will serve as Editors or Associate Editors of ten major journals in Psychology: Perception and Psychophysics (Dr. Tom Carr), American Journal of Community Psychology (Dr. William Davidson), Journal of Memory and Language (Dr. Fernanda Ferreira), Journal of Applied Psychology (Dr. Steve Kozlowski), Personnel Psychology (Dr. Ann Marie Ryan), Psychology and Aging (Dr. Rose Zacks), Multiciencia (Dr. Alex von Eye), Evaluation Research (Dr. Robin Miller), Personality and Social Psychology Bulletin (Dr. Deborah Kashy), and the Biometrical Journal (Dr. Alex von Eye).

Norman Abeles has been elected to several important national and international positions. He is President-Elect of APA's Division of International Psychology and will be president in 2005. He is also President Elect of the Section of Gerontology of the International Association of Applied Psychology and will become President in 2006 when IAAP meets in Athens, Greece. He has been appointed to the Advisory Committee to the Secretary of the Veteran’s Administration (through 2006). Finally, he was selected to be chair of the Medical School Oversight Committee at Michigan State University. This committee reports to the faculty and deals with the potential move of part of the Human Medicine School to Grand Rapids, MI.
S. Alexandra Burt

My research to date has sought to elucidate the origins of disorders of disruptive and antisocial behavior via two lines of questioning. First, I have worked to uncover the mechanisms through which genes and environments interact and coalesce to create the disorders of disruptive and antisocial behavior. Are genetic effects expressed independently of environmental forces or do they interact with and “feed off” of the environment? Though clearly critically important to our understanding of the development of behavioral disorders, we know little about the mechanisms through which genetic effects are expressed or the role that environmental factors play in this expression. I and others have proposed that there exists a dynamic relationship between genetic predispositions and contextual and individual-level environmental forces, in which environmental triggers are necessary for both the initial activation, and to a lesser extent, the continued expression of the genes influencing the disorders of disruptive and antisocial behavior. My current research program seeks to further examine this hypothesis. I am in the process of developing a twin study (and later, a parallel adoption study) that will examine measured candidate genes and measured environmental risk factors to determine if and how genes and environments interact in the development of delinquent and aggressive behaviors.

My second, but related, interest has focused on “comorbidity”, or the well-documented co-occurrence among the childhood behavioral disorders. While the meaning of comorbidity has been hotly debated, it may be a manifestation of meaningful covariance among specific disorders. If so, studies of the etiology of comorbidity among disorders are instrumental to understanding the etiology of specific mental disorders. My current program of research therefore also includes examinations of comorbidity across informants and overtime. Eventually, I hope to develop a comprehensive understanding of the interplay between genes and environments, and the role of comorbidity in this interplay, in the development of disorders of disruptive and antisocial behavior. Understanding the mechanisms through which genetic predispositions for these disorders are expressed should ultimately help mental health professionals improve the treatment, and thus the lives, of afflicted children and their families.
My research focuses on health behaviors. I am particularly interested in the context of race and gender in physical and psychological well-being. The majority of my work on gender has been in the field of addictive behaviors. The importance of individual differences, psychological vulnerability, ecological factors related to substance abuse is often obfuscated by the political and legal implications of illicit drug use. In addition, the majority of research on illegal drugs has focused on men; women, as well as theorizing around gender and addictive behaviors are largely absent from paradigms of addictive behaviors. My work is centered on culturally sanctioned substances, mainly alcohol and nicotine, specifically in the context of women’s lives.

I have studied how depression, disordered eating, and coping strategies are related to alcohol and nicotine use. I have compared men and women, as well as examined specific vulnerabilities for alcohol and nicotine use among women. I also focus on the ways that cultural and social forces relate to health behaviors. Specifically, my work has examined how the internalization of unrealistic appearance standards is related to smoking in women.

The intersection of race and gender identities is another area of focus in my research. Building on feminist and critical race theories of intersectionality, I have collected narratives of African American women’s constructions of race and gender. These narratives reveal the sense of private, public and communal selves that emerge as essential to how these women negotiate racism and sexism. These dimensions also emerge as integral to an understanding of cultural factors related to resilience in oppressed groups.

My research on social context, mental health, and health behaviors has given me the opportunity to work in applied settings. From 2000–2002, I taught, and eventually directed the Using Math: Girls Investigate Real Life intervention program. The purpose of the program was to provide an intervention for rising seventh grade girls who were at risk of losing interest in math and science. I also consult with community programs and non-profit organizations targeting underserved communities and health issues. My most recent projects include working on a team evaluating Substance Abuse Treatment Programs for the Michigan Department of Corrections and evaluating the intervention process of a grass-roots community center.
The faculty and students of the Psychology Department have been very active and successful in securing extramural funds during the last 6 months.

Professor **Pennie Foster-Fishman** along with graduate student Branda Nowell received a grant from the Michigan Nonprofit Research Program, to study “The role of social capital in domestic violence coordinating councils.” Professor **Cris Sullivan**, along with Holly Rosen, the Director of MSU Safe Place, received a Department of Justice grant to, “Combat violent crimes against women on campuses.” Professor **William Davidson**, received support from Ingham County, for two projects, “The adolescent diversion project,” and “Analysis of risk assessment.” He also received support from the American Psychological Association as the editor of the *American Journal of Community Psychology*.

Professor **Cynthia Jordan** received an NIH/PHS grant entitled, “Androgen targets in a simple behavioral system.” Professor **Marc Breedlove** received two NIH grants to study, “Hormonal effects on behavior and spinal cord morphology,” and, “Integrative neurobiology of social processes.” Professor **Cheryl Sisk** was awarded an NIMH grant to study, “Pubertal organization of brain and behavior,” and an NIH Institutional Predoctoral Training grant for “The interdisciplinary training program in neuroscience.” Along with Julia Zehr, Professor Sisk received NIH money to support a postdoctoral fellowship to study, “Steroid hormones during puberty and the organization of reproductive behavior.” She also secured a predoctoral fellowship (along with Kalynn Schulz) to investigate, “The effects of gonadal hormones during puberty on behavior.” Professor **Juli Wade** was the recipient of NSF support for, “The international meeting for the Society for Behavioral Neuroendocrinology.”

Professor **Fernanda Ferreira** received a NIH grant to study, “Comprehension in naturalistic contexts.” She also received (along with Professor John Henderson) a Strategic Partnership grant from the MSU Foundation to establish the Center for Integrated Study of Vision and Language (CISVAL). Professor **John Henderson** received a grant from ARO to study, “Human gaze control during real-world scene perception.” Along with Professor Ferreira he also received support from OVPRGS for the “Analytical core facilities.”
The Department of Psychology would like to hear from you. Please send us information about your professional and personal achievements.

**e-mail**: detwiler@msu.edu
**or**
**fax**: 517-432-2476