

## **Behavioral Neuroscience and Psychopharmacology**

The Behavioral Neuroscience and Psychopharmacology area of concentration is designed to train students broadly in the general theoretical principles and technical approaches used to investigate the neurobehavioral mechanisms of alcohol and drug abuse. Psychopharmacological approaches to understanding basic principles of learning are also emphasized. Students receive a concentrated lab experience using either animal models (quail, mice or rats) or human subjects. Faculty in the program use different levels of analysis including cell culture models, neurochemical assays, developmental toxicology, classical conditioning of drug effects, operant conditioning, human behavioral pharmacology, and cognitive approaches to behavior. Students are expected to receive in depth training in at least one level of analysis although training that integrates more than one level of analysis is strongly encouraged.

### **PROGRAM REQUIREMENTS**

#### **COURSE REQUIREMENTS**

- (1) Statistics sequence:
  - PSY 610 - Experimental design
  - PSY 611 - Correlational design
  
- (2) PSY 780 - Directed BNP studies
  - PSY 780A - first year students only
  - PSY 780B - first year and beyond
  
- (3) Any three proseminars selected from the following areas:
  - Learning
  - Cognitive processes
  - Developmental Psychology
  - Sensation & Perception
  - Physiological Psychology
  
- (4) Four electives (a minimum of one of these must be outside of the Psychology Department) (see listing of some possible options on page \*\*).

(5) Additional course work as recommended by the advisory committee  
RESEARCH REQUIREMENTS

It is expected that all students in the BNP area will be involved in research throughout their course of study towards the Ph.D. The area has two formalized requirements that are designed to train the student in conducting research:

- (1) Master's thesis
- (2) Dissertation

ALLIED AREA REQUIREMENT

Each student is expected to develop an allied area to gain expertise in some area outside of the student's main research specialty. This requirement can be satisfied by various combinations of course work and research or professional experience, as described previously for the Experimental Program. The selection of an appropriate allied area project will be made by the student in consultation with the advisory committee. Completion of this requirement occurs prior to scheduling the qualifying examination.

QUALIFYING EXAMINATION

Each student must pass the qualifying examination to be promoted to doctoral candidacy. The exam is intended to be a demonstration that the candidate has developed a broad, defensible perspective on his or her area of study. The specific content and format of the examination will be determined in discussions between the student and the advisory committee. There are currently two options for the written qualifying exams. The student may choose to include ½ of their exam as a performance component in the specialty area (e.g., a review paper; a series of critical reviews of papers or manuscripts or a grant application - all with the intent of eventual publication) followed by ½ of the exam as a sit-down, in-class, closed book test of the major and minor areas. Alternatively the student can choose to take the entire written qualifying exam as a sit-down in-class closed book test. The length of the written qualifying exam for students that choose to take the entire exam as a sit-down test is 3 days although it can be divided within the course of a week. Students that choose to take ½ as performance component will have 1 ½ days of sit-down exam. The performance component should be completed within a 6 week window as determined by the qualifying committee in conjunction with the student.

Performance on the written portion of the qualifying examination will be evaluated by the dissertation advisory committee, with 1 of 3 possible outcomes: pass, fail, or remedial work required. In the event of a pass on the written exam, the student will schedule the oral defense with the Graduate School. In the event of a failure on the written exam, the student is allowed to retake the written examination within one year. A second failure will result in a dismissal from the program. In the event that remedial work is required, the nature of the work will be

determined by the advisory committee and should be completed prior to the oral defense. When the written examination is passed with remedial work, the oral defense can be scheduled with the Graduate School.

## **TEACHING REQUIREMENT**

All students are expected to gain teaching experience, generally consisting of one or more semesters service as a teaching assistant or instructor. Students are also encouraged to take courses and attend workshops pertinent to teaching, especially if teaching is a part of one's primary career goal. In consultation with Dr. Taylor, the Director of Undergraduate Studies for the Department of Psychology, and/or Dr. Kim, a formal "teaching specialty" may be pursued, which can serve as an allied area for interested students. It will consist of course work pertinent to college teaching, a systematic assignment of teaching assistantships, and a teaching internship at the University of Kentucky or one of several liberal arts colleges in the area.

## **TRANSFERRING GRADUATE CREDIT FROM OTHER INSTITUTIONS**

Entering students are expected to fulfill all of the requirements outlined above. However, students may petition to have a previous Master's degree or selected course work count towards completion of the Ph.D. in the program.

In the case of students entering with a Master's degree from another institution, the BNP coordinator will assign a temporary faculty advisory committee to review the transfer of the previous degree. This committee will be assigned as soon as possible after the student is accepted into the program. The temporary committee will consist of the BNP coordinator, the prospective primary advisor, and one other faculty member. The charge of the committee will be to determine which program requirements the student may fulfill by transferring graduate work from another institution. Copies of the Master's thesis should be provided to the committee. This committee will also be responsible for setting a timetable for progress towards completion of the allied area requirement, the qualifying examination and the dissertation.

Students may also petition the BNP coordinator to transfer individual graduate courses taken at another institution on a course-by-course basis. Students are expected to provide course syllabi and supporting materials so that a relevant faculty member can determine if it fulfills the BNP course requirement. Recommendations for the waiver of individual courses must be approved by GSAC and a memorandum should be placed in the students personal file.

## **STUDENT SUPERVISION**

Student supervision occurs on three levels: primary faculty advisor, faculty advisory committee, and the entire BNP faculty. Each student will choose (or be assigned) a primary advisor, or mentor, upon entering the program. The student in consultation with the mentor will form an advisory committee. Prior to the Master's thesis, the advisory committee will consist of the mentor and two additional faculty members. After the thesis is completed, the advisory

committee will consist of the mentor and four additional faculty members. The advisory committee will play a critical role in advising throughout a student's graduate career.

The advisory committee is primarily composed of faculty within the area, but other departmental faculty, faculty from other units at the university, and in some cases from other institutions, can also serve. As noted above, there are three different advisory committees that supervise the student during the various stages of their training: (1) initial advisory committee; (2) Master's advisory committee; and (3) dissertation advisory committee. There is usually considerable overlap in the composition of these committees, but students do have the flexibility to reconstitute their committee if their interests change. There are four points during a student's career that constitute logical points at which the composition of the advisory committee are considered: (1) during the first semester of matriculation, the student must form an initial advisory committee; (2) at the point where a Master's thesis project is defined, the committee might undergo a change; (3) upon completion of the thesis, the dissertation advisory committee must be formed; (4) upon completion of the qualifying exam, a student might elect to make changes in the dissertation advisory committee for supervision of the dissertation.

#### INITIAL ADVISORY COMMITTEE

The initial advisory committee should be formed by the end of the first semester of enrollment. This committee will consist of the student's mentor and (at least) two other faculty members. The purpose of this committee is to guide the student's early progress in the program. The student will consult with this committee to select courses, define a research speciality, and begin development of the Master's thesis project. This committee will supervise all aspects of the student's academic experience until the Master's advisory committee is formed.

#### MASTER'S ADVISORY COMMITTEE

The primary responsibility of this committee is to guide completion of the Master's thesis. This committee will consist of the student's mentor and (at least) two other faculty members; the student's initial advisory committee may well serve as the thesis committee. The student will consult with this committee to develop a research idea that is then formalized into a Master's thesis proposal. This committee will determine the adequacy of the proposal, guide completion of the project, supervise other aspects of the student's academic progress during this time, and conduct the oral defense of the Master's thesis.

#### DISSERTATION ADVISORY COMMITTEE

During the semester following successful defense of the Master's thesis, the student must form a committee that will supervise the qualifying examination and dissertation. This committee will consist of the student's mentor and four other faculty members, at least one of whom must be outside of the Department of Psychology. One purpose of the committee is to advise and approve the allied area plan. Another purpose of the committee is to guide the preparation and completion of the student's qualifying examination, including both written and

oral components. This committee is also responsible for supervising academic progress during the remainder of the student's tenure, including the development, completion, and evaluation of the student's Ph.D. dissertation. Each student will develop a formal dissertation proposal, which will be evaluated by the committee. In accord with guidelines of the Graduate School, this committee will also conduct the oral defense of the dissertation, which is the final formal requirement for the Ph.D.

### **RECOMMENDED TIMETABLE OF PROGRESS IN THE PROGRAM\***

Fall of first year:	Initial advisory committee formed and meets
Spring of first year:	Master's advisory committee formed
Fall of second year:	Master's thesis proposed and research begun
Spring of second year:	Master's thesis defended
Fall of third year:	Dissertation advisory committee formed
Spring of third year:	Allied area work completed
Fall of fourth year:	Qualifying examination passed
Spring of fourth year:	Dissertation proposal accepted
Fifth year:	Dissertation defended

\* Students entering with prior graduate work will have a determination made of an appropriate timetable determined by a temporary advisory committee appointed by the program coordinator.

### **EVALUATION OF PROGRESS IN THE PROGRAM**

Students will receive explicit, timely feedback concerning their progress in the program. Students will be evaluated by the faculty of the program at several points during their academic careers.

### **ANNUAL EVALUATIONS**

All students will be evaluated by BNP faculty at the end of each academic year. There also will be a meeting of faculty of the entire Experimental Area to discuss particularly meritorious students or students that have encountered particular difficulties. Students will submit a statement of their accomplishments during the year and those accomplishments will be evaluated against students' statements of goals at the beginning of the academic year. In addition, any other information relevant to an evaluation of the student's professional progress will be considered (e.g., performance in teaching assignments, class participation, etc.). The content of

the discussion will be communicated to the student in a letter, which will be approved by all the faculty before it is conveyed to the student. A short meeting will also be set up for each student to meet with the BNP faculty to solicit comments and feedback.

## **MASTER'S THESIS**

The end of the fourth semester in the program is the goal for the completion of the Master's thesis. According to GSAC regulations, if the thesis is not completed by the start of classes in the sixth semester in the program, the student may have to meet with GSAC and could be subject to dismissal from the program.

## **QUALIFYING EXAMINATION**

The qualifying examination is the point in a doctoral program where a determination is made of whether the student will be promoted to candidacy for the Ph.D. The examination consists of a written and oral component, as described previously. It is expected that the oral defense is completed by the end of the fourth year of matriculation. If the qualifying exam has not been completed by the start of classes in the ninth semester (i.e., Fall of fifth year), the student may be placed on probation.

## **ACADEMIC PROBATION**

Students will receive explicit feedback about their progress in the program. In cases where the advisory committee rates either quality of performance or rate of progress to be inadequate, the BNP faculty may place the student on academic probation. When placed on probation, the BNP faculty will recommend a course of action that will allow the student to set goals for improvement. The student will receive a letter from the coordinator of the BNP area that outlines the nature of the problem leading to probation and the goals the student must achieve to end the probation period. A timetable for reaching these goals will be included in the letter. The student on probation will also meet with his/her mentor and the BNP coordinator to discuss the nature of the problem and the work needed for improvement. Probation periods will not normally extend beyond one year.

## **COURSE LOAD**

The usual course load for students receiving nonservice fellowships (financial awards that do not require specific teaching or research participation) is 12 credit hours. The usual course load for students on teaching (T.A.) or research assistantships (R.A.) is 9 credit hours each semester, and assistantship duties are limited to a maximum of 20 work-hours/week. A student must be officially enrolled with the graduate school for at least 9 credit hours in order to be considered a full-time graduate student. Once required course work has been completed, full-time status is maintained through enrollment in variable-credit research hours (PSY 781). At the appropriate time, students must also register for Master's Degree Research Credit (PSY 768) and Doctoral Degree Research Credit (PSY 769). Premaster's Research Credit is PSY 790.

## **STUDY PLANS**

The program is intended to provide maximum flexibility so that each student can develop a plan of study that includes courses, research, and other experience pertinent to the student's career objectives. Remember that if the student has received funding from a particular program or training grant, there may be a limited number of course requirements for these programs. The course work is intended to provide a grounding in research methodology along with a solid background in neuroscience and behavioral pharmacology. In addition, the program offers several course electives geared to specific areas that are of specific interest to the student.

Possible elective courses:

### *Psychology Courses:*

PSY 562: Advanced Topics in Cognitive Psychology\*

PSY 563: Advanced Topics in Developmental Psychology\*

PSY 564: Advanced Topics in Learning\*

PSY 565: Advanced Topics in Neuroscience\*

PSY 626: Survey of Health Psychology

*\* these courses vary by topic subheadings and can be taken repeatedly for credit*

### *Behavioral Science Courses:*

BSC 772: Drugs of Abuse: Pharmacological, Clinical & Social Issues

BSC 772: Biobehavioral Perspectives on Drug & Alcohol Abuse & Dependency

BSC 772: Topical Seminar on Drugs of Abuse

BSC 776: Dependency Behavior

BSC 745: Research Methods in Behavioral Science

BSC 775 Human Response to Stress

### *Pharmacology Courses:*

PHA 522: Systems Pharmacology

PHA 658: Advanced Neuropharmacology

### *Pharmacy Courses:*

PHR 645 Neurotoxicology

PHR 649 Molecular Neurobiology

TOX 600 Ethics in Scientific Research

PHR 760 Topics in Pharmaceutical Sciences (Journal Club)

### *Biology Courses:*

BIO 535 Comparative Neurobiology and Behavior

BIO 618 Molecular Neurobiology

BIO 630 Biology of Reproduction

BIO 638 Developmental Neurobiology

*Graduate School Courses:*

GS 610 College Teaching

GS 650 Preparing Future Faculty

**FACULTY**

Akins, Chana, Ph.D. University of Texas; 1994; Assistant Professor. Behavioral and neurobiological aspects of Pavlovian conditioning, drug effects in avians. ckakin1@pop.uky.edu

Bardo, Michael, Ph.D., Iowa State University, 1980; Professor, Psychopharmacology, neuroscience, conditioning with drugs of abuse. mbardo@uky.edu

Barron, Susan, Ph.D., State University of New York at Albany, 1987; BNP Coordinator, Associate Professor. Behavioral teratology, effects of prenatal drug exposure, psychopharmacology. sbarron@uky.edu

Fillmore, Mark, Ph.D., University of Waterloo, 1993; Associate Professor. Human behavioral pharmacology, alcohol, caffeine, drug abuse, cognition, motivation. mtfill2@uky.edu

Kelly, Thomas, Ph.D. (Behavioral Sciences and Psychology), University of Minnesota, 1983; Professor. Behavioral pharmacology, effects of drugs with abuse liability, influence of psychosocial factors on functional effects of drugs. thkelly@pop.uky.edu

Nixon, S.J., Ph.D. Professor, University of Oklahoma, 1982; Professor. Neurocognitive aspects of chronic substance abuse. sara.jo.nixon@uky.edu

Mark Prendergast, Ph.D., University of Nebraska, 1994; Assistant Professor. Mechanisms involved in brain damage, particularly in the rat hippocampus, that results from chronic ethanol exposure and withdrawal or other brain injury. prender@uky.edu

Rush, Craig R. (Behavioral Sciences and Psychology) University of Vermont, 1992; Professor, Human behavioral pharmacology of commonly abused drugs. crush2@pop.uky.edu