

Syllabus
Behavioral Pharmacology (PSYC 5620/6620)
Fall 2004

- Course Title:** Behavioral Pharmacology (PSYC 5620/6620)
- Instructor:** Christopher Newland, Ph.D.
Department of Psychology.
Room 213 Haley Center
newlamc@mail.auburn.edu
www.auburn.edu/~newlamc
844-6479 (office) 844-3295 (lab)
- Meeting Times:** 10:00-10:50, MWF
- Room:** Haley Center 3218
- Text:** *A Primer of Drug Action. 9th Edition.*
Robert M. Julien. New York: Freeman., 2001
Selected Readings.
- Graduate Teaching Asst.** Miranda Reed
reedmir@auburn.edu
- Office Hours:** Dr. Newland: Monday, Wednesday 8:30-10:00 or by appointment.
Miranda Reed. Monday, Wednesday, & Friday, 11-11:50 or by appointment.

Course Description (from catalog): A review of drugs that affect nervous system function and behavioral or neural mechanisms that modify these effects. Topics include substance abuse, preclinical and clinical psychopharmacology, learning and memory, behavioral mitigation of drug effects. Meets APA criteria for Level I training in psychopharmacology.

Course Objectives: Behavioral pharmacology is the study of the interaction between behavior and drugs that influence the nervous system. The study of drugs that act on the brain spans many disciplines and can be conducted along any of several levels of analysis ranging from changes in minute elements of the cell membrane to global issues like the sociology of substance abuse. In behavioral pharmacology and psychopharmacology, we emphasize the actions of drugs on the behaving individual (human or nonhuman), and how the particulars of ongoing behavior can actually influence these actions. In order to understand the behavior of an individual we will draw from the study of neural function, behavioral determinants of action, as well as social influences. In this course we examine behaviorally active drugs, their clinical utility, their actions on the nervous system, and experimental approaches to characterizing drug-behavior interactions.

Course Structure. The course will be centered around the textbook and selected readings. Class time will be used partly to cover material from the textbook, especially material that might be difficult to get from the book alone. For this I will need your help in letting me know what parts of the book you have difficulty with. I also hope to use some class time to extend the discussion in the textbook either to cover a topic in a little more depth or to discuss a point raised by the authors.

Grading. The course grade for undergraduates will be a simple average of six grades. There will be five in-class exams given through the term, including the final exam day. The sixth grade will come from four responses to journal articles that you turn in through the term. These be any article referred to in your text or readings or (with my permission) an article that you locate and are interested in. Articles in the latter category must come from a quality peer-reviewed journal.

If you miss an exam due to a university-approved excuse listed in the Tiger Cub then you may make up at the *next* available time. Make-up exams will be provided by the department at a time that will be announced early in the term. Make arrangements *before* the exam for anticipated absences. Make arrangements *the day* of the exam for unanticipated absences, such as an illness. Arrangements should be made with Miranda Reed.

Graduate Course Credit. In addition to the undergraduate assignments, students taking PSYC 6620 are required to do one of the two extra assignments listed below. This assignment will count as an exam, so for students enrolled in PSYC 6620 the course grade will be the average of *seven* exams. The options are:

- Attend a professional meeting with sessions *pertinent to behavioral pharmacology*. Provide a report on the activities. (Approval of instructor is required).
- Write a paper on one of the topics listed at the end of this syllabus.

Academic Honesty. Cheating is theft and a betrayal of the openness and good-faith required for higher education to function. Cheating will not be tolerated. The policies established in the Tiger Cub will serve as guidelines for dealing with dishonesty. In this course you are encouraged to study together, but all exams and home assignments must be taken on your own unless specified otherwise.

Students with Disabilities. Students with a disability documented by Auburn's Program for Students with Disabilities should schedule a meeting with me early in the term. I will work with the student to meet the accommodations recommended by the Program for Students with Disabilities.

Potential Term Paper Topics.

1. Behavioral tolerance.
2. Drug effects on learning or memory.
3. Reinforced abstinence in the treatment of substance abuse.
4. Contextual control as a mediator of drug effects.
5. Preclinical behavioral pharmacology of a drug class (you pick the drug class).
6. Developmental neurotoxicology of a relevant drug or toxicant (suggestions: lead, methylmercury, ethanol, barbiturates, phenytoin, retinol, or clear with the instructor one in which you are interested).
7. Pharmacotherapy in developmental disabilities.
8. Drugs and/or brain injury—their effects on and choice or self-control.
9. Behavioral pharmacology of substance abuse (this will have to be narrowed, check with the instructor).
10. Drugs as discriminative stimuli. (you may choose a particular drug class and describe the discriminative/subjective effects of that).
11. Drug effects on motor function.
12. Rate dependent effects of drugs.
13. Specificity of antipunishment effects of drugs.
14. Drug/behavior therapy of one of: ADHD, anxiety disorders, schizophrenia, disorder of your choice (with instructor's approval).
15. Drugs and sleep.
16. Topic of your choice, with approval of instructor.

Schedule of Activities

Wk	Class	Date	Topic	Chapter/ Readings
1	1	18 Aug	Introductory comments.	1
	2	20 Aug	Pharmacokinetics: Drug uptake, distribution, and elimination.	1
2	3	23 Aug	Measuring drug effects: The dose-effect curve.	2
	4	25 Aug	The peripheral nervous system.	3
	5	27 Aug	General organization of the N.S./The neuron.	3
3	6	30 Aug	Neurotransmission	3
	7	1 Sep	Metabotropic and ionotropic receptors	2,3
	8	3 Sep	Some specific neurotransmitters	3
4		6 Sep	Labor Day Holiday, Mon 6 Sep.	
	9	8 Sep	Metabolic and pharmacodynamic tolerance	3
	10	10 Sep	New drug development and bringing a drug to market.	[1] FDA Web Page
5	11	13 Sep	EXAM 1.	
	12	15 Sep	Alcohol, uptake, metabolism and elimination.	4
	13	17 Sep	Alcohol, direct effects, tolerance and withdrawal.	4,
6	14	20 Sep	Developmental neurotoxicity of ethanol.	5
	15	22 Sep	Barbiturates, anesthetics and antiepileptic drugs: general effects	6
	16	24 Sep	Benzodiazepines and second-generation anxiolytics	
7	17	27 Sep	Sedative hypnotics: direct behavioral effects and drug interactions.	4,5,6
	18	29 Sept	Cocaine: Basic pharmacology	7
	19	1 Oct	Cocaine and psychomotor stimulants: Direct behavioral effects	7
8	20	4 Oct	Amphetamine: Clinical uses and side effects.	7
	21	6 Oct	EXAM 2.	
	22	8 Oct	Neuroleptics: Schizophrenia and its neural bases. (Mid-Semester)	17
9	23	11 Oct	Neuroleptics: Basic Pharmacology	17
	24	13 Oct	Neuroleptics: Clinical uses and side effects.	17
	25	15 Oct	Behavior principles: Reinforcement and rate dependency.	[2]

10	26	18 Oct	Behavior principles: Antipunishment effects of anxiolytics.	[3]
	27	20 Oct	Neuroleptics and avoidance.	[4]
	28	22 Oct	EXAM 3: CHAPTERS	
11	29	25 Oct	Substance abuse: Background issues.	[5]
	30	27 Oct	Reinforcing effects of abused drugs.	[6]
	31	29 Oct	Behavioral economics: Environmental influences over substance abuse.	[7]
12	32	1 Nov	Stimulus properties of drugs.	[8]
	33	3 Nov	Profiling the discriminative stimulus properties of a drug.	[9]
	34	5 Nov	Respondent processes and stimulus effects	[10]
13	35	8 Nov	Contextual control over drug effects.	[11]
	36	10 Nov	Behavioral prostheses.	[12]
	37	12 Nov	Repeated acquisition of discriminations.	[13]
14	38	15 Nov	EXAM 4	
	39	17 Nov	Behavioral tolerance: operant mechanisms.	[14]
	40	19 Nov	Behavioral tolerance and stimulus control.	[15]
		22-27 Nov	Thanksgiving Holiday.	
15	41	29 Nov	Behavioral tolerance: respondent mechanisms.	[16]
	42	1 Dec	Papers due for graduate students. Drug/behavior interactions in clinical settings: ADHD and psychomotor stimulants.	[17]
	43	3 Dec	Drugs and developmental disabilities	[18, 19]
16	44	6 Dec	Drugs, chemicals, and aging.	[20, 21]
	45	8 Dec	Choice, self –control, and cortical/striatal dopamine.	TBA

FINAL EXAM
WEDNESDAY, 15 DEC 2004
11:AM - 1:30 PM

References

1. FDA. (2000). *New drug development and review process*. U.S. Food and Drug Administration. Available: http://www.fda.gov/cder/handbook/dev_rev.htm [2000].
2. McKim, W. A. (2003). Research design and the behavioral analysis of drug effects. In W. A. McKim (Ed.), *Drugs and behavior: An introduction to behavioral pharmacology* (pp. 24-38). Upper Saddle River, New Jersey: Prentice Hall.
3. Kleven, M. S., & Koek, W. (1999). Effects of benzodiazepine agonists on punished responding in pigeons and their relationship with clinical doses in humans. *Psychopharmacology*, *141*(2), 206-212.
4. Shannon, H. E., Hart, J. C., Bymaster, F. P., Calligaro, D. O., DeLapp, N. W., Mitch, C. H., Ward, J. S., Fink-Jensen, A., Sauerberg, P., Jeppesen, L., Sheardown, M. J., & Swedberg, M. D. (1999). Muscarinic receptor agonists, like dopamine receptor antagonist antipsychotics, inhibit conditioned avoidance response in rats. *Journal of Pharmacology & Experimental Therapeutics*, *290*(2), 901-907.
5. Stolerman, I. (1992). Drugs of abuse: Behavioural principles, methods and terms. *Trends in Pharmacological Sciences*, *13*, 170-176.
6. Campbell, U. C., Rodefer, J. S., & Carroll, M. E. (1999). Effects of dopamine receptor antagonists (d1 and d2) on the demand for smoked cocaine base in rhesus monkeys. *Psychopharmacology*, *144*(4), 381-388.
7. Silverman, K., Wong, C. J., Umbricht-Schneiter, A., Montoya, I. D., Schuster, C. R., & Preston, K. L. (1998). Broad beneficial effects of cocaine abstinence reinforcement among methadone patients. *Journal of Consulting & Clinical Psychology*, *66*(5), 811-824.
8. Schuster, C. R., & Balster, R. L. (1977). The discriminative stimulus properties of drugs, *Advances in behavioral pharmacology* (pp. 86-139). New York: Academic Press.
9. Kamien, J. B., & Woolverton, W. L. (1989). A pharmacological analysis of the discriminative stimulus properties of d-amphetamine in rhesus monkeys. *Journal of Pharmacology & Experimental Therapeutics*, *248*(3), 938-946.
10. Foltin, R. W., & Haney, M. (2000). Conditioned effects of environmental stimuli paired with smoked cocaine in humans. *Psychopharmacology*, *149*(1), 24-33.
11. Laties, V. G. (1972). The modification of drug effects on behavior by external discriminative stimuli. *Journal of Pharmacology and Experimental Therapeutics*, *183*, 1-13.
12. Wood, R. W., Rees, D. C., & Laties, V. G. (1983). Behavioral effects of toluene are modulated by stimulus control. *Toxicology and Applied Pharmacology*, *68*, 462-472.
13. Thompson, D. M., & Moerschbaecher, J. M. (1979). An experimental analysis of the effects of d-amphetamine and cocaine on the acquisition and performance of response chains in monkeys. *Journal of the Experimental Analysis of Behavior*, *32*, 433-444.
14. Balster, R. L. (1985). Behavioral studies of tolerance and dependence, *Behavioral pharmacology: The current status* (pp. 403-418). New York: Alan R. Liss.
15. Rees, D. C., Wood, R. W., & Laties, V. G. (1987). Stimulus control and the development of behavioral tolerance to daily injections of d-amphetamine in the rat. *Journal of Pharmacology & Experimental Therapeutics*, *240*(1), 65-73.

16. Siegel, S., Baptista, M. A., Kim, J. A., McDonald, R. V., & Weise-Kelly, L. (2000). Pavlovian psychopharmacology: The associative basis of tolerance. *Experimental & Clinical Psychopharmacology*, 8(3), 276-293.
17. anonymous. (1999). A 14-month randomized clinical trial of treatment strategies for attention-deficit/hyperactivity disorder. The mta cooperative group. Multimodal treatment study of children with adhd.[comment]. *Archives of General Psychiatry*, 56(12), 1073-1086.
18. Aman, M. G., Collier-Crespin, A., & Lindsay, R. L. (2000). Pharmacotherapy of disorders in mental retardation. *European Child & Adolescent Psychiatry*, 9 Suppl 1, I98-107.
19. Valdovinos, M. G., Napolitano, D. A., Zarcone, J. R., Hellings, J. A., Williams, D. C., & Schroeder, S. R. (2002). Multimodal evaluation of risperidone for destructive behavior: Functional analysis, direct observations, rating scales, and psychiatric impressions. *Experimental & Clinical Psychopharmacology*, 10(3), 268-275.
20. Newland, M. C., & Rasmussen, E. B. (2000). Aging unmasks adverse effects of gestational exposure to methylmercury in rats. *Neurotoxicology & Teratology*, 22(6), 819-828.
21. Weiss, B. (1990). Risk assessment: The insidious nature of neurotoxicity and the aging brain. *NeuroToxicology*, 11, 305-313.