

**Course:** Psychology 5898: Seminar in Behavioral Neuroscience

**Semester:** Spring 2018

**Time:** Tuesday/Thursday 9:35-10:55AM

**Place:** Ramseyer Hall 009

**Instructor:** Dr. Kathryn Lenz

Assistant Professor, Departments of Psychology & Neuroscience

Office: Psychology Building, Room 45

Phone: 614-292-8565

Email: lenz.56@osu.edu

**Course description:** This course is designed to provide upper-level psychology and neuroscience students with an overview of contemporary research topics in the broad interdisciplinary field of Behavioral Neuroscience, encompassing behavioral, cognitive, developmental, and systems neuroscience. The course includes research-based lectures by various faculty from several Departments and Colleges who are each distinguished investigators in their particular research field. Each faculty member will describe the current state of understanding in a particular area of Behavioral Neuroscience as well as critical issues yet to be resolved. The remainder of the course meetings will be student presentations of current research papers centered on 'hot topics' in behavioral neuroscience. Thus a major goal of the course is to increase students' exposure to current research, practice reading and comprehending primary literature, and gain experience presenting research findings orally.

**Text and other resources:** There is no textbook for this class. Students will read primary research articles in behavioral neuroscience research. For faculty guest lecture days, 2-3 articles relevant to the lecture will be chosen by the lecturer. These articles should be read prior to the lecture, and the content of these articles is fair game on exams. For student presentation days, the class will be responsible for reading the research articles being presented prior to class, and students must be ready to make insightful comments and critiques of the research as well as posing questions in class to generate lively discussion (See participation). Articles will be posted on Canvas prior to each day's class.

**Office Hours:** Office hours will be held **each Tuesday/Thursday from 12-1 PM, and by appointment**. I am here to help with anything you need and I encourage you to regularly attend office hours. I'm more than happy to meet with you outside of office hours if you schedule it in advance via email, but please no unscheduled drop-ins outside of regular office hours. If you are struggling with the course materials or would like to work toward a higher grade in the class, please meet with me as early as possible in the semester. Please use office hours as an opportunity to regularly review the material, your exam results, and ask any questions you have. I also encourage each student to meet with me before their research article presentation to ensure it is a good choice of article and that they understand all technical details in the article.

**Exams.** There will be three midterm exams in this course, which will consist of long answer essays in response to prompts from each faculty guest speaker based on their lectures and assigned readings as well as questions related to the articles in student presentations. All midterms will be taken during regular class times throughout the semester as noted in the daily schedule below. These exams will include the material

covered since the last exam, generally 3-4 faculty lectures. **Each exam will be worth 20 points (Exam 1-2: 20 points; Total: 60 points).**

**Presentation:** Each student will present a PowerPoint discussion on a behavioral neuroscience research article. Each presentation should last approximately 30 min, with an additional 10 min set aside for class discussion. That means that 1-2 students will present per class period. The article will be selected in consultation with myself, and I encourage you to choose your article and meet with me well in advance of your presentation (the sooner the better!). The order of presentations will be decided on the first week of class via Doodle Poll (see Canvas for link). Each PDF article will be posted to Canvas prior to the presentation and students should read and be ready to discuss it prior to class. Each student's presentation will be worth **25 points** toward their final grade.

**Student Attendance and Participation:** Attendance and participation are critical in this course, and attendance will be taken at the beginning of each class. If you expect to be absent, you must obtain permission from the instructor prior to the start of class. OSU's policy defines acceptable excuses as: a death in the family, personal illness or the illness of your child or spouse, and unforeseen accidents. Please obtain documented proof of these events should they occur. If no notification is received the absence will be counted as unexcused.

**Attendance:** Attendance will account for **5 points** of your final grade and will be computed as follows. **For excused absences**, you must perform makeup work for the day of class missed, in the form of a 1 page summary of the readings assigned for that day's class, either student presentation papers or faculty-assigned papers. Otherwise your absence will be treated as unexcused.

5 points = 1 excused absence or less

4 points = 2 excused or 1 unexcused absence

3 points = 3 excused or 2 unexcused absences

1 point = 4 excused or 3 unexcused absences

0 points = 5 or more excused or 4 or more unexcused absences.

**Participation:** All students are expected to actively participate in class, both in faculty lectures and student presentation discussions. The entire course revolves around student's ability to read and think on various topics, which means everyone must contribute. Examples of class participation include asking questions during student or faculty presentations, or responding to discussion questions during student presentations. In addition, to ensure that students are reading articles prior to class and thinking critically about them, we will utilize a Canvas discussion board to regularly log student responses to the readings. Each day of student presentations will be accompanied by a discussion thread, where each student is expected to log their initial responses, questions, ideas etc. about each article. These will not be graded for what you have to say, but merely that you have something to say about each article. The procedure for these will be demonstrated on the first day of class. If you do not attend class regularly, your participation grade will suffer in addition to your attendance grade above. A combination of in class discussion and discussion board usage will comprise your participation grade. Class participation will account for **15 points** of your final grade, so take it seriously!

**Grading:** Grades will be based on points earned out of a possible **100 points**. This will include your scores from three midterm exams, presentation, and attendance and participation. No curve or 'rounding up' will be applied to grades at the end of the semester, and no extra credit will be offered.

**Points breakdown:**

<b>Exams:</b>	<b>60 points maximum</b>	<b>(20 per midterm x 3)</b>
<b>Presentation:</b>	<b>20 points maximum</b>	
<b>Attendance:</b>	<b>5 points maximum</b>	
<b>Participation:</b>	<b>15 points maximum</b>	

Final score will be **100 points** maximum. **The standard OSU grading scale will be used to assign final grades:**

A	93-100%	(93 points)
A-	90-92%	(90-92 points)
B+	87-89%	(87-89 points)
B	83-86%	(83-86 points)
B-	80-82%	(80-82 points)
C+	77-79%	(77-79 points)
C	73-76%	(73-76 points)
C-	70-72%	(70-72 points)
D+	67-69%	(67-69 points)
D	60-66%	(60-66 points)
E	0-59%	(0-59 points)

**Make-up Policy:** Students are expected to take their exams at the times specified on the syllabus. Students will be requested to provide *verifiable* documentation of the absence (a doctor's note, an obituary, or letter from university athletics department). If the absence is valid (i.e., a university approved reason with sufficient documentation) then a make-up exam will be scheduled within one week of the scheduled exam with no grade penalty. If the absence is NOT considered valid (i.e., unapproved reason or insufficient documentation) then a make-up exam will be denied.

**Academic Misconduct:** It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct at <http://studentconduct.osu.edu>.

**Disabilities Statement:** The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability

Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. **SLDS contact information:** [slds@osu.edu](mailto:slds@osu.edu); 614-292-3307; [slds.osu.edu](http://slds.osu.edu); 098 Baker Hall, 113 W. 12<sup>th</sup> Avenue.

**Sexual misconduct/relationship violence:** Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at <http://titleix.osu.edu> or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at [titleix@osu.edu](mailto:titleix@osu.edu).

**Daily Schedule for Psych 5898:**

Week	Date	Topic Covered in Class
1	Tues 1/9	Class overview, presentation sign-up. Lecture: Finding & Presenting a Research Article
	Thurs 1/11	<b>Faculty lecture: Dr. Liz Kirby</b>
2	Tues 1/16	Student presentations
	Thurs 1/18	Student presentations
3	Tues 1/23	Student presentations
	Thurs 1/25	Student presentations
4	Tues 1/30	Student presentations
	Thurs 2/1	<b>Faculty Lecture: Dr. Derick Lindquist</b>
5	Tues 2/6	Student presentations
	Thurs 2/8	Student presentations
6	Tues 2/13	<b>Faculty Lecture: Dr. Jonathan Godbout</b>
	Thurs 2/15	<b>Exam 1 in class</b>
7	Tues 2/20	Student presentations
	Thurs 2/22	Student presentations
8	Tues 2/27	<b>Faculty Lecture: Dr. Leah Pyter</b>
	Thurs 3/1	<b>Faculty Lecture: Dr. Benedetta Leuner</b>
9	Tues 3/6	<b>Faculty Lecture: Dr. Laurence Coutellier</b>
	Thurs 3/8	Student presentations
----	3/13 + 3/15	<b>SPRING BREAK: NO CLASS</b>
10	Tues 3/20	Student presentations
	Thurs 3/22	<b>Exam 2 in class</b>
11	Tues 3/27	Student presentations
	Thurs 3/29	<b>Faculty lecture: Dr. Katy Lenz OR</b> student presentations
12	Tues 4/3	Student presentations
	Thurs 4/5	Student presentations
13	Tues 4/10	<b>Faculty Lecture: Dr. Tamar Gur</b>
	Thurs 4/12	Student presentations
14	Tues 4/17	<b>Faculty Lecture: Dr. Dana McTigue</b>
	Thurs 4/19	Student presentations
15	Mon 4/30	<b>Exam 3 during Final Exam time: 8:00am-9:45am in regular classroom</b>

**PSYCH 6810**  
**Statistical Methods in Psychology I**  
Fall 2017

Lecture	:	MW 9:35 to 10:55 in PS 35
Lab	:	Th 9:35 to 10:55 / 11:10 to 12:30 in PS 22
Instructor	:	Dr. Andrew F. Hayes (hayes.338, Lazenby Hall LZ230)
Teaching Assistants	:	Jack DiTrapani (ditrapani.4, LZ240d) Saemi Park (park.2339, LZ240d)
Office hours	:	By appointment, preferably; by happenstance, frequently.

**Course catalog description**

Basic concepts of descriptive and inferential statistics; includes estimation, hypothesis testing, non-parametric techniques, and analysis of variance.

**Instructor's description**

This course provides a broad overview of the fundamentals of statistical description and inference and their implementation in computer software. Topics include data description and visualization, the theory and practice of estimation and hypothesis testing, and special and simple cases of the general linear model used to compare groups as typically applied in psychology and other social sciences. This course is the first of two required statistical methods courses in the Ph.D. program in Psychology, is a prerequisite to PSYCH 6811 (Statistics in Psychology II: Linear regression analysis), and functions as the foundation course for further advanced study in applied statistical methods at the graduate level in psychology and other disciplines. This course will cover material you may have covered in related courses as an undergraduate, but it will do so at a graduate level and a higher level of abstraction and a focus on theory, but without unnecessary higher-level mathematics.

**Course Administration**

**Required Course Materials**

- Hayes, A. F. (2005). *Statistical methods for Communication Science*. New York: Routledge.  
*I recommend purchasing the soft cover version and saving a lot of money.* Also on reserve at Thompson Library. The ISBN for the soft cover version is 9781138982932
- "Using SPSS"/"Using SAS"/"Using R": PDF documents freely available from the CARMEN web page.
- IBM Statistics ("SPSS"), SAS and R.
- A USB memory stick
- Additional supplementary and optional readings will be posted as PDF files on CARMEN as needed.

**Supplementary/Optional Course Materials**

**Additional texts (on reserve in Thompson Library)**

- Agresti, A., & Finlay, B. (2009). *Statistical methods for the social sciences* (4<sup>th</sup> edition). Upper Saddle River, NJ: Prentice-Hall
- Moore, D. S., McCabe, G. P., & Craig, B. A. (2012). *Introduction to the practice of statistics* (7<sup>th</sup> edition). New York: Freeman and Company

**Additional material on the web:**

- <http://www.ats.ucla.edu/stat/>

#### Books on SPSS (available electronically through the OSU Libraries)

- Collier, J. (2010). *Using SPSS Syntax: A beginner's guide*. Thousand Oaks, CA: Sage.
- Einspruch, E. L. (2004). *Next steps with SPSS*. Thousand Oaks, CA: Sage.

#### Books on SAS (available for free through the OSU Libraries)]

- Delwiche, L. D., & Slaughter, S. J. (2012). *The little SAS book* (5<sup>th</sup> Edition). SAS Institute.
- Schlotzhauer, S. D. (2009). *Elementary statistics using SAS*. Cary, NC: SAS Institute.

#### Books on R (available for free through the OSU Libraries)

- Crawley, M. J. (2013). *The R book* (2<sup>nd</sup> Edition). West Sussex, UK: Wiley and Sons.
- de Vries, A., & Meys, J. (2012). *R for dummies*. West Sussex, UK: Wiley and Sons.
- Muenchen, R. A. (2011). *R for SAS and SPSS users*. New York: Springer.
- Zuur, A. F., Ieno, E. N., & Meesters, E. H. W. G. (2009). *A beginner's guide to R*. New York: Springer.

#### **Lecture and Lab Components**

This course has a lecture and a lab component. The lectures will be held in PS35 on Monday and Wednesday mornings and focus on concepts, theory, and some practical computational matters. The lab component of the course is held on Thursday in the morning in PS22 in the department's computing lab. This component of the course will focus on hands-on training using statistical software, though some new concepts and ideas will be presented in the lab as well. The lab component is the primary place where you will get your hands dirty learning how to write statistical code under the guidance of the TAs. It is also a good place to have discussions about concepts with a smaller group and the TAs, who will sometimes have opinions that are different than the instructor's on matters of controversy or practice. The course TAs, who are also graduate students, have knowledge and advice pertinent to the course and graduate school in general that will benefit you in one way or another. Use them as a resource. ***Due to space constraints, you must attend the lab in which you are registered.***

#### **Computer Software**

In this class you will get exposure to and practice with statistical programming and data management using IBM Statistics (aka "SPSS"), SAS, and R. All three of these programs are installed in the computer lab in PS22. You are encouraged to download and install each of these programs on your personal laptop or other computer so you will have access to them outside of the lab. SPSS and SAS are freely available to students through an OSU site license. See <https://ocio.osu.edu/software> for instructions on how to download and license. R can be downloaded at no charge from <http://www.r-project.org>. SPSS is available for both Windows and Mac OS, whereas SAS is available only for Windows through OSU. Note that Windows 10 users require the Windows 10 *business class* operating system.

There is no required text or reading pertinent to the use of SPSS, SAS, and R. You will find three "Using..." documents on CARMEN pertinent to the use of SPSS, SAS, and R. This will most likely be updated periodically as the semester progresses. You are encouraged to seek out various books and web resources for additional information about these programs. Some suggestions can be found in the "supplementary materials" section above.

#### **Evaluation**

You will be evaluated exclusively based on your performance on various assignments and exams. Each assignment or exam is converted from points earned to a 0 to 100 scale, and weighted as described below when the final course grade is derived. The grading system in this class is largely a percentage-based system, where

93+= A; 89-92=A-; 87-88=B+; 83-86=B; 79-82=B-; 77-78=C+; 73-76=C; 69-72=C-; 67-68=D+; 63-66=D; <63=E

Midterm Exam (20%): There will be a two-part midterm examination on October 18<sup>th</sup> and 19<sup>th</sup> that requires you to demonstrate that you are comfortable with the methods and concepts outlined in the course thus far. The midterm will be open notes and open book, but should not be approached casually because of this. This exam will be given only once. With the exception of an extreme, documented, and unforeseen circumstance, no makeup exam will be provided if you miss it. It will not be given early or late to accommodate course or personal conflicts you have built into your schedule. **Students with disabilities needing additional time or a distraction free workspace to complete the exam should register with Student Life Disabilities Services (SDLS) at least two weeks in advance of the exam to have the exam proctored by officials at SLSD.**

Final Exam (20%): You will be given a take home final exam on the last day of class that is due no later than 10AM on December 11th. A dataset will be distributed to you and your job will be to read the data, do any needed data manipulation, conduct several analyses, and interpret and describe the results. You may turn in the exam early if desired.

Lab Participation (10%): Each week you will meet with a graduate teaching assistant in Psychology 22. You are expected to attend each meeting and participate in various activities. Everyone starts with 100% of participation points. Points are docked for failing to attend, not turning in various exercises you will be asked to complete now and then, and so forth.

Take-home assignments (50%): At various points during the semester you will receive an assignment to complete. There will be five or six such assignments roughly corresponding to each unit, but the topics covered in various assignments may straddle units. The due dates can be found in the schedule of topics at the end of this syllabus. These due dates are tentative. Assignments are due at the beginning of class on the due date. In no circumstance will an assignment be due earlier than the date listed, but the due date may be pushed back if the course gets behind schedule or it is otherwise warranted. Unless you are told otherwise, you *may* work as a team with one or two other students enrolled in this class when working through graded assignments. In this case, you will turn in one response to the assignment with each person's name on it, and you will each receive the grade allocated to your response. It is a violation of the Code of Student Conduct to collaborate on the assignments with anyone who is *not* a part of your team (other than the course instructor or the course TAs) prior to the time and date the assignment is due. Such collaboration includes exchanging answers, electronically or otherwise, or other forms of casual or formal conversation related to the content of the assignment. Violators of this rule will be sent to the Committee on Academic Misconduct in accordance with university policy.

In some cases, answers will be right or wrong, but in other cases there is room for subjective grading based on presentation, thoroughness, and so forth. Writing quality will matter when your assignments are graded. Be specific, precise, attentive to detail, and careful in how you phrase your answers, as you will be graded based on your actual answer, not what you intended to say or said awkwardly. Submit something you will be proud to submit, not something to just get you by until the next deadline. Do not wait until the last minute to start the assignments, as procrastination will show in the quality of your work. Use Word or a comparable word processing program to complete assignments. Use the symbol font for Greek symbols when needed, and **learn to use Microsoft's Equation editor** or some other system for generating clean, crisp mathematical expressions (such as LaTeX, if you are already familiar with it or up to the challenge of learning it). Be careful in your formatting of mathematical equations, and be aware of order of operations rules (see assignment #0 for a review). Submit something presented neatly and that you will be proud to claim is a product of your thinking.

You are expected to turn in a hard copy of your assignment with all sheets stapled together, as well as upload an electronic copy to a CARMEN drop box labeled for that assignment. An assignment is determined to be late if the **hard copy** is not delivered by the date and time the assignment is due.

The answers for each question will be provided soon after the assignment is due. It is up to you to check your responses with the official answer sheet. If you do not understand any inconsistencies between the official answers and your own, you may contact me for assistance. Frequently, we will discuss the assignments in class or lab after the due date has passed and everyone has turned in their assignment.

## **Policies and Other Miscellaneous Matters**

### **Late or Absent Assignments and Missed Exams**

Unless otherwise notified, assignments are due by the beginning of class on the date due. Points are lost for each hour an assignment is late, and an assignment will not be accepted more than 24 hours after the due date. The only exceptions to these rules are tragic, extraordinary, and totally unforeseen personal circumstances that are convincingly documented no later than 24 hours after the due date. Exams are given only once. As noted above, no make-up exams are given except in extraordinary, unforeseen, and documented circumstances.

### **Attendance**

There is no formal attendance policy for this course. However, you are expected to attend regularly. If I believe attendance is slipping, I reserve the right to create an attendance policy. Not attending class regularly is a very bad idea, as some of the examined material will be presented only during lecture or labs, and many of the SPSS, SAS, and R techniques to be discussed in lab are not always easily found in the documentation or other readings. As a general rule, subjective decisions about grading on assignments are less likely to go in your favor if you appear not to be putting in the effort to learn by regularly attending class. ***Due to space constraints, you must attend the lab in which you are registered.***

### **Academic Misconduct**

All students at Ohio State University are bound by the Code of Student Conduct (see <http://studentconduct.osu.edu/>). Violations of the Code in this class, especially pertaining to 3335-23-04 Section A on Academic Misconduct, will be aggressively prosecuted through the procedures the university has set up to deal with violations of the Code. If any of the teaching staff believes you have violated the Student Code, your case will be referred to the Committee on Academic Misconduct (see <http://oaa.osu.edu/coam.html>). Not following the rules of the course as outlined in this syllabus or provided orally is considered a violation of the Code of Student Conduct. Penalties for academic misconduct from a graduate student are especially stiff and are almost certain to include failure in this course and suspension from the university, even for a first offense. Graduate students in Psychology found in violation of the Code are, needless to say, rarely perceived to be in good standing and can expect revocation of funding and, potentially, expulsion from the graduate program. Repeat offenses and especially egregious violations of the Code can result in expulsion from the University, regardless of program, even on the first offense. Make sure that you are familiar with the Code of Student Conduct, and familiarize yourself with “Ten Suggestions for Preserving Academic Integrity” available online at <http://oaa.osu.edu/coamtensuggestions.html>. I expect students who believe a classmate has violated this policy to come forth to me so the alleged violation can be investigated and appropriate action can be taken if needed. If possible, your identity will be protected. You can be found in violation of the Code of Student Conduct for assisting others violate the Code. “Cheating” in any form in graduate school will not be tolerated, and the consequences for doing so are severe.



Having said all this, we understand that there is value to study groups and assisting others acquire understanding of the material in this class. We encourage such study groups and we will do what we can to help these groups flourish. Except as discussed in the “Take Home Assignments” section above, those conversations should steer clear of questions that are part of graded assignments.

***It is considered a violation of the Code of Student conduct to provide, receive, or use materials from this course from a prior year, whether taught by the current instructor or someone else, when completing assignments or studying for exams. In addition, distribution of PDFs or other electronic versions of textbooks or other commercial materials to others who have not purchased or not otherwise licensed to have such materials, as well as possession of such materials so received, is not only illegal but also a violation of the university’s Code of Student Conduct and is grounds for suspension or dismissal from the university.***

### **Tentative Nature of this Syllabus**

This syllabus represents a contract in the works. Events that transpire over the term may require me to modify the administration of this course and therefore the syllabus. In the event I need to modify the syllabus, I will announce the modification in class and on CARMEN and/or through email. Ultimately, it is the student’s responsibility to keep up with any such modifications and be aware of current policies and deadlines.

### **Mathematics Anxiety**

Often one of the student’s greatest barriers to mastering material in statistics courses is fear of mathematics. Many students lock up with anxiety when they are asked to do any computation and this anxiety typically interferes with the ultimate goal of conceptual understanding. I hope you will not let this happen to you. In this class most of the computations will be done by computer, although during lecture some basic computations cannot be avoided. You will be shown formulas and expect to understand them. But you need not understand the mathematics of the formula so much as you need to understand how they are conceptually used. To be sure, you need to be comfortable with basic mathematical operations. This is graduate school, and you have chosen to study the scientific discipline of psychology or a related social science. You will have to think analytically and quantitatively throughout your days as a graduate student at this university. If this is something you do not feel up to, you probably don’t belong here. You will be challenged in this course, but there is no reason why everyone can’t do well. The best thing that you can do to enhance your likelihood of success is discarding all the baggage that you may be bringing with you into the course—fear, anxiety, a belief that you are not good with numbers, or that you are destined to fail.

With these words of encouragement, at the same time remember that this is a graduate-level course. I admonish Master’s students with less experience dealing with the intensity and pace of graduate school, and even Ph.D. students with a Master’s degree from another university, not to approach this course as if it were an undergraduate course. You will not succeed if you don’t dedicate time and energy to reading and contemplating the material. You will probably find yourself working harder during your first year of graduate school than you have ever worked before.

### **PSYCH 6810 online**

This course is represented on CARMEN. I will upload data files, PowerPoint slides, PDFs of extra readings, and other course-relevant material to CARMEN. Learn to use CARMEN, as it is used throughout this university in almost every class you will take.

### **Roles of the Teaching Assistants**

The graduate teaching assistants (TA) are responsible for the lab component of the course, grading, and helping you master the topics. Although the TAs will do their best to respond to your concerns and questions in a timely fashion, keep in mind that they are also students at OSU and have their own demands and schedules that may not always mesh with yours. So please be patient if they are not available to respond to your needs immediately.

### **Students with Disabilities**

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I should register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. For accommodations needed related to an exam, seek the section of the syllabus above on examinations. **SLDS contact information:** [slds@osu.edu](mailto:slds@osu.edu); 614-292-3307; [slds.osu.edu](http://slds.osu.edu); 098 Baker Hall, 113 W. 12<sup>th</sup> Avenue.

### **Sexual Misconduct/Relationship Violence:**

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at <http://titleix.osu.edu> or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at [titleix@osu.edu](mailto:titleix@osu.edu)

## **Schedule of Lecture Topics**

The course is divided up into six units, with the time dedicated to each unit being flexible and determined in part by the pace of discussion and questions asked during lectures. We will use the assignment due dates as a rough guide to scheduling. You will be told when we are transitioning into the next unit. I recommend you read each chapter several times as we work through the unit, for your understanding will grow by this repetition, and after concepts that may have confused you at first are clarified during lecture. You probably won't do as well in this course as you could if you don't read the book. You are advised to set aside time each day to read what you have not, and reread what you have.

### **UNIT 1: Basic Concepts, Sampling and Measurement, Data Description**

*This unit covers variables, samples, statistics and parameters, sampling and basic measures of central tendency and variation, as well as some graphical and tabular displays of data.*

Reading: Chapters 1, 2, 3, and 4

Assignment #1 tentative due date: September 13

### **UNIT 2: Fundamentals of Probability and the Normal Distribution**

*In this unit we cover simple laws of probability, conditioning, properties of the normal distribution, and probability and related computations primarily for normally-distributed variables.*

Reading: Chapter 5  
Assignment #2 tentative due date: September 27

### **UNIT 3: Fundamentals of Estimation Theory, Sampling Distributions, Point and Interval Estimates**

*This unit focuses on the sampling behavior of an estimator, the central limit theorem, the t distribution, using estimation theory to make educated guesses about parameters (as point and interval estimates), and the relationship between sample size and precision of estimation.*

Reading: Chapter 7  
Assignment #3 tentative due date: October 11

### **MIDTERM EXAMINATION: October 18 and 19**

### **UNIT 4: Hypothesis Testing: Concepts and Theory**

*This unit outlines the concepts and theory of hypothesis testing, including null and alternative hypotheses, decision errors, power, and the application of theory to simple inferential tasks such as testing a hypothesis about a single parameter.*

Reading: Chapters 8 and 9 (up to page 196)  
Assignment #4 tentative due date: November 1

### **UNIT 5: Hypothesis Testing in Practice I: Comparing Two Groups**

*This unit extends the theory and practice of hypothesis testing to comparisons between two means (independent groups and two dependent or matched means) as well as proportions in the form of tests of independence in a crosstabulation.*

Reading: Chapter 9 (pp. 196-209), Chapters 10 and 11 (up to page 265)  
Assignment #5 tentative due date: November 20

### **UNIT 6: Hypothesis Testing in Practice II: More than Two Groups**

*This final unit further extends the theory and practice of hypothesis testing to problems involving more than two groups or means.*

Reading: Chapter 11 (pp. 265-270), Chapter 14 (up to page 399)  
Assignment #6 tentative due date: December 4, **4:00PM**

### **FINAL EXAM DUE: Monday December 11, 10:00 AM**

## Administrative Notes

**PSYCH 6811**  
**Statistical Methods in Psychology II**  
Spring 2018

Lecture	:	MW 9:35 to 10:55 in PS 35
Lab	:	Th 9:35 to 10:55 / 11:10 to 12:30 in PS 22
Instructor	:	Dr. Andrew F. Hayes (hayes.338, Lazenby Hall LZ230)
Teaching Assistants	:	Jack DiTrapani (ditrapani.4, LZ240d) Saemi Park (park.2339, LZ240d)
Office hours	:	By appointment, preferably; by happenstance, frequently.

## **Course Description**

### **Course catalog**

Simple linear regression and correlation, multiple linear regression, interactions; introduction to other related methods such as nonlinear regression and random effects models.

### **Instructor's description**

This course covers an introduction to the analysis of data using the general linear model. Topics include simple and multiple linear regression, partial association, multicategorical categorical predictors, moderation, the interpretation of model parameters, and other topics in linear models as time allows. Focus is on conceptual understanding rather than mathematical computation. Students will gain experience practicing their learning through various assignments using statistical software. This course is the second of two required statistical methods courses in the Ph.D. program in psychology and functions as the foundation course for further advanced study in applied statistical methods at the graduate level in psychology and other disciplines. Because you should already be familiar with basic principles of statistics and inference from the prerequisite course, this course will be delivered at a quicker pace than PSYCH 6810.

## **Course Administration**

### **Course Materials**

- Darlington, R. B., & Hayes, A. F. (2017). *Regression analysis and linear models: Concepts, applications, and implementation*. New York: The Guilford Press. Available electronically through OSU libraries and on two hour reserve at the Thompson Library.
- IBM Statistics ("SPSS"), SAS, and R.
- A USB memory stick

### **Supplementary Reading**

- Hayes, A. F. (2005). *Statistical methods for communication science*. New York: Routledge.
- The occasional PDF available on CARMEN.

### **Lecture and Lab Components**

This course has a lecture and a lab component. The lectures will be held in PS35 on Monday and Wednesday mornings and focus on concepts, theory, and some practical computational matters. The lab component of the course is held on Thursday in the morning in PS22 in the department's computing lab. This component of the course will focus on hands-on training using statistical software, though some new concepts and ideas will be

presented in the lab as well. The lab component is the primary place where you will get your hands dirty learning how to write statistical code in SPSS and R under the guidance of the TAs. It is also a good place to have discussions about concepts with a smaller group and the TAs, who will sometimes have opinions that are different than the instructor's on matters of controversy or practice. The course TAs, who are also graduate students, have knowledge and advice pertinent to the course and graduate school in general that will benefit you in one way or another. Use them as a resource. ***Due to space constraints, you should attend the lab in which you are registered, at least until enrollment and everyone's schedules settle down.***

## Computer Software

In this class you will get exposure to and practice with statistical programming and data management using IBM Statistics, SAS, and R. Both of these programs are installed in the computer lab in PS22. You are encouraged to download and install each of these programs on your personal laptop or other computer so you will have access to them outside of the lab. SPSS and SAS is freely available to students through an OSU site license. For download and licensing instructions, see <https://ocio.osu.edu/software>. R can be downloaded at no charge from <http://www.r-project.org>.

There is no required text or reading pertinent to the use of these programs. You are encouraged to seek out various books and web resources for additional information about these programs. On CARMEN you will find "Using SPSS," "Using SAS," and "Using R" documents that will be periodically updated during the semester. You will find these helpful.

For additional guidance, consider consulting one of many resources on the use of computer software for data analysis. Some suggestions are below, many of which are available electronically through the OSU libraries.

### Additional material on the web:

- <http://www.ats.ucla.edu/stat/>

### Books on SPSS (available electronically through the OSU Libraries)

- Collier, J. (2010). *Using SPSS Syntax: A beginner's guide*. Thousand Oaks, CA: Sage.
- Einspruch, E. L. (2004). *Next steps with SPSS*. Thousand Oaks, CA: Sage.

### Books on SAS (available for free through the OSU Libraries)

- Delwiche, L. D., & Slaughter, S. J. (2012). *The little SAS book* (5<sup>th</sup> Edition). SAS Institute.
- Schlotzhauer, S. D. (2009). *Elementary statistics using SAS*. Cary, NC: SAS Institute.

### Books on R (available for free through the OSU Libraries)

- Crawley, M. J. (2013). *The R book* (2<sup>nd</sup> Edition). West Sussex, UK: Wiley and Sons.
- de Vries, A., & Meys, J. (2012). *R for dummies*. West Sussex, UK: Wiley and Sons.
- Muenchen, R. A. (2011). *R for SAS and SPSS users*. New York: Springer.
- Zuur, A. F., Ieno, E. N., & Meesters, E. H. W. G. (2009). *A beginner's guide to R*. New York: Springer.

## Evaluation

You will be evaluated exclusively based on your performance on various assignments and exams. Each assignment or exam is converted from points earned to a 0 to 100 scale, and weighted as described below when the final course grade is derived. The grading system in this class is largely a percentage-based system, where

93+= A; 89-92=A-; 85-88=B+; 78-84=B; 74-77=B-; 70-73=C+; 65-69=C; 60-64=C-; 55-59=D+; 50-54=D; <50=E

Midterm Exam (20%): There will be a midterm examination on **March 8th** that requires you to demonstrate that you are comfortable with the methods and concepts outlined in the course thus far. The midterm will be open notes and open book, but should not be approached casually because of this. This exam will be given only once. With the exception of an extreme, documented, and unforeseen circumstance, no makeup exam will be provided if you miss it. It will not be given early or late to accommodate course or personal conflicts you have built into your schedule.

Final Exam (20%): You will be given a take home final exam on the last day of class that is due between **10AM and noon on April 27**, which is the date and time the registrar has scheduled the final exam for this course. A dataset will be distributed to you and your job will be to read the data, do any needed data manipulation, conduct several analyses, and interpret and describe the results. You may turn in the exam early if desired.

Lab Participation (20%): Each week you will meet with a graduate teaching assistant in Psychology 22. You are expected to attend each meeting and participate in various activities. Everyone starts with 100% of participation points. Points are docked for failing to attend, not turning in various exercises you will be asked to complete now and then, and so forth.

Take-home assignments (40%): At five various points during the semester you will receive an assignment to complete. They will be distributed at least one week prior to the due date. The tentative due dates are

Assignment #1: January 31<sup>st</sup>

Assignment #2: February 21<sup>nd</sup>

Assignment #3 : March 5<sup>th</sup>

Assignment #4: April 2<sup>nd</sup>

Assignment #5: April 18<sup>th</sup>

Assignments are due at the beginning of class on the due date. Due dates may be adjusted depending on the pacing of the material in class. In no circumstance will an assignment be due earlier than the date listed, but the due date may be pushed back if the course gets behind schedule or it is otherwise warranted. Unless you are told otherwise, you *may* work as a team with one or two other students enrolled in this class when working through graded assignments. In this case, you will turn in one response to the assignment with each person's name on it, and you will each receive the grade allocated to your response. It is a violation of the Code of Student Conduct to collaborate on the assignments with anyone who is *not* a part of your team (other than the course instructor or the course TAs) prior to the time and date the assignment is due. Such collaboration includes exchanging answers, electronically or otherwise, or other forms of casual or formal conversation related to the content of the assignment. Violators of this rule will be sent to the Committee on Academic Misconduct in accordance with university policy.

In some cases, answers will be right or wrong, but in other cases there is room for subjective grading based on presentation, thoroughness, and so forth. Writing quality will matter when your assignments are graded. Be specific, precise, attentive to detail, and careful in how you phrase your answers, as you will be graded based on your actual answer, not what you intended to say or said awkwardly. Submit something you will be proud to submit, not something to just get you by until the next deadline. Do not wait until the last minute to start the assignments, as procrastination will show in the quality of your work. Use Word or a comparable word processing program to complete assignments. Use the symbol font for Greek symbols when needed, and **learn to use Microsoft's Equation editor** or some other system for generating clean, crisp mathematical expressions. Be careful in your formatting of mathematical equations, and be aware of order of operations rules. Submit something presented neatly and that you will be proud to claim is a product of your thinking.

You are expected to turn in a hard copy of your assignment with all sheets stapled together, as well as upload an electronic copy to CARMEN. An assignment is determined to be late if the **hard copy** is not delivered by the date and time the assignment is due.

The answers for each question will be provided soon after the assignment is due. It is up to you to check your responses with the official answer sheet. If you do not understand any inconsistencies between the official answers and your own, you may contact me for assistance. Frequently, we will discuss the assignments in class or lab after the due date has passed and everyone has turned in their assignment.

## **Policies and Miscellaneous Matters**

### **Late or Absent Assignments and Missed Exams**

Unless otherwise notified, assignments are due by the beginning of class on the date due. An assignment will not be accepted more than 24 hours after the due date. The only exceptions to these rules are tragic, extraordinary, and totally unforeseen personal circumstances that are convincingly documented no later than 24 hours after the due date. Exams are given only once. As noted above, no make-up exams are given except in extraordinary, unforeseen, and documented circumstances.

### **Attendance**

There is no formal attendance policy for this course. However, you are expected to attend regularly. If I believe attendance is slipping, I reserve the right to create an attendance policy. Not attending class regularly is a very bad idea, as some of the examined material will be presented only during lecture or labs, and many of the SPSS, SAS, and/or R techniques discussed in lab are not always easily found in the documentation or other readings. As a general rule, subjective decisions about grading on assignments are less likely to go in your favor if you appear not to be putting in the effort to learn by regularly attending class. Attendance may be taken in lectures and lab on randomly chosen days.

### **Academic Misconduct**

All students at Ohio State University are bound by the Code of Student Conduct (see [http://studentaffairs.osu.edu/resource\\_csc.asp](http://studentaffairs.osu.edu/resource_csc.asp)). Violations of the Code in this class, especially pertaining to 3335-23-04 Section A on Academic Misconduct, will be aggressively prosecuted through the procedures the university has set up to deal with violations of the Code. If any of the teaching staff believes you have violated the Student Code, your case will be referred to the Committee on Academic Misconduct (see <http://oaa.osu.edu/coam.html>). Not following the rules of the course as outlined in this syllabus or provided orally is considered a violation of the Code of Student Conduct. Penalties for academic misconduct from a graduate student are especially stiff and are almost certain to include failure in this course and suspension from the university, even for a first offense. Graduate students in Psychology found in violation of the Code are, needless to say, rarely perceived to be in good standing and can expect revocation of funding and, potentially, expulsion from the graduate program. Repeat offenses and especially egregious violations of the Code can result in expulsion from the University, regardless of program, even on the first offense. Make sure that you are familiar with the Code of Student Conduct, and familiarize yourself with “Ten Suggestions for Preserving Academic Integrity” available online at <http://oaa.osu.edu/coamtensuggestions.html>. I expect students who believe a classmate has violated this policy to come forth to me so the alleged violation can be investigated and appropriate action can be taken if needed. If possible, your identity will be protected. You can be found in violation of the Code of Student Conduct for assisting others violate the Code. “Cheating” in any form in graduate school will not be tolerated, and the consequences for doing so are very severe.



Having said all this, we understand that there is value to study groups and assisting others acquire understanding of the material in this class. We encourage such study groups and we will do what we can to help these groups flourish.

### **Tentative Nature of this Syllabus**

This syllabus represents a contract in the works. Events that transpire over the term may require me to modify the administration of this course and therefore the syllabus. In the event I need to modify the syllabus, I will announce the modification in class and on CARMEN and/or through email. Ultimately, it is the student's responsibility to keep up with any such modifications and be aware of current policies and deadlines.

### **Mathematics Anxiety**

Often one of the student's greatest barriers to mastering material in statistics courses is fear of mathematics. Many students lock up with anxiety when they are asked to do any computation and this anxiety typically interferes with the ultimate goal of conceptual understanding. I hope you will not let this happen to you. In this class most of the computations will be done by computer, although during lecture some basic computations cannot be avoided. You will be shown formulas and expect to understand them. But you need not understand the mathematics of the formula so much as you need to understand how they are conceptually used. To be sure, you need to be comfortable with basic mathematical operations. This is graduate school, and you have chosen to study the scientific discipline of psychology or a related social science. You will have to think analytically and quantitatively throughout your days as a graduate student at this university. If this is something you do not feel up to, you probably don't belong here. You will be challenged in this course, but there is no reason why everyone can't do well. The best thing that you can do to enhance your likelihood of success is discarding all the baggage that you may be bringing with you into the course—fear, anxiety, a belief that you are no good with numbers, or that you are destined to fail.

With these words of encouragement, at the same time remember that this is a graduate-level course. I admonish Master's students with less experience dealing with the intensity and pace of graduate school, and even Ph.D. students with a Master's degree from another university, not to approach this course as if it were an undergraduate course. You will not succeed if you don't dedicate time and energy to reading and contemplating the material. You will probably find yourself working harder during your first year of graduate school than you have ever worked before.

### **PSYCH 6811 online**

This course is represented on CARMEN. I will upload data files, PowerPoint slides, PDFs of extra readings, and other course-relevant material to CARMEN. Learn to use CARMEN, as it is used throughout this university in almost every class you will take.

### **Roles of the Teaching Assistant (TA)**

The graduate teaching assistants are responsible for the lab component of the course, grading, and helping you master the topics. Although the TAs will do their best to respond to your concerns and questions in a timely fashion, keep in mind that they are also students at OSU and have their own demands and schedules that may not always mesh with yours. So please be patient if they are not available to respond to your needs immediately.

## Students with Disabilities

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I should register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. For accommodations needed related to an exam, seek the section of the syllabus above on examinations. **SLDS contact information:** [slds@osu.edu](mailto:slds@osu.edu); 614-292-3307; [slds.osu.edu](http://slds.osu.edu); 098 Baker Hall, 113 W. 12<sup>th</sup> Avenue.

## Sexual Misconduct/Relationship Violence

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at <http://titleix.osu.edu> or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at [titleix@osu.edu](mailto:titleix@osu.edu)

## Schedule of Lecture Topics

The course is divided up into six units, with the time dedicated to each unit being flexible and determined in part by the pace of discussion and questions asked during lectures. We will use the assignment due dates as a rough guide to scheduling. You will be told when we are transitioning into the next unit.

I recommend you read the readings for each unit several times as we work through the unit, for your understanding will grow by this repetition, and after concepts that may have confused you at first are clarified during lecture. You are advised to set aside time each day to read what you have not, and reread what you have.

If you took PSYCH 6810, you should still have a copy of Hayes (2005). Use this as optional supplementary reading. Chapters 12 and 13 roughly overlap with Units 1, 2, and 3. Chapters 14-15 roughly overlap with Unit 4, and Chapter 16 roughly overlaps with Unit 5.

### UNIT 1: Regression analysis fundamentals

*This unit introduces the fundamentals of linear regression analysis using the simple regression model. Topics include the least squares criterion, residuals, estimation and interpretation of model parameters, the correlation versus the regression coefficient.*

Reading: Darlington and Hayes (2017) Chapters 1 and 2

### UNIT 2: Multivariate association and partial association

*This unit addresses the use of the linear regression model for generating estimates of one variable from a set of predictor variables. Topics covered include the multiple correlation, partial regression coefficients, partial and semipartial association*

Reading: Darlington and Hayes (2017) Chapters 3, Chapter 6 for your interest (optional)

### **UNIT 3: Statistical inference**

*This unit addresses statistical inference, including inference about multiple correlation as well as for individual variables in a model. Also included are such topics as collinearity, bias, and power.*

Reading: Darlington and Hayes (2017) Chapter 4

### **UNIT 4: Extending the fundamentals**

*This unit further develops your understanding of the fundamentals of linear regression analysis, including dichotomous regressors, sets of regressors and setwise partial association, regression to the mean, variable selection methods, “effect size”*

Reading: Darlington and Hayes (2017) Chapters 5 and 7, 8

### **UNIT 5: Multicategorical regressors**

*This unit illustrates the correspondence between linear regression analysis and analysis of variance and covariance. Various coding systems for representing multicategorical variables are described as well as the interpretation of regression coefficients when using different coding strategies. Omnibus inference about a model is compared to analysis of variance. Also addressed is the comparison of groups when adjusting for other variables, adjusted means, and the equivalence between linear regression analysis and analysis of covariance. We also discuss the multiple test problem.*

Reading: Darlington and Hayes (2017) Chapters 9, 10, and 11

### **UNIT 6: Nonlinearity and interaction**

*In this unit, the constraints that one variable’s effect on another in a regression model is linear, or that it is independent of other variables in the model, are relaxed. With a simple extension of the model, we address how to model curves, as well as how to set up a model that allows one variable’s effect to depend linearly on another variable in the model. Interpretation of model coefficients, the influence of variable scaling, and probing and visualizing interactions is addressed.*

Reading: Darlington and Hayes (2017) Chapters 12, 13, and 14

### **UNIT 7: Regression diagnostics and assumptions and other miscellaneous topics**

*This unit covers various miscellaneous topics as time allows. Some possible topics include the hunt for influential or “irregular cases,” and a discussion of the statistical assumptions underlying the use and interpretation of linear regression analysis.*

Reading: Darlington and Hayes (2017) Chapter 16, and perhaps other material to be announced

**Final exam due no later than April 27, 10:00 – noon.**

# Psychology 6820

## Introduction to Bayesian Statistics for Psychological Data

Lecture: MW 9:35-10:55, PS22

Instructor: Trisha Van Zandt  
Lazenby 240H, 614-688-4081  
Office hours: W 11:00-12:00, or by appointment  
E-mail: [van-zandt.2@osu.edu](mailto:van-zandt.2@osu.edu)

T.A.: Bob Gore  
Lazenby 221P  
Office hours: F 9:30-11:00  
E-mail: [gore.95@osu.edu](mailto:gore.95@osu.edu)

Web site: This course will use [Carmen](#). Electronic communications via Carmen use your OSU handle (e.g., “smith.9999@osu.edu”). Make sure you check your OSU email on a regular basis.

Texts:

1. Bolstad, W.M. (2007). *Introduction to Bayesian Statistics* (2<sup>nd</sup> Edition) Hoboken, NJ: John Wiley & Sons.
2. Gill, J. (2014). *Bayesian Methods: A Social and Behavioral Sciences Approach* (3<sup>rd</sup> Edition) Boca Raton, FL: Chapman and Hall/CRC Press.
3. (Recommended) Gelman, A., Carlin, J.B., Stern, H.S. et al. (2014). *Bayesian Data Analysis* (3<sup>rd</sup> Edition) Boca Raton, FL: Chapman and Hall/CRC Press.

Software:

1. **R** (free download for all platforms) with the “Bolstad” library (see Appendix D, p. 387).
2. The ‘**rstan**’ package (free download, use the ‘install.packages()’ command in R).
3. Other useful packages to install include ‘mcmc’ and ‘MCMCpack.’
4. You might eventually want to check out **JASP**, an open-source alternative to SPSS that incorporates some Bayesian procedures. We won’t use it in this class, though.

## Students with Disabilities

This syllabus is available in alternative formats upon request. In addition, if you may need an accommodation based on the impact of a disability, you should contact me immediately. Students with special needs should contact the [Office of Disability Services \(ODS\)](#) at 292-3307, TDD 292-0901, for certification if they have not already done so. Upon such certification, the ODS and I will make every effort to accommodate special needs. However, to ensure that evaluation of student performance in the course is conducted in a manner that is fair to all students, special accommodations will not be granted in the absence of ODS certification.

## Sexual Misconduct and/or Relationship Violence

The Ohio State University is bound by **Title IX**, a federal law enacted in 1972. Title IX prohibits sex discrimination and recognizes that such discrimination includes sexual misconduct: harassment, domestic and dating violence, sexual assault, and stalking. Under this law, sexual misconduct is a civil rights offense, and perpetrators will be held accountable under the law in the same way as others who commit civil rights abuses against people who are protected because of their race, religion, national origin, sexual orientation, disability status, etc.. Victims of sexual misconduct and/or violence are entitled to the same kinds of accommodations and support services as victims of other kinds of civil rights abuses.

As an instructor, one of my responsibilities is to help create a safe learning environment on our campus. As a professor of the Ohio State University, I also have a mandatory reporting responsibility. This means that I am required to share information regarding sexual misconduct or other crimes that may have occurred either on or off of the OSU campus with the University's Office of Human Resources. If you or someone you know has been sexually harassed or assaulted, you may receive confidential counseling from the Office of Student Life's **Counseling and Consultation Service** at 614-292-5766. You may also contact the **Sexual Assault Response Network of Central Ohio (SARNCO)** at 614-267-7020 (24/7 helpline). Other resources, confidential and non-confidential, may be found at the **University's Title IX Coordinator's office** or by contacting the Ohio State Title IX Coordinator at [titleix@osu.edu](mailto:titleix@osu.edu).

## Academic Misconduct

All students at the Ohio State University are bound by the Code of Student Conduct (see [http://studentaffairs.osu.edu/resource\\_csc.asp](http://studentaffairs.osu.edu/resource_csc.asp)) and are responsible for familiarizing themselves with the Code. In particular, Rule 3335-23-04 (Prohibited conduct), Section A, defines academic misconduct. Suspected violations of the code in this class will be dealt with according to the procedures detailed in that code. Any alleged cases of misconduct will be referred to the Committee on Academic Misconduct.

Specifically, the use of unauthorized materials during exams, the use of unauthorized assistance on a graded assignment, unauthorized collaboration such as working together on homeworks or sharing files, falsification of documents, serving as or enlisting the assistance of a substitute for an exam or graded assignment, or violation of course rules as contained in this syllabus, in addition to the other prohibited conducts described in Rule 3335-23-04 Section A, constitute academic misconduct.

If you have a question about whether or not an activity is or could be perceived to be academic misconduct, for this or any other class, please ask me.

**All graded assignments in this course should be completed by you alone and not by or in collaboration with anyone else.**

### Is it misconduct?

1. If you have used your mouse to highlight text from a document/web site/etc. that you did not write, and moved/copied that text into a document of your own, it is academic misconduct. Take notes (without cutting and pasting) on the highlighted text in a separate document, then write the ideas in your own words in the document you intend to present as your own.
2. If you email files to another classmate, copy your files onto your classmate's thumb drive, or similarly receive files from another classmate, it is academic misconduct. Studying together, discussing material together, asking each other about specific problems and how to solve them is encouraged. Under no circumstances should these encouraged activities result in shared files. Guard your work! Do not share your computers or drives without making sure your work is secure.

3. Think about your assignments to be turned in using the same logic as papers to be submitted for publications. If your assignment should really acknowledge a co-author or two, you have committed academic misconduct.

## Course Description and Objectives

Over the past several decades, modern statistical analysis has moved steadily away from the traditional frequentist approach taught in introductory-level statistics courses and toward Bayesian analysis. The reasons for this are manifold, and include the wide availability of powerful desktop computers and software that makes Bayesian statistics possible for everyone. The driving force behind this shift, however, is the fact that Bayesian techniques are more desirable than frequentist null hypothesis tests for at least four reasons.

First, the idea that our prior expectations about the outcome of an experiment can play a role in our analyses embodies the cumulative nature of the scientific enterprise. Why must we pretend that a population mean is equal to something that we know it isn't, or that there is no difference between two groups when all previous studies have shown that there is? Bayesian statistics acknowledges that we do not perform analyses in complete ignorance of the state of the world.

Second, the treatment of parameters as uncertain or subject to randomness is more realistic than the fixed parameters of frequentist null hypothesis testing. Is it reasonable to state that a population mean is exactly equal to some value? Bayesian statistics allow us to express our uncertainty about the values of parameters and measure precisely how much our uncertainty is reduced after we observe the outcomes of our experiments.

Third, the Bayesian analysis is based on a model of the data specified *a priori*, and therefore does not require the analyst to rely on models that are known to be false or true only "in the limit," when the sample of data becomes infinitely large. Linear regression, for example, states that the relationship between dependent and independent variables is a weighted sum with Gaussian error, a descriptive model that we can almost always, with some thought, demonstrate to be false for real-world systems. Why not perform our analyses from the perspective of a model that has some explanatory power?

Fourth, the questions we can answer using Bayesian statistics are those of most scientific interest, and are of the form "What can I conclude about the hypothetical process that produced the data I observed?" in contrast to the confusing, less useful and philosophically problematic questions answered by null hypothesis testing: "What is the probability of getting the measurement that I obtained if I assume that changes in my independent variable had no effect?" The difficulties that statistics students encounter in interpreting  $p$ -values and confidence intervals stem from their quite natural desire to evaluate the null hypothesis with their data, rather than to evaluate the data with their null hypothesis.

Bayesian statistics can be mastered by students with modest mathematical and statistical backgrounds. Therefore it is particularly troublesome that, at this time, introductory statistics classes designed for psychologists and other social scientists focus almost exclusively on frequentist methods. This class is designed to introduce basic Bayesian ideas to psychologists trained in frequentist methods. At the end of this class, you will have learned:

- The distinction between frequentist and Bayesian statistics;
- The most common discrete and continuous probability distributions used in Bayesian inference;
- How to construct simple models for Bayesian inference on proportions, means and regression;
- How to choose appropriate priors for different simple data models;
- How to evaluate statistical hypotheses using the Bayesian posterior;
- How to choose between different models for a data set;
- How to perform simple simulations using R; and

- How to use the Bayesian analysis package Stan,

among other things.

## Grades

This course will use the following fixed grading scale:

A	A-	B+	B	B-	C+	C	C-	D+	D
93%	90%	87%	83%	80%	77%	73%	70%	67%	60%

Your grade will be based on 5 homework assignments, each assignment worth 10 points for 50% of your grade and one final project worth 50 points for 50% of your grade. Due dates appear on the class schedule. I reserve the right to modify the weights on the assignments and the project as I see appropriate.

## Homework

Homework includes both your daily reading assignment and exercises from the book and given in class. The purpose of homework exercises is to give you the opportunity to practice computations that illustrate theoretical concepts presented in class. Homework and answer keys will be posted on Carmen. Due dates are noted on the course schedule and the Assignments link on Carmen.

## Final Project

The final project will be an analysis of data that you have collected, either in your laboratory or data you have obtained online. If you have difficulty finding an appropriate data set, please come to me for assistance.

You will perform an analysis of your data with respect to one of the models we have discussed in class or a model of your own devising. You will be required to hand in the following: 1) an electronic file containing your data (all identifying information must be removed if the data involve human subjects); 2) all your code, with documentation, necessary to conduct the analyses; and 3) a 15-20 page writeup of your results.

The final project is “scaffolded” so that you will be required to turn in components of the project at times throughout the semester. Please see the project guidelines posted on Carmen for more information.

## Tentative Schedule:

MONDAY		WEDNESDAY	
Aug 21		23	1
		Introduction Bolstad 1-3	
28	2	30	3
Probability Review Bolstad 4(55-66)		Bayes' Theorem Bolstad 4(63-74) Gelman et al. 1.1-1.5 Etz & Vandekerckhove (2017)	
Sep 4		6	4
<i>Labor Day</i>		Computation and Simulation in R <i>Bring your laptop</i> <b>Homework 1 due</b>	
11	5	13	6
Discrete Distributions Bolstad 5(77-85)		Discrete Distributions (cont) Bolstad 5(83-89)	
18	7	20	8
Binomial and Poisson Models Bolstad 6(101-113)		Continuous Distributions Bolstad 7(121-129) <b>Data set due</b>	
25	9	27	10
Continuous Distributions (cont) Bolstad 7(129-134)		Beta-binomial Model Bolstad 8 Gill 4(97-129) <b>Homework 2 due</b>	
Oct 2	11	4	12
Bayesian vs. Frequentist Inference Bolstad 9(161-170)		Issues in Inference Bolstad 9(170-178)	
9	13	11	14
Bayes Factors Kruschke 12 Gill 7(216-224) Benjamin et al. (2017)		Normal Model Bolstad 11(199-209) <b>Literature review due</b>	
16	15	18	16
Normal Model for the Mean Bolstad 11(207-216)		Rstan <i>Bring laptop and data set</i> <b>Homework 3 due</b>	
23	17	25	18
Inference with the Normal Model Bolstad 12(228-236), 15(297-307)		Full Normal Model (Mean and Variance) Gill 3(69-76)	



MONDAY		WEDNESDAY	
30	19	Nov 1	20
Markov Chains and Sequential Sampling Grinstead & Snell (405-410,433-442,447-449,461-466) Kruschke (165-173)		Regression Bolstad 14(267-279) <b>Model due</b>	
6	21	8	22
Inference in Regression Bolstad 14(280-286)		Using Rstan for Regression <i>Bring your laptop and data set.</i> <b>Homework 4 due</b>	
13	23	15	24
Linear Models Gill 5(145-155)		Multiple Regression Gill 5(155-161)	
20	25	22	
Convergence and Mixtures Gill 14(475-499) Bolstad 16 <b>Initial analysis due</b>		<i>Thanksgiving Break</i>	
27	26	29	27
Graphical Models Lee & Wagenmakers 6		Hierarchical Beta-Binomial Model Kruschke 9 <b>Homework 5 due</b>	
Dec 4	28	6	29
Latent Class Models <b>Check Carmen for Final Project due date</b>			

## PSYCH 6822

### Mediation, Moderation, and Conditional Process Analysis Spring 2018, Campbell Hall 251, Monday 2:15-5:00

This is an interdisciplinary data analysis seminar focused on the application of principles of linear modeling in the context of linear regression analysis to exploring questions about mediated (i.e., indirect) and moderated (i.e., interaction) effects. We will spend part of the course talking about partitioning effects into direct and indirect components and how to quantify and test hypotheses about indirect effects, part talking about estimating, testing, and probing interactions in linear models, and part integrating moderation and mediation as “conditional process analysis” by discussing and how to conceptualize and test the contingencies of a mechanism. Computer applications will focus on SPSS and SAS using off-the-shelf code and the PROCESS macro available through [www.processmacro.org](http://www.processmacro.org) and documented in the text for the course. It is assumed that you have taken a course in multiple regression and have done well or are otherwise comfortable with the principles of multiple regression analysis. No knowledge of matrix algebra is required or assumed.

### Instructor

Dr. Andrew F. Hayes  
Office: Lazenby Hall 230  
Office hours: by appointment or happenstance

Email: [hayes.338@osu.edu](mailto:hayes.338@osu.edu)  
Phone: I have no phone in my office.  
WWW: [www.afhayes.com](http://www.afhayes.com)

### Learning Objectives

By the end of this course, you will...

- be able to statistically partition one variable’s effect on another into its primary pathways of influence, direct and indirect.
- understand historical and modern approaches to inference about indirect effects in causal models.
- know how test competing theories of mechanisms statistically through the comparison of indirect effects in models with multiple mediators
- acquire an understanding of how to build flexibility into a regression model that allows a variable’s effect to be a function of another variable in a model.
- understand how scaling of variables influence parameter estimates and their interpretation.
- have the ability to visualize and probe interactions in regression models.
- have learned how to integrate models involving moderation and mediation into a conditional process model.
- have learned how to estimate the contingencies of mechanisms through the computation and inference about conditional indirect effects.
- know how to determine whether a mechanism is dependent on a moderator variable.
- be able to apply the methods discussed in this course using readily-available statistical software
- be in a position to talk and write in an informed way about the mechanisms and contingencies of causal effects.

## What We Will and Will Not Cover

### Topics covered:

- Path analysis: Direct, indirect, and total effects in mediation models.
- Estimation and inference about indirect effects in single mediator models.
- Multiple mediator models (parallel and serial).
- Mediation analysis with a multicategorical independent variable.
- Estimation of moderation and conditional effects.
- Probing and visualizing interactions.
- Multicategorical moderators and independent variables in moderation analysis.
- The effects of variable scaling and model parameterization on interpretation.
- Conditional Process Analysis (also known as “moderated mediation”)
- Quantification of and inference about conditional indirect effects.
- Testing a moderated mediation hypothesis and comparing conditional indirect effects
- Moderation in serial mediation models
- Mediation analysis in the two-condition within-participant design.

### What is not covered:

- Dichotomous, ordinal, or count variable models or other models not based on OLS regression.
- Models involving latent variables or other methods requiring an SEM program.
- Nested data (i.e., multilevel models)
- Longitudinal data problems involving more than two waves of data
- “Potential outcomes” approach to mediation analysis

## Required Readings and Other Materials

- Hayes, A. F. (2018). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach (2<sup>nd</sup> edition)*. New York: The Guilford Press.
- A laptop computer with a version of SPSS **or** SAS installed (available at no charge through the web page of the Office of the Chief Information Officer). Make sure your laptop is charged sufficiently to make it through class.
- Data files available on CARMEN that have been downloaded on to your laptop.
- Various readings that are generally supplementary, in PDF form available through CARMEN.

Note: If there is no way you can get access to a laptop that you can bring to class regularly, see the instructor.

## Evaluation

Your grade will be calculated based on a weighting of three components ranging between 0 and 100, using the weighting below. Grading scale: 92+ = A; 89-91: A-; 82-88 = B+; 75-81 = B; 70-74 = B-; 65-69 = C+; 60-64 = C; 50-59 = C-; 45-49 = D+; 40-45 = D; <40 = E. I do not “curve” my grading.

### Attendance (25%)

You are expected to attend class, participate with your own questions when you have them, and contemplate the questions of others and my answers. At least some material not included in the book or my lectures will be delivered in response to questions, and you will benefit from hearing those questions and answers. Thus, you will learn merely by attending class regularly even if you are just a passive observer of others most of the time. Attendance will be taken at the beginning of class, and it is worth 25% of your course grade. You do not need to have a perfect attendance record in order to receive full attendance credit.

### In-Class Activities (25%)

Occasional activities will be provided in class and being there to experience these will aid in your learning of the material. These will take the form of very short quizzes or brief data analysis problems and/or interpretation of output. Sometimes these will be announced in the course prior to their administration, and sometimes they will be unannounced. Sometimes you will be required to work alone, and sometimes you may be allowed to work with one classmate. Your lowest activity mark will be discarded from the computation of your in-class activities grade. On occasions (if any) when you are allowed to work with another person, you will turn in the activity with both your names and you will receive the same mark regardless of who contributed to the answer and in what proportion. Your worst activity mark will be dropped from the derivation of this component of your grade (including if you received a zero on the activity because you were absent).

### Midterm and In-Class Final Exam (25% each)

Fifty percent of your grade will be based on your performance on a midterm and final examination, each of which is worth 25% of your course grade.

*Take-Home Midterm Examination.* You will take a midterm examination during the week of March 5<sup>th</sup>. It will be distributed at the end of class on Monday March 5<sup>th</sup> and should be returned to Dr. Hayes in hard copy form no later than **3PM Friday March 9<sup>th</sup>**. The exam will consist of various multiple choice, fill in the blank, and short answer questions. With the exception that follows, you are not to communicate with anyone else about the content of this exam or receive any kind of assistance when completing it. However, if you choose, you may work with one classmate on this exam. If you choose to do so, then of course you can communicate with this one classmate about the exam. In this case, you should turn in only one copy of the exam with both of your names on it. You will each receive the same grade.

*In-Class Final Exam:* You will take an in-class final examination on the day and time the registrar has assigned for this class, and it will take place in Campbell Hall 251. This date and time is **Tuesday May 1<sup>st</sup> at 4:00-5:45PM**. Like the midterm examination, the final exam will contain a variety of different question types, including multiple choice, fill in the blank, and short answer formats. It will be comprehensive in nature but will heavily favor material covered since the midterm exam.

## Policies

### Academic Misconduct

By faculty Rule 3335-5-487, "...it is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term 'academic misconduct' includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee."

Violations of the Code of Student Conduct in this class, especially pertaining to academic misconduct, will be aggressively prosecuted through the procedures the university has set up to deal with violations of the Code. If I believe you have violated the Student Code, your case will be referred to the Committee on Academic Misconduct (see <http://oaa.osu.edu/coam.html>). Make sure that you understand the Code of Student Conduct, and familiarize yourself with "Ten Suggestions for Preserving Academic Integrity" available online at <http://oaa.osu.edu/coamtensuggestions.html>. A common sanction for violation of the academic section of the Code of Student Conduct by graduate students is failure in the course and suspension from the university. Repeat offenses and especially egregious violations of the Code can result in dismissal from the University.

The Code of Student Conduct can be found at <http://studentaffairs.osu.edu/csc/>.

### Cell Phones and General Politeness

A ringing cell phone is annoying and a distraction to the instructor and others in the room. Please be respectful of those around you by silencing your cell phone prior to the start of class. If you anticipate that you will need to leave class early, please select a seat near the edge of a row or in the front of the room to avoid disrupting others when you leave. To maintain an atmosphere conducive to learning, please be courteous to other members of the class and treat them with the dignity and respect that you expect from others.

### Use of Electronic Mail

There may be occasions where I will need to get in touch with you outside of regular class hours. Email will usually be the first means by which contact will be initiated. It is important that you check your OSU email account regularly, and make sure you purge your account of unneeded email so that new email can get through. If you do not use your OSU email address as your primary email account, please arrange to have your OSU email forwarded to your preferred account. For email forwarding, go to <https://my.osu.edu/>

### Emergencies

In the event of an emergency, please carefully follow the directions of the teaching staff or, if deemed prudent by your own judgment, contact 9-1-1 or the University Police at 614-292-2525. Non emergencies requiring police intervention can be directed to 614-292-2121.

### Tentative Nature of this Syllabus

Events that transpire over the term may require me to modify the administration of this course and therefore the syllabus. In the event I need to modify the syllabus, I will announce the modification in

class and on CARMEN. Ultimately, it is your responsibility to keep up with any such modifications and be aware of current policies, deadlines, etc.

## Students with Special Needs

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I should register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. For accommodations needed related to an exam, seek the section of the syllabus above on examinations. **SLDS contact information:** [slds@osu.edu](mailto:slds@osu.edu); 614-292-3307; [slds.osu.edu](http://slds.osu.edu); 098 Baker Hall, 113 W. 12<sup>th</sup> Avenue.

## Sexual Misconduct/Relationship Violence

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at <http://titleix.osu.edu> or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at [titleix@osu.edu](mailto:titleix@osu.edu)

## Schedule of Lectures and Readings

This course is organized into units rather than individual lectures. We will spend what time is needed on each unit before progressing to the next, adjusting as needed with the goal of covering all of the material by the end of the semester in mind. The sequence of units and relevant readings can be found below. You are encouraged to read the book more than once as you will learn something new after each reading. You will also benefit from reading the supplementary readings available on CARMEN, although doing so is optional (though students in the quantitative psychology doctoral program should consider these required reading as well). Some of the material in this class has no corresponding supplementary reading.

### **UNIT 0: OVERVIEW AND REVIEW OF REGRESSION CONCEPTS**

*This unit reviews the principles of ordinary least squares linear regression analysis, including the least squares criterion, construction and interpretation of the regression model, interpretation of model coefficients, and statistical inference.*

#### Required reading

Chapters 1 and 2

## **UNIT 1: STATISTICAL MEDIATION ANALYSIS**

*This unit introduces the basic concepts of statistical mediation analysis. Elementary path analysis rules and the estimation of total, direct, and indirect effects is covered for the simple mediation model (i.e., one mediator). The PROCESS macro for SPSS and SAS is introduced. Various approaches to inference about indirect effects, estimation of effect size, and the interpretation of the indirect and direct effect in standardized and unstandardized form are topics in this unit.*

### Required reading

Chapters 3 and 4, Appendix A

### Supplementary primary readings for your interest

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, and Computers*, 36, 717-731.

Hayes, A. F., & Rockwood, N. J. (2017). Regression-based statistical mediation and moderation analysis in clinical research: Observations, recommendations, and implementation. *Behaviour Research and Therapy*, 98, 39-57.

Hayes, A. F., & Scharkow, M. (2013). The relative trustworthiness of inferential tests of the indirect effect in statistical mediation analysis: Does method really matter? *Psychological Science*, 24, 1918-1927.

## **UNIT 2: MODERATION ANALYSIS**

*This unit describes the use of linear regression analysis for examining the contingencies of an effect. It focuses on the linear moderation model that allows one variable's effect on another to be a linear function of another variable in the model. The conditional effect is defined. Methods of estimating such conditional effects, "probing" evidence of moderation, and visualizing moderated effects are described. Various myths about moderation analysis are described and debunked.*

### Required reading

Chapters 7 through 9 (you may skip sections 9.4 and 9.5)

### Supplementary primary readings for your interest

Hayes, A. F., & Rockwood, N. J. (2017). Regression-based statistical mediation and moderation analysis in clinical research: Observations, recommendations, and implementation. *Behaviour Research and Therapy*, 98, 39-57.

Hayes, A. F., & Matthes, J. (2009). Computational procedures for probing interactions in OLS and logistic regression: SPSS and SAS implementations. *Behavior Research Methods*, 41, 924-936.

Bauer, D. J., & Curran, P. J. (2005). Probing interactions in fixed and multilevel regression: Inferential and graphical techniques. *Multivariate Behavioral Research*, 40, 373-400. (stop at page 387)

Hayes, A. F., Glynn, C. J., & Hude, M. E. (2012). Cautions in the interpretation of coefficients and hypothesis tests in linear models with interactions. *Communication Methods, and Measures*, 6, 1-12.

Irwin, J. R., & McClelland, G. H. (2001). Misleading heuristics and moderated regression models. *Journal of Consumer Research*, 38, 100-109.

Kromrey, J. D., & Foster-Johnson, L. (1998). Mean centering in moderated multiple regression: Much ado about nothing. *Educational and Psychological Measurement*, 58, 42-67.

### **UNIT 3:           CONDITIONAL PROCESS ANALYSIS I**

*This unit combines the material from Unit 1 and Unit 2 into an integrated analytical model for examining the moderation of mechanisms. Topics include conditioning direct and indirect effects on moderators, quantifying the relationship between a moderator and indirect and direct effects, and approaches to testing whether a mechanism is moderated.*

#### Required reading

Chapters 11, 12

Hayes, A. F., Montoya, A. K., & Rockwood, N. J. (2017). The analysis of mechanisms and their contingencies: PROCESS versus structural equation modeling. *Australasian Marketing Journal*, 25, 76-81.

#### Supplementary primary readings for your interest

Hayes, A. F. (2015). An index and test of linear moderated mediation. *Multivariate Behavioral Research*, 50, 1-22.

Hayes, A. F., & Rockwood, N. J. (2017). Regression-based statistical mediation and moderation analysis in clinical research: Observations, recommendations, and implementation. *Behaviour Research and Therapy*, 98, 39-57.

Preacher, K. J., Rucker, D. D., & Hayes, A. F. (2007). Assessing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research*, 42, 185-227.

### **UNIT 4:           STATISTICAL MEDIATION AND MODERATION ANALYSIS II**

*This unit extends the principles of mediation and moderation analysis introduced in Unit I and II to models with multiple mediators or moderators, including the parallel and serial multiple mediator model, the comparison of indirect effects, mediation analysis when the independent variable is multicategorical, moderated moderation, and mediation analysis in the two-condition within-subject design.*



### Required reading

Chapters 5, 6, 9 (sections 9.4, 9.5), 10

Montoya, A. K., & Hayes, A. F. (2017). Two-condition within-participant statistical mediation analysis: A path-analytic framework. *Psychological Methods, 22*, 6-27.

### Supplementary readings for your interest

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling methods for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*, 879-891.

Hayes, A. F., & Preacher, K. J. (2014). Statistical mediation analysis with a multicategorical independent variable. *British Journal of Mathematical and Statistical Psychology, 67*, 451-470.

Hayes, A. F., & Montoya, A. K. (2017). A tutorial on testing, visualizing, and probing interaction involving a multicategorical variable in linear regression analysis. *Communication Methods and Measures, 11*, 1-30.

## **UNIT 5:        ADVANCED TOPICS IN CONDITIONAL PROCESS ANALYSIS**

*This unit addresses complex problems in conditional process analysis as time allows, including models that combine multiple mediation and moderation; multicategorical independent variables; partial, conditional, and moderated moderated mediation; editing preprogrammed models in PROCESS and creating your own models.*

### Required reading

Chapter 13, Appendix B

Hayes (in press). Partial, conditional, and moderated moderated mediation: Quantification, inference, and interpretation. *Communication Monographs*.

Hayes, A. F. (2015). An index and test of linear moderated mediation. *Multivariate Behavioral Research, 50*, 1-22

## Fundamentals of Factor Analysis

Psychology 7820

Fall 2017

Lecture        Tuesdays and Thursdays, 2:20-3:40pm  
                  Psychology Building (PS) Room 219  
Instructor     Paul De Boeck, 232 Lazenby  
                  [deboeck.2@osu.edu](mailto:deboeck.2@osu.edu)

### Course overview

Factor analysis is an analysis of associations between variables in order (1) to find or evaluate underlying factors that can explain the associations or (2) to reduce a set of variables to a smaller set as a summary of the larger set (principal components analysis). The former is a model based approach, while the latter is purely descriptive. Typically the associations are correlation or covariance measures.

The factor analytic approach has been initiated and further developed within the domain of psychology for the study of intelligence and personality and within educational sciences for cognitive tests. It is now a broadly used approach in many disciplines, from engineering and chemistry to linguistics, marketing, and the social sciences, and it has led to the development of latent variable statistical models and structural equation models. Within the social sciences it is primarily based on individual differences because the correlations and covariance matrices that are analyzed are relationships between these individual differences.

The emphasis of this course is on laying foundations for a correct understanding, application, and interpretation of factor analysis in psychology and the social sciences. The course covers major topics in descriptive, exploratory and confirmatory factor analysis. It is intended as a first course in a mini-sequence that will gradually progress to courses on (1) factor based structural equation models for an investigation of relationships between latent variables and (2) item response theory for factor based measurement models.

### Course objectives

At the end of the semester, you are expected to have a solid understanding of exploratory and confirmatory factor analysis and of principal component analysis so that you become an informed data analyst when conducting your own analysis, whether for thesis or dissertation research, or for other research projects that you will no doubt undertake in the future.

You should be able to demonstrate your ability to use major exploratory and confirmatory factor analysis software, and be able to list them confidently in the quantitative/statistical expertise section in your CV. You should be able to interpret the results from factor analysis and communicate the interpretation effectively, whether in your own work or for evaluating the adequacy of other researchers' work.

For quantitative methodology students an additional objective is to become familiar with the general

conceptual framework for latent variable modeling, so that you may contribute to the methodological and statistical literature in the future.

### Software

We will be using three software programs. The first is SPSS for principal component analysis and exploratory factor analysis. The second is Professor Michael Browne's Comprehensive Exploratory Factor Analysis (CEFA; Version 3.04) program for exploratory factor analysis. CEFA is free and can be downloaded from:

<http://faculty.psy.ohio-state.edu/browne/software.php>

The third is Yves Rosseel's R package `lavaan`, which can be freely downloaded from the CRAN website. It will be used for confirmatory factor analysis.

### Assignments

There will be three homework assignments, focused on:

- principal component analysis and matrix algebra (exercises prepared in class)
- exploratory factor analysis using CEFA
- confirmatory factor analysis using `lavaan`

All assignments must be typed and no more than five pages of text (double spaced).

Working together is fine but you must turn in independent reports.

In addition to these homework assignments, there will be a final exam with three open-ended questions. The final-exam will be a take-home exam, distributed on Nov 29 and due at 2pm Dec 6. You may consult any resource (lecture notes, books, articles, etc.), but you may not discuss any part of the exam with another person. Additional details will be provided closer to the end of the course.

Finally, each week there will be an easy in-class quiz on a topic of the class in question. The quiz will be prepared in class, so that one should be able to give a correct response based on one's participation in the same class.

### Grading

The final exam, the three assignments, and the set of in-class quizzes each count for 20%.

### Students with disabilities

Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated, and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerence Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; <http://www.ods.ohio-state.edu/>

### Academic misconduct

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct.

## Tentative Schedule

Week 1	Background	Aug 22 & 24
Week 2	Matrix Algebra	Aug 29 & 31
Week 3	Principal Components Analysis	Sep 5 & 7
Week 4	Principal Component Analysis	Sep 12 & 14
Week 5	Common Factor Model	Sep 19 & 21
Week 6	Exploratory Factor Analysis (EFA)	Sep 26 & 28
Week 7	EFA with SPSS	Oct 3 & 5
Week 8	EFA with CEFA	Oct 10
Week 9	EFA with CEFA & Rotation	Oct 17 & 18
Week 10	Confirmatory Factor Model (CFA)	Oct 24 & 26
Week 11	lavaan for CFA	Oct 31 & Nov 2
Week 12	lavaan for CFA	Nov 7 & 9
Week 13	Estimation	Nov 14 & 16
Week 14	Model Fit	Nov 21
Week 15	Extensions depending on ...	Nov 28 & 30
Week 16	Closing considerations	Dec 5

## Reading material

Five articles by way of documentation: to be determined.

Course notes will be made available by the instructor after each topic.

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## Sexual misconduct/relationship violence

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at <http://titleix.osu.edu> or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at [titleix@osu.edu](mailto:titleix@osu.edu)

## Disability Services

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability

Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: [slds@osu.edu](mailto:slds@osu.edu); 614-292-3307; [slds.osu.edu](http://slds.osu.edu); 098 Baker Hall, 113 W. 12<sup>th</sup> Avenue.

Structural Equation Models  
Psychology 7821, Fall 2016, 3 credits  
Class meeting: Tues/Th 9:35 - 10:55, Jennings Hall 136

R. Cudeck  
240K Lazenby Hall  
cudeck.1@osu.edu, 614-292-1030  
Office hour: Tues 11:00 - 12:00 or appointment

Rick Farouni  
240D Lazenby Hall  
farouni.1@osu.edu  
Office Hour: TBA or appointment

This course is a survey of the main statistical models and methods of structural equation models. It is geared toward general PhD students in the social sciences who have taken a one year graduate level sequence in applied statistics such as Psy 6810/6811 plus a semester course in regression.

Requirements: Ten computer exercises (67%) plus final exam (33%). Computer exercises are due on the date assigned. You may turn in one exercise up to one week late. Missed homeworks lower grade by 1/3 letter. Please do not hand in unedited computer results.

Notes will be distributed in class

#### Tentative List of Topics

Overview, orientation, examples

##### Matrix algebra

Types of matrices: Constant, identity, null, diagonal, square, symmetric, lower triangle

Operations: Trace, addition, subtraction, multiplication (conformability)

Scalar-matrix multiplication

Determinant (memorize determinant of 2 x 2 matrix)

Definition of a singular matrix

Inverse matrix (memorize inverse of 2 x 2 matrix)

##### Basic statistics in matrices

Mean vector

Diagonal matrix of variances or standard deviations

Correlation matrix

Covariance matrix

Multiple regression

Regression equation

Least squares criterion function

Solving for the regression coefficients

Predicting an individual response

Factor analysis

- Principal Components (*not* a variety of factor analysis)
- Regression Model and Correlation Structure
- Multiple Factors: Background
- Estimation of the Multiple Factor Model
- Analytic Rotation
- How Many Factors?
- Standard Errors of Estimate
- Target Rotation
- Restricted Factor Analysis
- Test Theory Models

SEM: Major statistical components

- Path diagrams
- Mathematical representation of SEM models
- Data model and covariance structure
- LISREL model, RAM model, other versions
- Identification and estimation
- Models as approximations, model fit, model modification
- Using correlations versus variances and covariances
- Direct, indirect, total effects
- Multiple populations
- Mean structures
- Missing data
- Ordinal variables

SEM models

- Regression: Simple, multiple, multivariate, sur
- Measurement models for true scores
- Factor analysis and more general latent variable models
- Patterned correlation structures
- Path analysis, latent variable regression
- MIMC model
- Longitudinal designs and latent growth curves

Reference lists and supplementary material for leisure reading

On-line SEM workshops at Friedrich-Schiller University (Germany)

<http://www.metheval.uni-jena.de/courses.php?&lang=en> (hours and hours with the major SEM people)

Werner Wothke's nice SEM workshop notes, based on sas calis

<http://smallwaters.com/> and click on "Intro to SEM"

Syntax and data files for 5 computer programs, from T Brown "Confirmatory factor analysis"

<http://people.bu.edu/tabrown/cfabook.html>

AERA SEM-SIG links

<http://www.hawaii.edu/sem/sem.html>

Keith Smolkowski's list

<http://homes.ori.org/~keiths/bibliography/statistics-sem-cfa.html>

Jim Steiger's course, Intro to SEM

<http://www.statpower.net/SEM.html>

Edward Rigdon's page of links

<http://www2.gsu.edu/~mkteer/index.html>

SEM Net (a listserv with lots of references)

<https://listserv.ua.edu/archives/semnet.html>

Scientific Software

<http://www.ssicentral.com/lisrel/resources.html> (several program guides here)

<http://www.ssicentral.com/lisrel/examples.html>

<http://www.ssicentral.com/lisrel/advancedtopics.html>

<http://www.ssicentral.com/lisrel/references.html>



## Computing

SEM is a small acronym that applies to a gigantic collection of models and methods for the analysis of several variables. After learning the concepts, the main goal of this course is to learn how to estimate and interpret SEMs. Thus computing is a big deal. The best strategy for computing is to build on the software you use most, and become familiar with its SEM library. R, STATA, SPSS, MATLAB, SAS are comprehensive statistical packages with excellent SEM modules. AMOS, RAMONA, EQS, lavaan (in R), CALIS, MPlus, LISREL are the main specialized SEM procedures. All these programs handle the popular SEM models equally well. At the same time, they each have a few specialized features that no other program can deal with. For the major varieties of SEM, stay with the computer software that you and your research group routinely use.

I personally use SAS and LISREL. Both are available free of charge to OSU students. The student version of Lisrel is restricted to 16 variables and only plain text or SPSS SAV files can be imported. Otherwise it's the full-featured program. <http://ssicentral.com/lisrel/student.html>

## Two Important Administrative Issues

(1) It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct [http://studentlife.osu.edu/pdfs/csc\\_12-31-07.pdf](http://studentlife.osu.edu/pdfs/csc_12-31-07.pdf).

(2) The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. You are also welcome to register with Student Life Disability Services to establish reasonable accommodations. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: [slds@osu.edu](mailto:slds@osu.edu); 614-292-3307; [slds.osu.edu](http://slds.osu.edu); 098 Baker Hall, 113 W. 12th Avenue.

# Fundamentals of Item Response Theory

Psychology 7822

## When?

Spring 2018

Thursday 4:00-6:45 #36183

## Where?

Lazenby Hall room 220

## Instructor

Paul De Boeck

Lazenby Hall room 232

phone office: 614-292-4131

email: deboeck.2@osu.edu

office hours: Thursday 3:00-4:00 or by appointment

## **Aims**

The aims of the course are:

- to give students a deep understanding of a powerful methodology for *measurement* based on test data and more generally for the *analysis of categorical data* in the presence of individual differences,
- to bring students to the level of proficient users of *item response models* and *software* for these models starting from test data and other types of categorical data.

The course helps for measurement-based research and to prepare for jobs in test companies and for other measurement-related jobs.

Item response theory (IRT) has become increasingly popular in the past few decades in a wide variety of fields, such as clinical psychology, cognitive psychology, industrial and organizational psychology, education, marketing, consumer behavior, educational measurement, political sciences, and health sciences. It has become an essential feature of the modern measurement landscape and a powerful data analysis and statistical modeling tool for categorical data with individual differences.

It can be used for a variety of purposes:

- analyzing data from tests, surveys, and experiments
- developing and adapting tests and surveys
- maximizing the efficiency of tests and surveys

## **Overview**

The course consists of four sections. Section 1 is an introduction and Sections 2 to 4 cover different IRT approaches and models and will be taught in a hands-on way based on existing data sets and easy-to-use software packages.

### Section 1: Why IRT?

1. Before introducing IRT, classical test theory will be discussed.

It is the predecessor of IRT but the basic concepts are still valid. However, IRT has a much broader scope and a much larger potential.

2. We start from the interests students have who take the course.

Based on these interests different focus topics will be selected going through Sections from 2 to 4. Here is a tentative list, to be completed:

- measurement of latent variables
- levels of measurement: ordinal, interval, ratio
- multidimensionality
- relationship with factor models and multilevel models
- pre-post designs
- measurement of change
- accurate confidence intervals
- item selection and short forms
- analysis of binary data,
- analysis of rating scale data
- decision making data
- group differences
- measurement invariance and fair tests
- surveys
- measurement precision and reliability
- ...

IRT can be used as a tool for measurement, for exploration, for data analysis.

It is different from classic test theory, from analysis of variance, from multiple regression analysis, from multilevel modeling, etc., but it also shares many aspects with these other approaches.

Seeing the relationships will yield a better understanding of IRT and of these other approaches.

### Section 2: IRT as generalized linear mixed modeling

Depending on the points of interest selected in the first section, IRT will be illustrated as a generalized form of linear mixed models (GLMM). This opens new perspectives within and beyond the measurement domain, and in disciplines other than where IRT has been used thus far.

*Software:* `lme4` package in R and more in particular the `glmer()` function, a simple and flexible software for mixed models. No advance knowledge of R is required for the course. Students will receive scripts with code to use the `glmer()` function.

### Section 3: Common IRT models and concepts

Again depending on the points of interest selected in the first section, IRT will be illustrated with typical IRT software for the well-known one-, two-, and three-parameter models, the graded response and partial credit models, multidimensional IRT, etc., and for item and test information, item fit, person parameter estimation, measurement invariance, differential item functioning, etc.

*Software:* flexMIRT version 2 (Cai, 2013), `irtoys` (Partchev, 2011) and `ltm` in R (Rizopoulos, 2012). `irtoys` and `ltm` are available in R, and students will receive a free license for flexMIRT version 2. Students will also receive scripts with code to use `irtoys` and `ltm`, and syntax files to use flexMIRT.

### Section 4: Special IRT topics

The first special topic is IRTree modeling of rating scale data. Rating scale data are either analyzed as interval-scale data or as ordinal data, using either linear factor analysis or ordinal factor analysis and IRT for ordered-category data, respectively. Unfortunately, rating scale data are neither interval-scale nor fully ordinal but only partially ordinal. In order to respect the partially ordinal nature of the data, IRTree models can be used.

Other special topics depend on the interests of students. For example, models for learning and

growth and be discussed.

*Software:* flirt version 1.15 (Jeon, Rijmen, & Rabe-Hesketh, 2014a and b), downloadable from <http://faculty.psy.ohio-state.edu/jeon/lab/flirt.php>.

## Software

Bates, D., & Maechler, M (2010). *lme4: Linear mixed-effects models using Eigen and Eigen++*.

<http://CRAN.R-project.org/package=lme4>.

Cai, L. (2013). *flexMIRT<sub>R</sub> version 2: Flexible multilevel multidimensional item analysis and test scoring* [Computer software]. Chapel Hill, NC: VectorPsychometric Group.

Jeon, M., Rijmen, F., & Rabe-Hesketh, S. (2014a). Flexible item response theory modeling with the R package flirt. *Applied Psychological Measurement, 38*, 404.

Jeon, M., Rijmen, F., & Rabe-Hesketh, S. (2014b). *flirt: Flexible item response theory modeling. R package version 1.15*. downloadable from <http://faculty.psy.ohio-state.edu/jeon/lab/flirt.php>

Partchev, I. (2012). *irtoys: Simple interface to the estimation and plotting of IRT models*.

<http://CRAN.R-project.org/package=irtoys>.

Rizopoulos, D. (2012). *ltm: Latent trait models under IRT*.

<http://CRAN.R-project.org/package=ltm>.

## References reading material

De Boeck, P., Bakker, M., Zwitser, R., Nivard, M., Hofman, A., Tuerlinckx, F., & Partchev, I. (2011).

The estimation of item response models with the lmer function from the lme4 package in R.

*Journal of Statistical Software, 39*, 1-28.

De Boeck, P., & Wilson, M. (2004). A framework for item response models. In P. De Boeck & M. Wilson (Eds.), *Explanatory item response models: A generalized linear and nonlinear approach* (pp. 3-41). New York: Springer.

Rijmen, F., Tuerlinckx, F., De Boeck, P., & Kuppens, P. (2003). A nonlinear mixed model framework for item response theory. *Psychological Methods, 8*, 185-205.

Jeon, M. & De Boeck, P. (2016). A generalized item response tree model for psychological assessments. *Behavior Research Methods, 48*, 1070-1085.

Thissen, D., Nelson, L., Rosa, K., & McLeod, L. (2001). Item response theory for items scored in more than two categories. In D. Thissen & H. Wainer (Eds.), *Test scoring* (p. 141-186). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Thissen, D., & Orlando, M. (2001). Item response theory for items scored in two categories.

In D. Thissen & H. Wainer (Eds.), *Test scoring* (p. 73-140). Mahwah, NJ: Lawrence Erlbaum.

Tuerlinckx, F., & Wang, W. C. (2004). Models for polytomous data. In P. De Boeck & M. Wilson (Eds.), *Explanatory item response models: A generalized linear and nonlinear approach* (pp. 75-109). New York: Springer.

Wainer, H., & Thissen, D. (2001). True score theory: The traditional method. In D. Thissen & H. Wainer (Eds.), *Test scoring* (p. 73-140). Mahwah, NJ: Lawrence Erlbaum.

Wirth, R. J., & Edwards, M. C. (2007). Item factor analysis: Current approaches and future directions. *Psychological Methods, 12*, 58-79.

Wilson, M., & De Boeck, P. (2004). Descriptive and explanatory item response models.

In P. De Boeck & M. Wilson (Eds.), *Explanatory item response models: A generalized linear and nonlinear approach* (pp. 43-74). New York: Springer.

## Schedule

Weeks	Topics	Assignments and deadlines
Week 1-2 Jan 11 & 18	Section 1	
Week 3-6 Jan 25 to Feb 15	Section 2	1 <sup>st</sup> project initiated in week 5
Week 7-12 Feb 22 to Mar 29	Section 3	1 <sup>st</sup> project due Feb 25 2 <sup>nd</sup> project initiated in week 9 2 <sup>nd</sup> project due April 1 Final project formulation due April 5
Week 10 Mar 15	Spring break	
Week 13 – 15 Mar 22 to Apr 19	Section 4	Final project due April 26

## Grading Policies

There are no exams. Instead:

- For 3/5 of your grade there will be *two small projects*. Each of these two counts for 30 of the 100 points. You can either do the default project offered by the instructor or a project of your own choice. The projects involve software applications with a brief report: output, graphics where helpful, and a verbal description of the results.

The length of a brief report is 1 to 2 pages, output and graphics not included.

- For 2/5 of your grade there will be a *final project*. It counts for 40 of the 100 points.

The topic of your final project is up to you and implies an IRT analysis of data you have which you would like to analyze, or of data provided to you if you do not have your own data. The length of the report is between 3 and 5 pages.

We will discuss plans for the final project in greater detail as we progress through the semester.

Students who would have a final project in mind earlier, can contact the instructor.

**Sexual misconduct/relationship violence:**

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at <http://titleix.osu.edu> or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at [titleix@osu.edu](mailto:titleix@osu.edu)

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Analysis of Repeated Measures and Longitudinal Data  
Psychology 7823, Spring 2017  
Tues/Thur, 9:35-10:55, Baker Sys, Rm 394, 3 cr

R. Cudeck  
240K Lazenby Hall  
cudeck.1@osu.edu, 2-1030  
Office: Tues 11:00-12:00 or appointment

Rick Farouni  
240D Lazenby Hall  
farouni.1@osu.edu  
Mon 3:30-4:30 or appointment

Background: A course at the graduate level in regression, including knowledge of matrix algebra are both assumed. Familiarity with a statistics package that includes a module for mixed model analysis such as lme/lme4/lmer in R, MIXED in SPSS, nlme in MATLAB, xtmixed in STATA, HLM and SUPERMIX from Scientific Software, MLwiN from Univ of Bristol, XLSTAT for Excel, MIXED from NCSS, or MIXED/NLMIXED in SAS.

Requirements: Ten computer exercises including a final comprehensive project, due on the date assigned. You may turn in one exercise up to one week late.

Procedure: Detailed notes, data sets, and worked examples distributed at every class meeting. Extensive practical experience with realistic problems is the focus of this course.

#### Tentative List of Topics

1. Introduction
2. Graphical displays and classical procedures for repeated measures
3. Linear models for longitudinal data
4. Extended linear models: Multiple groups and unbalanced data
5. Maximum likelihood estimation and missing data analyses
6. Issues in selecting a model
7. Covariance structures for residual variables
8. Transforming the independent variable: Centering
9. Random coefficient models
10. Linear mixed-effects model
11. Level-two covariates
12. Segmented polynomials
13. Nonlinear models
14. Multi-level models for cluster sample problems
15. Meta-analysis
16. Computation issues and software every class day as we go

## Readings

Because repeated measures designs are important in many disciplines, the literature on appropriate statistical methods is voluminous, varied, growing. Algebraic notation, mathematical level, point of view and scientific orientation vary considerably. There is interesting recent work in statistics journals, especially *Biometrics* and *Applied Statistics*. This literature is well worth the investment to follow, but can be heavy sledding for behavioral scientists. In this course, articles that are especially relevant for particular topics will be referred to as each topic is covered. For an introduction to the subject from various perspectives as well as more in-depth coverage of selected topics, here are many of the more important books.

## Book-length Treatments

1. Aerts, M., Geys, H., Molenberghs, G., Ryan, L.M. (2002). *Topics in modelling of clustered data*. London: Chapman and Hall.
2. Allison, P. D. (2005). *Fixed effects regression methods for longitudinal data using SAS*. Cary, NC: SAS Institute.
3. Bijleveld, C.J.H., van der Kamp, L., Mooijaart, A., van der Kloot, W.A., van der Leeden, R., Van Der Burg, E. (1999). *Longitudinal data analysis: Designs, models and methods*. Thousand Oaks, CA: Sage.
4. Bickel, R. (2007). *Multilevel analysis for applied research*. New York: Guilford.
5. Brown, H. & Prescott, R. (2006). *Applied mixed models in medicine* (2nd ed.). New York: Wiley.
6. Brunner, E., Domhof, S., Lnager, F. (2002). *Nonparametric analysis of longitudinal data in factorial experiments*. New York: Wiley.
7. Collins, L. M. & Horn, J. L. (1991). *Best methods for the analysis of change*. Washington, DC: APA
8. Collins L. & Sayer A. G. (2001). *New methods for the analysis of change*. Washington, DC: APA
9. Crouchley, R. (1987). *Longitudinal data analysis*. Brookfield, Vt: Avebury
10. Crowder, M. J. & Hand, D. J. (1990). *Analysis of repeated measures*. London: Chapman & Hall.
11. Davidian, M. & Giltinan, D. M. (1995). *Nonlinear models for repeated measurement data*. London: Chapman & Hall.
12. Davis, C. S. (2002). *Statistical methods for the analysis of repeated measurements*. New York: Springer.
13. de Leeuw, J. & Kreft, I. G. G. (2005). *Handbook of quantitative multilevel analysis*. Boston, MA: Kluwer.
14. de Leeuw, J. & Meijer, E. (2008). *Handbook of multilevel analysis*. New York: Springer.
15. Demidenko, E. (2004). *Mixed models: Theory and applications*. New York: Wiley.
16. Demidenko, E. (2013). *Mixed Models: Theory and applications with R* (2nd Ed.). New York: Wiley.
17. Diggle, P. J., Liang, K.-Y., & Zeger, S. L. (1994). *Analysis of longitudinal data*. Oxford: Oxford University Press.
18. Duncan, T. E., Duncan, S. C., Strycker, L. A., Li, F., & Alpert, A. (1999). *An introduction to latent variable growth curve modeling: Concepts, issues, and applications*. Mahwah, NJ: Earlbaum.



19. du Toit, S. H. C. (1993). *Analysis of multilevel models: Part 1: Theoretical aspects*. Pretoria, South Africa: Human Sciences Research Council.
20. Fahrmeir, L. & Tutz, G. (2002). *Multivariate statistical modelling based on generalized linear models*, (2nd ed). NY: Springer.
21. Fitzmaurice, G., Davidian, M., Verbeke, G. & Molenberghs, G. (2008). *Longitudinal data analysis: A handbook of modern statistical methods*. New York: Chapman & Hall/CRC
22. \*\*Fitzmaurice, G., Laird, N., & Ware, J. (2004). *Applied longitudinal analysis*. New York: Wiley.
23. Frees, E. W. (2004). *Longitudinal and panel data: Analysis and applications in the social sciences*. Cambridge, England: Cambridge University Press.
24. Galwey, N. W. (2006). *Introduction to mixed modelling: Beyond regression and analysis of variance*. New York: Wiley.
25. Garson, G.D. (Ed.) (2012). *Hierarchical linear modeling: Guide and applications*. Thousand Oaks, CA: Sage
26. Gelman, A. Hill, J. (2006). *Data analysis using regression and multilevel/hierarchical models*. Cambridge University Press.
27. Goldstein, H. (1979) *The design and analysis of longitudinal studies: Their role in the measurement of change*. New York: Academic Press.
28. Goldstein, H. I. (1995). *Multilevel statistical models*. London: Arnold.  
(online at <http://www.soziolegie.uni-halle.de/langer/multilevel/books/goldstein.pdf>)
29. Goldstein, H. I. (1987). *Multilevel models in educational and social research*. London: Oxford
30. Gottman, J. M. (1995). *The analysis of change*. Mahwah, NJ: Erlbaum.
31. Gregoire, T. G., Brillinger, D. R., Diggle, P. J., Russek-Cohen, E., Warren, W. G., Wolfinger, R. D. (Eds.) (1997). *Modelling longitudinal and spatially correlated data*. New York: Springer.
32. \*\*Hand, D. & Crowder, M. (1996). *Practical longitudinal data analysis*. London: Chapman & Hall.
33. Heck, R. H. & Thomas, S. L. (2009). *An introduction to multilevel modeling techniques (2nd ed.)*. New York: Psychology Press..
34. Hedeker, D. & Gibbons, R. D. (2006). *Longitudinal data analysis*. New York: Wiley.
35. Hoffman, L. (2014). *Longitudinal analysis: Modeling within-person fluctuation and change*. New York: Taylor & Francis
36. Hox, J. (1995). *Applied multilevel analysis*. Amsterdam: TT-Publikaties.  
(<http://joophox.net/publist/pubenjh.htm> :: click on his 1995 book link "Applied Multilevel Analysis")
37. Hox J. (2002). *Multilevel analysis techniques and applications*. Mahwah, NJ: Earlbaum.
38. Jiang, J. (2007). *Linear and generalized linear mixed models and their applications*. New York: Springer.
39. Jones, R. H. (1993). *Longitudinal data with serial correlation: A state-space approach*. London: Chapman & Hall.
40. Kshirsagar, A.M. & Smith, W.B. (1995). *Growth curves*. New York: Marcel Dekker.
41. Kreft, I. & De Leeuw, J. (1998). *Introducing multilevel modeling*. Thousand Oaks, CA: Sage.

42. Leyland, A. H. & Goldstein, H. (2001). *Multilevel modelling of health statistics*. New York: Wiley.
43. Lindsey, J. K. (1999). *Models for repeated measurements* (2nd Ed.). Oxford: Oxford University Press.
44. Littell, R. C., Millikan, G. A, Stroup, W. W., Wolfinger, R. D., Schabenberger, O. (2006) *SAS for mixed models* (2nd ed.). Cary, NC: SAS
45. Little, T.D. (2013). *Longitudinal structural equation modeling*. New York: Guilford Press.
46. Little, T. D., Schnabel, K. U., & Baumert, J. (2000). *Modeling longitudinal and multilevel data: Practical issues, applied approaches, and specific examples*. Mahwah, NJ: Earlbaum.
47. Liu, X. (2016). *Methods and applications of longitudinal data analysis*. Amsterdam: Elsevier.
48. Long, J. D. (2011) *Longitudinal data analysis for the behavioral sciences using R*. Thousand Oaks, CA: Sage.
49. Longford, N. T. (1993). *Random coefficient models*. Oxford, England: Clarendon Press.
50. Luke, D. (2004). *Multilevel modeling*. Thousand Oaks, CA: Sage.
51. McCulloch, C. E., & Searle, S. R. (2001). *Generalized, linear, and mixed models*. New York: Wiley
52. McCulloch, C. E., Searle, S. R., Neuhaus, J. M. (2008). *Generalized, linear, and mixed models* (2nd Ed.). New York: Wiley
53. Molenberghs, G & Verbeke, G (2005). *Models for discrete longitudinal data*. New York: Springer.
54. Moskowitz, D. S. & Hershberger, S. L. (2002). *Modeling intraindividual variability with repeated measures data*. Mahwah, NJ: Erlbaum.
55. Newsom, J., Jones, R. N., Hofer, S. M. (2012). *Longitudinal data analysis: A practical guide for researchers in aging, health, and social sciences*. New York: Routledge.
56. Nezlek, J.B. (2011). *Multilevel modeling for social and personality psychology*. Thousand Oaks, CA: Sage.
57. O'Connell, A. A., McCoach, D. B. (2008). *Multilevel modeling of educational data*. Charlotte, NC: Information Age Publishing.
58. Panik, M J (2013) *Growth curve modeling: Theory and applications*. New York: Wiley.
59. Pinheiro, J. C. & Bates, D. M. (2000). *Mixed-Effects models in S and S-PLUS*. New York: Springer.
60. Rabe-Hesketh, R. & Skrondal, A. (2008). *Multilevel and longitudinal modeling using stata* (2nd ed.) College Station, TX: Stata Press.
61. \*\*Raudenbush, S. W. & Bryk, A. S. (2002). *Hierarchical Linear Models* (2nd ed.). Newbury Park, CA: Sage.
62. Reise, S. P. & Duan, N. (2003). *Multilevel modeling: Methodological advances, issues and applications*. Mahwah, NJ: Earlbaum.
63. \*\*Singer, J. D. & Willett, J. B. (2003). *Applied longitudinal data analysis*. Oxford: Oxford University Press.
64. Snijders, T. & Bosker, R. (2012). *Multilevel analysis: An introduction to basic and advanced multilevel modeling* (2nd Ed.). Thousand Oaks, CA: Sage.
65. Stroup, W.W. (2013). *Generalized linear mixed models*. Boca Raton, FL: Taylor-Francis, CRC Press.

66. Twisk, J.W.R. (2013). *Applied longitudinal data analysis for epidemiology: A practical guide* (2nd ed.). London: Cambridge University Press.
67. Weiss, R. (2005). *Modeling longitudinal data*. New York: Springer-Verlag.
68. Verbeke, G. & Molenberghs, G. (1997). *Linear mixed models in practice*. New York: Springer.
69. Verbeke, G. & Molenberghs, G. (2000). *Linear mixed models for longitudinal data*. New York: Springer.
70. Vonesh, E. F. (2012). *Generalized linear and nonlinear models for correlated data: Theory and applications using SAS*. Cary, NC: SAS Institute.
71. Vonesh, E. F. & Chinchilli, V. M. (1997). *Linear and nonlinear models for the analysis of repeated measurements*. New York: Dekker.
72. Wang, J., Xie, H., Fischer, J. H. (2011). *Multilevel models: Applications using SAS*. Boston: Walter de Gruyter.
73. Weiss, R. E. (2005). *Modeling longitudinal data*. New York: Springer.
74. West, B., Welch, K. B., Galecki, A. T. (2014). *Linear mixed models: A practical guide using statistical software* (2nd Ed.). New York: Taylor & Francis CRC Press.
75. Wu, L. (2010). *Mixed effects models for complex data*. New York: Taylor & Francis CRC press.
76. Zimmerman, D. L. & Nunez-Anton, V. (2010). *Antedependence models for longitudinal data*. New York: Chapman & Hall/CRC.

## Selected Reviews and Applications

1. Special issue: Longitudinal modeling of developmental processes. *International Journal of Behavioral Development*, 31(4), July 2007.
2. Bryk, A. S. & Raudenbush, S. W. (1987). Applications of hierarchical linear models to assessing change. *Psychological Bulletin*, 101, 147-158.
3. Burchinal, M. & Appelbaum, M. I. (1991). Estimating individual developmental functions: Methods and their assumptions. *Child Development*, 62, 23-43.
4. Cheng J., Edwards L.J., Maldonado-Molina M.M., Komro K.A., Muller K.E. (2010). Real longitudinal data analysis for real people: Building a good enough mixed model. *Statistics in Medicine*, 29, 504-520.
5. De Leeuw, J. & Kreft, I. (1986). Random coefficient models for multilevel analysis. *Journal of Educational Statistics*, 11, 57-85.
6. \*\*Fitzmaurice, G.M., & Ravichandran, C. (2008). A primer in longitudinal data analysis. *Circulation*, 118, 2005-2010
7. Gibbons, D. R., Hedeker, D., Elkin, I., Waternaux, C., Kraemer, H. C., Greenhouse, J. B., Shea, M. T., Imber, S. D., Sotsky, S. M. & Watkins, J. T. (1993). Some conceptual and statistical issues in analysis of longitudinal psychiatric data. *Archives of General Psychiatry*, 50, 739-750.
8. Gibbons, R. D., Hedeker, D., Waternaux, C., Davis, J. M. (1988). Random regression models: A comprehensive approach to the analysis of longitudinal psychiatric data. *Psychopharmacology Bulletin*, 24, 438-443.
9. Laird, N. M. (1988). Missing data in longitudinal studies. *Statistics in Medicine*, 7, 305-315.
10. Laird, N. M. & Ware, J. H. (1982). Random-effects models for longitudinal data. *Biometrics*, 38, 963-974.
11. Landis, J. R., Miller, M. E., Davis, C. S. & Koch, G. G. (1988). Some general methods for the analysis of categorical data in longitudinal studies. *Statistics in Medicine*, 7, 109-137.
12. Lindstrom, M. J. & Bates, D. M. (1990). Nonlinear mixed effects models for repeated measures. *Biometrics*, 46, 673-687.
13. McDonald, R. P. & Goldstein, H. (1989). Balanced versus unbalanced designs for linear structural relations in two-level data. *British Journal of Mathematical and Statistical Psychology*, 42, 215-232.
14. Muthen, B. O. (1994). Multilevel covariance structure analysis. *Sociological Methods and Research*, 22, 376-398.
15. Peugh, J. L., & Enders, C. K. (2005). Using the SPSS mixed procedure to fit cross-sectional and longitudinal multilevel models. *Educational and Psychological Measurement*, 65(5), 717-741.
16. Raudenbush, S. W. (1988). Educational applicationis of hierarchical linear models: A review. *Journal of Educational Statistics*, 13, 85-116.
17. Rogosa, D. R., Brandt, D., & Zimowski, M. (1982). A growth approach to the measurement of change. *Psychological Bulletin*, 90, 726-748.
18. Rogosa, D. & Saner, H. (1995). Longitudinal data analysis examples with random coefficient models. *Journal of Educational and Behavioral Statistics*, 20, 149-170.
19. Rogosa, D. R. & Willett, J. B. (1985). Understanding correlates of change by modeling individual differences in growth. *Psychometrika*, 50, 203-228.

20. Singer, J. (1998). Using SAS Proc Mixed to fit multilevel models, hierarchical models, and individual growth curves. *Journal of Educational and Behavioral Statistics*, *24*, 323-355.
21. Sullivan, L. M., Dukes, K. A., & Losina, E. (1999). Tutorial in biostatistics: An introduction to hierarchical linear modelling. *Statistics in Medicine*, *18*, 855-888.
22. Voelkle, M.C. (2007). Latent growth curve modeling as an integrative approach to the analysis of change. *Psychology Science*, *49(4)*, 375-414.
23. Vonesh, E. F. (1992). Non-linear models for the analysis of longitudinal data. *Statistics in Medicine*, *11*, 1929-1954.
24. Ware, J. H. (1985). Linear models for the analysis of longitudinal studies. *American Statistician*, *39*, 95-101.
25. Zeger, S. L. & Liang, K.-Y. (1986). Longitudinal data analysis for discrete and continuous outcomes. *Biometrics*, *42*, 121-130.

### Three Important Administrative Issues

(1) Academic Misconduct: It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct [http://studentlife.osu.edu/pdfs/csc\\_12-31-07.pdf](http://studentlife.osu.edu/pdfs/csc_12-31-07.pdf).

(2) Sexual misconduct/relationship violence: "Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at <http://titleix.osu.edu> or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at [titleix@osu.edu](mailto:titleix@osu.edu)

(3) Accommodations: The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. You are also welcome to register with Student Life Disability Services to establish reasonable accommodations. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: [slds@osu.edu](mailto:slds@osu.edu); 614-292-3307; [slds.osu.edu](http://slds.osu.edu); 098 Baker Hall, 113 W. 12th Avenue.

Psychology 7874  
Research Methods in Social Psychology I  
Office hours: by appointment

Fall, 2017  
Richard E. Petty  
Office: 100E Lazenby

## SYLLABUS

### Course Goals:

This course is the first in a two course methodology sequence required of all doctoral students in the social psychology program. This first course provides an introduction to issues of research design and scientific inference associated primarily with laboratory-based *experiments* in social psychology, though some issues with quasi-experiments and field studies will also be addressed. The companion second course focuses on reviewing research including empirical articles and grants as well as literature and conceptual review papers, though the current course will also introduce manuscript reviewing to a limited extent.

Topics to be covered in this course include hypothesis formulation and operationalization; assessing the validity of experiments (statistical, internal, construct, external); conceptual versus exact replications; moderation versus mediation of effects; different kinds of dependent measures; artifacts; critical tests of theories; and ethics of experimentation with human participants. For a reasonable one chapter overview of the content of this course, see:

Wilson, T. D., Aronson, E., & Carlsmith, K. (2010). The art of laboratory experimentation. In S. T. Fiske, D. T. Gilbert, & G. Lindzey (Eds.), *Handbook of Social Psychology*. (5<sup>th</sup> ed., Vol. 1, pp. 51-81). Hoboken, NJ: John Wiley & Sons.

### Texts that can serve as useful references include:

Reis, H. T., & Judd, C. M. (Eds.) (2014). *Handbook of research methods in social and personality psychology* (2<sup>nd</sup> edition). New York: Cambridge University Press.

Crano, W.D., Brewer, M.B., & Lac, A. (2015). *Principles and methods of social research* (3<sup>rd</sup> edition). New York: Taylor and Francis.

Lilienfeld, S. O., & Waldman, I.D. (Eds.) (2017). *Psychological science under scrutiny: Recent challenges and proposed solutions*. West Sussex, UK: Wiley/Blackwell.

Readings will be available on CANVAS one week before the class period at which they will be discussed. Students are responsible for downloading and making copies of these readings from the CANVAS site. In addition to the weekly readings, students will be responsible for five short papers, five sets of discussion questions, making oral presentations, participating in class discussion, and taking an exam that covers the course content.

**Grading:** Grades for the course will be based on the following:

1. Five two page papers (due by e-mail to [petty.1@osu.edu](mailto:petty.1@osu.edu) by noon on class day; double spaced; 400-600 words) = 35% (7% each)
2. Weekly class participation + biweekly discussion questions (due at 10 pm the night before class, e-mailed to [petty.1@osu.edu](mailto:petty.1@osu.edu)), and any oral reports = 35%
3. Final Exam = 30%

*Class Meetings and Topics*

<u>Week</u>	<u>DATE</u>	<u>COURSE TOPIC</u>	<u>PAPER GRP.</u>
W1.	August 28, 2017	Introduction to the Course and Basic Concepts	
W2.	September 11, 2017	Generating Hypotheses to Test	A1
W3.	September 18, 2017	Causality and Statistical Validity (Part 1)	B1
W4.	September 25, 2017	Causality and Statistical Validity (Part 2)	A2
W5.	October 2, 2017	Replicability of Research (Part 1)	oral reports
W6.	October 9, 2017	Replicability of Research (Part 2) solutions? .005	B2
W7.	October 16, 2017	Internal Validity	A3
W8.	October 23, 2017	Construct Validity/Dependent Variables	oral reports
W9.	October 30, 2017	REVIEW #1	B3
W10.	November 6, 2017	External Validity and Generalizability	A4
W11.	November 13, 2017	Mediators, Moderators and Interaction Effects	B4
W12.	November 20, 2017	REVIEW #2	A5
W13.	November 27, 2017	Field Research/Method versus Theory	B5
W14.	December 4, 2017	Ethics in Research	oral reports

FINAL EXAM (Wednesday, December 13, 2017; 2:00-3:45 pm)



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### **Sexual misconduct/relationship violence:**

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at <http://titleix.osu.edu> or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at [titleix@osu.edu](mailto:titleix@osu.edu)

### **Disability Services:**

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. **SLDS contact information:** [slds@osu.edu](mailto:slds@osu.edu); 614-292-3307; [slds.osu.edu](http://slds.osu.edu); 098 Baker Hall, 113 W. 12<sup>th</sup> Avenue.

# Special Topics in Quantitative Psychology (Psych 7896)

*Spring 2018*

Syllabus

Class meetings: Monday, 12:10–2:00 p.m.  
Psychology Building, room 35

Instructor: Paul De Boeck  
Office: Lazenby Hall, room 232  
E-mail: deboeck.2@osu.edu  
Phone: 614-292-4131  
Mailbox: By room 224 in Lazenby Hall  
Office hours: Thursday 3:00-4:00pm

## **Course Overview**

This course is required in principle for all quantitative psychology graduate students and will run over the length of the regular academic year (fall and spring semesters). Students can opt out only with the explicit approval of their advisor. The goals of this course are to familiarize students with ongoing research in the field of quantitative psychology, prepare students to present their own work, and encourage students to explore other content areas and begin viewing them through a quantitative lens.

### *Familiarize students with ongoing research*

Throughout the academic year, students will attend weekly meetings that feature talks from OSU faculty, external visitors, and their fellow graduate students. This will allow students to remain up to date with work being done by faculty and students here at OSU and by researchers in the field at large. In a typical year, we anticipate having several visitors from off campus to speak about their research. Our non-student speakers, both internal and external, will often represent the cutting edge in quantitative research.

### *Prepare students to present their own work*

Each student will be required to make one oral presentation in this course during each year he or she is a student in the program. Ideally, this will be a talk about ongoing or completed research the student is engaged in. Giving talks is a tremendously important part of professional life for quantitative researchers, regardless of the setting. Faculty will work with students to polish their presentation skills in a comfortable environment to prepare them for job talks and presentations at academic conferences.

### *Encourage students to explore other content areas*

To be an effective quantitative psychologist, it is important to be able to relate to and make connections with other content areas. These connections can take the form of a particular focus in one allied content area in which the student has deep expertise, or in a general ability to be able to quickly “get up to speed” in an additional content area. Both are reasonable

ways to proceed, but one or the other is viewed as necessary to function effectively as a quantitative psychologist.

### **Grading Policies**

All students will be assigned a grade for this course (e.g., A, A-, B+, B, ...). Grades will be based on three components:

1. Each student is required to give a presentation once a year: a relatively short 25 minute talk, or, upon request a 45 minute talk. Ideally, this talk should be on research the student is planning, conducting, or has completed. The student presenter should contact the discussant (see component 3) no later than one week before the talk in order to agree on how the discussant will be informed on the content of the presentation.
2. Once a semester, each student will attend a talk in another content area. This can be another area within psychology or in another department entirely. The area or department should be one that is potentially amenable to quantitative methods. If you are not sure whether a particular talk would satisfy this requirement, contact the instructor. Students are expected to prepare a brief paper (no more than two pages) summarizing the main theme of the talk in five lines and linking something from the talk to their own research or to briefly present the main theme and the link they saw with their own possible research. The papers should be emailed to the instructor before the first day of finals each semester and the short presentations are scheduled for the last seminar of the semester. Students will be assigned at random to one of two groups: either with presentation in the Fall semester and paper in the Spring semester, or the other way around.
3. Students are expected to be actively involved in the weekly meetings. To be involved, you must first be present. Attendance is mandatory. Absences that are not approved prior to their occurrence will negatively affect your final grade. Each student is also required once a year to be discussant for a presentation, which implies that a few questions are asked or remarks are made. Beyond attendance and being discussant, we expect students to actively participate in the sessions. Obviously not every student will ask a question or make a comment on a weekly basis, but students should try to contribute whenever they can, also when they do not have the role of discussant. Failing to speak during any of the meetings in an entire semester will negatively affect your final grade.

The grade assigned for each semester will be based on the tasks completed that semester. For example, in both semesters the student is expected to complete numbers 2 and 3 above (number 3 with or without being discussant). In the semester in which the student does not make a presentation, these will be the elements which determine the final grade. In the semester in which the student does make a presentation, all three elements will determine the final grade. The presentation is worth 60 points, papers are worth 20, and class participation is worth 20 (including being discussant). Thus, in non-presentation semesters the point total will be 40 and in presentation semesters it will be 100.

### **Other Policies**

1. When an outside speaker is visiting, students will be expected to meet with the speaker during pre-arranged lunches. This is contingent on each student's availability, and on other practical considerations.

2. When an outside speaker is visiting students may be asked to read one or two relevant papers to help prepare for the talk and the meeting with the speaker.

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# Psych 7898: SEMINAR IN ADVANCED BEHAVIORAL NEUROSCIENCE

Spring 2018

Tuesdays, 3:30 – 5:20pm

Psychology Building, Room 217

## Instructor

Dr. Benedetta Leuner, Assistant Professor, Departments of Psychology & Neuroscience

Email: leuner.1@osu.edu

Office: Psych 51

Office hours: Tuesdays from 2:15 PM-3:15 PM, or by appointment

## Goals of the Seminar

The purpose of this ongoing seminar is to promote the continued development of professional skills for our Ph.D. candidates in BN and NGP, as outlined in the following learning goals.

- 1. Effective Communication in the Presentation of Results.** Each student will present their most recent research results in the fall or spring semester. These talks provide an important opportunity for students to “think on their feet” in response to questions or critiques.
- 2. Exposure to Foundational Areas of Behavioral Neuroscience.** Students will read classic and contemporary research or review papers outside of their particular research domain and attend talks by outside speakers. The resulting discussions will serve to broaden the students’ area of expertise into domains that are contemporary and foundational to the growth of the field.
- 3. Become Familiar with Issues Pertinent to Behavioral Neuroscientists.** Students will participate in assignments and discussion on issues related to performing neuroscience research including ethics, rigor and reproducibility, methods, statistics, etc.

## Class schedule\*

Date	Topic Covered in Class
1/9	Introduction
1/16	<i>Assignment #1: Rigor and reproducibility in rodent behavioral research</i>
1/23	<i>Journal Club: Angela, Caitlin</i>
1/30	<i>Journal Club: Josh</i>
2/6	<i>Assignment #2: Method paper</i>
2/13	<i>Journal Club: Joe, David</i>
2/20	<i>Journal Club: AJ, Chloe</i>
2/27	<i>Journal Club: Tyler, Lars</i>
3/6	Research presentation: Dr. Zach Weil, Title TBA
3/13	<b>No Class-Spring Break</b>
3/20	Research presentation; Dr. Matt Paul, U Buffalo, Title TBA
3/27	<i>1st year Student Presentations: Angela, AJ, and Tyler</i>
4/3	Assignment #3: Attend the Denman Forum
4/10	<i>4th year Student Presentations: David, Chloe</i>
4/17	<i>4th year student presentations: Lars, Joe</i>

***\*Schedule subject to change. Any changes will be announced in class and via email.***

## 1. Assignments (15 points each, 45 points total):

- **Assignment #1: Rigor and reproducibility in rodent behavioral research.** Read Gulinello et al (2018) *Rigor and reproducibility in rodent behavioral research*. *Neurobiology of Learning and Memory* and come prepared to discuss in class on 1/16.
- **Assignment #2: Method paper.** Pick a method that you currently don't use in your research. Write a 3-5 page paper (double-spaced) on the method, how it is done, its advantages/disadvantages, etc...Also discuss how you would apply it to your own research.
- **Assignment #3: Attend the Denman Research Forum.** Provide a list of 3 posters you reviewed.

**2. Journal club presentation:** The journal club topic this semester is "Stress and Mood-related Behavior". Each student will be responsible for selecting a primary research article *published in the last 12-18 months* to present in class. Presentations must be at least 30 minutes long, and include a powerpoint presentation and leading discussion. All presenters must generate 2-3 questions for discussion based on the research article, as well as discuss any limitations to the research presented and follow-up experiments that would be interesting to do. The journal club presentation is worth **30 points**.

**3. Attendance and Participation:** There are no exams in this course so attendance is a must. More than one unexcused absence will result in a **10 point reduction** from the total points. All students will be expected to participate in journal club discussions and to ask **at least 3-4** questions over the semester during student/faculty presentations. To facilitate participation in journal club discussions, each student will be expected to come to class with three talking points. These should be handed in at the end of the class. Participation is worth **30 points**.

## Grading

Final grades will be based on standard breakdown percentages, out of 100 total points (e.g., 90 for an A-). The point breakdown is as follows:

**Assignments (10 points each):** 45 points

**Journal club presentation:** 30 points

**Attendance and Participation:** 25 points

**Total:** 100 points

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Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: [slds@osu.edu](mailto:slds@osu.edu); 614-292-3307; [slds.osu.edu](http://slds.osu.edu); 098 Baker Hall, 113 W. 12<sup>th</sup> Avenue.

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**Psychology 8896**  
**Advanced Seminar in Quantitative Psychology: Power Analysis**  
**Autumn 2017**

**Time:** Wednesdays, 9:00 – 11:45am

**Location:** Lazenby 220

**Instructor:** Jolynn Pek

Lazenby 228

[pek.5@osu.edu](mailto:pek.5@osu.edu)

**Office hours:** Mondays, 9:00-10:00am or by appointment

### **Course Description**

Power analysis is an important component to research design. In the context of limited resources, which should be responsibly expended, power analysis allows researchers to determine a range of sample sizes which would presumably provide adequate power to detect statistical significance of effect sizes. Underlying concepts to understanding and computing power will be discussed in relation to current methodological concerns in psychological science (e.g., replicability and reproducibility).

Students will learn how to determine an effect size and accompanying error variances required to compute power. Additionally, various approaches to computing power will be introduced such as using canned software (e.g., G\*power, R pwr package, and SAS PROC POWER) as well as implementing Monte Carlo simulations to estimate power in R. Additionally, misconceptions, limits, and abuses of power analysis will also be discussed.

This course is appropriate for graduate students in psychology, education, communications, related social sciences, public health, and business. Evaluation will be based on three components: (a) Class attendance and participation, (b) a limited number of homework sets, and (c) power analysis project.

### **Course Objectives**

This course is designed to provide students with basic concepts regarding how to compute power, and how to conduct power analyses for common research designs and analyses. Students would also become familiar with ongoing discussions of power in relation to replication.

### **Grading**

There are three evaluated components in the grade:

(a) Class attendance and participation (30%): Did you read the readings and formed an opinion about them? For each week (beginning August 28), the readings posted in Carmen will serve as the topical focus. Everybody is to read the readings during the week (before class), and send two or more questions via Carmen which can be the focus of clarifying discussion during class by Noon on each Tuesday preceding class. During class on each Wednesday morning, we will address the questions via discussion or additional reading material. Students are allowed to miss one instance of submitting questions.



(b) Homework sets (30%): Can you compute power from canned programs? There will be two homework assignments which will involve computing power using canned programs. Homework reports should be 2-4 pages long involving power computations. Please deliver a printed copy to my (Pek) mailbox in Lazenby Hall. The mailbox is located around the corner from Lazenby 226.

(c) Project (40%): Can you compute power using Monte Carlo simulations OR review a special topic in power analysis? Additional details on project requirements will be provided at a later time.

Students are encouraged to discuss problems, but are required to submit their own report.

### **Extra Credit**

An "extra credit" opportunity is available (up to 2%). If you find any video, presentation material, podcast, or document (e.g., blogs, .pdfs) which could be included either in the class discussion, or provide additional learning opportunities outside class, please email me (pek.5@osu.edu) the link or document. Contributions which I am unaware of will be credited as bonus points to your final grade.

### **Students with Disabilities**

Students with disabilities who have been certified by the Office for Disability Services will be appropriately accommodated, and should inform the instructor as soon as possible of their needs. Student Life Disability Services can be contacted at [slds@osu.edu](mailto:slds@osu.edu); 614-292-3307; [slds.osu.edu](http://slds.osu.edu); 098 Baker Hall, 113 W. 12th Avenue.

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## Tentative Schedule

Week	Meeting Day	Description	Grade Requirements
1	August 23	Preliminaries	
2	30	P-values	
3	September 6	Effect Sizes	
4	13	Canned programs	
5	20	Monte Carlo power analysis I	Assignment 1 due
6	27	Monte Carlo power analysis II	
7	October 4	<b>**No Class**</b>	
8	11	Autumn Break	
9	18	Misconceptions I	Assignment 2 due
10	25	Misconceptions II	Project plan due
11	November 1	Replication: Type I error	
12	8	Replication: Type II error	
13	15	Replication: Other research characteristics	
14	22	Thanksgiving	
15	29	Replication: Measurement validity	
16	December 6	Student presentations	
17	13	Student presentations	Final report due

## Psychology 6861

### Research Design and Methodology

Fall 2016

Monday 11:00-1:45

**Instructor:** Julian F. Thayer, [Thayer.39@osu.edu](mailto:Thayer.39@osu.edu)

**CA:** David Cregg, [cregg.3@buckeyemail.osu.edu](mailto:cregg.3@buckeyemail.osu.edu)

**Office:** Psychology 133

**Location:** Psy 0115

**Textbooks:** Beyond Significance Testing, Rex B. Kline  
Understanding the New Statistics, Geoff Cumming  
Readings from Foundations of Behavioral Science Research, 2<sup>nd</sup> Ed,  
Rosenthal and Rosnow

**Software:** ESCI, freeware accompanies the Cumming book  
Statistica, Student trial version

The goals of this course are to introduce you to the fundamentals of research design and methodology. With this introduction you should be better able to design and conduct your own research. Moreover, you should be a better consumer of the research literature. My hope is to make this course both interesting and informative. My approach tends to be pragmatic. Whereas there will be discussions of abstract concepts the idea is to provide you with the tools to actually use the material we discuss. Therefore you should be thinking about how the material we cover might relate to your own research such as your first-year project or your Master's thesis. Your final paper should serve as the culmination of our journey together as it relates to your own interests.

The course will cover two themes. The first theme will provide you with the basics including discussion of ethical considerations in research, issues of validity and reliability, sampling and selection effects, and an introduction to a theory of data. The second theme of the course will involve the discussion of specific research designs ranging from non-experimental or correlational designs to quasi-experimental and randomized experimental designs to case-studies and single-subject or small n designs.

**Course assignments** are primarily geared towards professional activity in research and teaching settings. Grading is based on a term paper, weighted as 60% of your final grade, a mid-term exam weighted as 30% of your grade, and class participation, weighted as 10% of your final grade.

Your term paper, which will be approximately 15-20 pages in length, is due on the last day of class. You will get the opportunity to submit a brief (1-2 pages) preliminary outline of your paper, due about halfway through the course. I will give you feedback on your outline and make suggestions for the final paper. The mid-term exam will be comprised of essay, short-answer, and multiple choice questions. Details on all of the above assignments will be provided at a later date.

**Class participation** points will be partially based on your taking part in class discussions. *Informed* participation in class discussions requires reading the assigned material in *advance of the class*. Attendance is expected, and is also part of class participation. Please see me ahead of time if you anticipate having to miss a class. In addition to the textbooks, additional readings will be required and made available throughout the quarter.

Any changes or adaptations to the schedule will be announced in class. Students are responsible for knowing about such announced modifications.

### **Academic Misconduct**

All students at the Ohio State University are bound by the Code of Student Conduct (see [http://studentaffairs.osu.edu/pdfs/csc\\_12-31-07.pdf](http://studentaffairs.osu.edu/pdfs/csc_12-31-07.pdf)). Violations of the code in this class will be dealt with according to the procedures detailed in that code. Specifically, any alleged cases of misconduct will be referred to the Committee on Academic Misconduct. For good, concise, plain-English advice on how to stay out of academic trouble, see Ten Suggestions for Preserving Academic Integrity at <http://oaa.osu.edu/coam/ten-suggestions.html>

### **Students with disabilities**

This syllabus is available in alternative formats upon request. In addition, if you November need an accommodation based on the impact of a disability, you should contact the instructor immediately. Students with special needs should contact the Office of Disability Services (ODS) at 292-3307 for certification if they have not already done so. Upon such certification, the ODS and the instructor will make every effort to accommodate special needs. However, to ensure that evaluation of student performance in the course is conducted in a manner that is fair to all students, special accommodations will not be granted in the absence of ODS certification.

## **Course outline:**

Week 1(Aug.29\*): Introduction

Readings: R & R: Chapters 1-3: Nature of Behavioral Research; Development and Testing of Research Ideas; Reliability and Validity

Kline: Chapters 1-2: Changing Times; Fundamental Concepts

Cumming: Chapters 1-3: Estimating with Confidence; Confidence Intervals; Confidence Intervals Rather than p Values

Psychological Science New Guidelines: Editorial and Cumming paper

Week 2(Sept. 12): R & R: Chapters 4-5: Experimental Designs; Quasi-experimental designs

Kline: Chapters 3: What's wrong with Statistical tests

Cumming: Chapters 4-5: More on confidence intervals; Replication

Week 3(Sept.19): R & R: Chapters 6-7: Artifacts and their control; Gathering data

Kline: Chapters 4: Parametric effect size indices

Cumming: Chapters 6: Two simple designs

Week 4(Sept. 26): Partitioning variance

Readings: Lecture Notes from Turner and Thayer

Week 5(Oct. 3): Partitioning variance: Interactions

Readings: Lecture Notes from Turner and Thayer

Week 6(Oct. 10): Mid-term exam

Week 7(Oct. 17): How to do a literature search: Dr. Jos Brosschot, Leiden University

Week 8(Oct. 24): R & R: Chapters 10-12: Selection of subjects and stimuli; Ethics; Pluralism and data analysis

Week 9(Oct. 31): Partitioning Variance: Contrasts R & R: Chapter 21: Contrast analysis

Week 10(Nov.7): Contrasts in Statistica

Week 11(Nov.14): More on design: Kline: Chapters 8-9: Replication and Meta-analysis;

Cumming: Meta-analysis models; Multivariate repeated measures replicated single-subject designs

Week 12(Nov.21\*): Multilevel models: Dr. Derek Spangler, Ohio State University

Week 13(Nov.28): Meta-analysis: Dr. Julian Koenig, University of Heidelberg

Cumming: Chapter 7: Meta-analysis introduction

Week 14(Dec. 5): Final paper due

**Psychology 7897: Topics in Social Psychology**  
**Psychology of Self-Control**  
**Spring 2017**  
**Meetings: Wednesdays, 12:00-2:00 pm, LZ 120**

**Instructor**

Kentaro Fujita  
Email: fujita.5@osu.edu  
Phone: 247-2751  
Office: 128 Lazenby

**Course description**

This class is a multi-disciplinary survey of research in self-control. In this course, we will discuss how researchers in a variety of fields (social, cognitive, developmental, and comparative psychology, judgment & decision-making, neuroscience, economics, and marketing) have modeled and measured self-control and self-control processes. Through discussion of weekly readings, students will examine when and why people make decisions and act in ways that are contrary to their best interests.

**Course requirements**

This class will focus mainly on THEORY and PRINCIPLES. The goal of this course is to uncover principles that cut across research areas and psychological phenomena. Hence, students in this course are expected not only to learn the major theoretical perspectives on self-control, but also how to evaluate and/or apply these ideas. The aim is to learn to look beyond specific research findings to see universals that apply to multiple domains. Although students will be reading empirical work in this class, the focus will be on models and principles, rather than on specific empirical studies and methodologies.

The primary goals in this course are to exercise critical thinking, integrate existing research into novel frameworks, and generate new hypotheses. The primary means by which this course will strive to attain these goals will be active discussion of ideas. The course requirements are designed to facilitate this process.

**Thought Papers (25% of final grade)**

Each week, students will submit to the instructor a one-page thought paper. These papers are due at **NOON on MONDAYS**. These papers are to be emailed to instructor, and cc'ed to the Discussion Leaders (see below). Thought papers should record your reactions to the readings of the week, particularly questions or comments you would like to discuss in class. Discussion Leaders will also use these to facilitate discussion preparation.

All papers will be graded on a three-tier system. A check represents what the instructor expects from the average student in the class. A check-plus represents superior work, whereas a check-minus represents work that is below expectation. If you have questions or would like to discuss the grading of specific thought papers, please feel free to make an appointment to meet with the instructor.

**Discussion Participation (25% of final grade)**

This course is meant to be one in which all students share ideas and participate equally. As added encouragement to speak up, 25% of your final grade in the course will be based on your participation in class. As with the thought papers, discussion participation will be graded on a three-tier system.

### **Discussion Leaders (10% of final grade)**

One to two student(s) each week will be assigned to lead discussion in class. Discussion leaders are not to rehash the reading material. Rather, prior to class, discussion leaders will read all thought papers for that week and note areas of confusion, contention, or discussion. Discussion leaders should use these observations to raise questions and highlight areas of interest as starting points for dialogue. Grading of this portion will be based on preparation and organization of discussion points. As with the thought papers and discussion participation, discussion leading will be graded on a three-tier system.

### **Final Paper (40% of final grade)**

A term paper is due **Friday, May 5 at NOON**. Ideally, this paper would be an empirical proposal that would begin with a coherent argument on some issue covered in the course and end with a proposal for future research. You do not have to collect actual data to test your ideas, but doing so will not be discouraged as long as it does not violate any ethical guidelines. If you do not wish to write an empirical proposal, you may instead write a more theoretical review paper in which you present a coherent argument extending, reinterpreting, or resolving contradictions in research we have covered in the course. These papers should not simply be restatements of material we have already considered but need to be an original contribution to our understanding of self-control, broadly construed. You are encouraged to discuss your term paper idea with me before you begin writing. Note that there is no explicit page limit for these term papers, but do not add length under the illusion that it is necessarily increasing quality. Make every word count. The final paper will be graded using the standard OSU grading scheme (A, A-, B+, etc.)

### **Academic Misconduct**

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Your instructor will report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct at <http://studentconduct.osu.edu>

### **Sexual Harrassment/Misconduct**

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at <http://titleix.osu.edu> or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at [titleix@osu.edu](mailto:titleix@osu.edu)

### **On Accessing Syllabus & Readings**

The course syllabus, readings, and other course materials can be accessed online at <https://carmen.osu.edu>. You will need to login using your OSU username and password. Once logged in, select "Psych 7897" and click the information you wish to access. If you have trouble accessing your account, please call 614-688-HELP (4357) with any questions about Canvas.

## **STUDENTS WITH DISABILITIES**

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: [slds@osu.edu](mailto:slds@osu.edu); 614-292-3307; [slds.osu.edu](http://slds.osu.edu); 098 Baker Hall, 113 W. 12th Avenue.



## Schedule of Readings

### January 11: Introduction

### January 18: \*\*\*NO CLASS\*\*\* (Society of Personality and Social Psychology)

### January 25: Behavioral Approaches/Delay Discounting

- Ainslie, G. (1975). Specious reward: A behavioral theory of impulsiveness and impulse control. *Psychological Bulletin*, 82, 463-496.
- Rachlin, H. (1995). Self-control: Beyond commitment. *Behavioral and Brain Sciences*, 18, 109-159.
- Kirby, K. N., & Herrnstein, R. J. (1995). Preference reversals due to myopic discounting of delayed reward. *Psychological Science*, 6(2), 83-89.

### February 1: Explanations for Delay Discounting

- Ersner-Hersfield, H., Wimmer, G. E., & Knutson, B. (2009). Saving for the future self: Neural measures of future self-continuity predict temporal discounting. *Social, Cognitive, and Affective Neuroscience*, 4, 85-92.
- McClure, S. M., Laibson, D. I., Loewenstein, G., & Cohen, J. D. (2004). Separate neural systems value immediate and delayed monetary rewards. *Science*, 306, 503-507.
- Weber, E. U., Johnson, E. J., Milch, K. F., Chang, H., Brodscholl, J. C., & Goldstein, D. G. (2007). Asymmetric discounting in intertemporal choice: A query-theory account. *Psychological Science*, 18, 516-523.
- Zauberman, G., & Lynch, J. G. (2005). Resource slack and propensity to discount delayed investments of time versus money. *Journal of Experimental Psychology: General*, 134(1), 23-37.

### February 8: Pre-Commitment & Counter-Active Control

- Trope, Y., & Fishbach, A. (2000). Counteractive self-control in overcoming temptation. *Journal of Personality and Social Psychology*, 79, 493-506.
- Ariely, D., & Wertenbroch, K. (2002). Self-control by pre-commitment. *Psychological Science*, 13, 219-224.
- Thaler, R. H., & Benartzi, S. (2004). Save more tomorrow™: Using behavioral economics to increase employee saving. *Journal of Political Economy*, 112(S1), S164-S187.

### February 15: Flying Under Radar, Licensing, and Balancing

- Coelho do Vale, R., Pieters, R., & Zeelenberg, M. (2008). Flying under the radar: Perverse package size effects on consumption self-regulation. *Journal of Consumer Research*, 35, 380-390.
- Khan, U., & Dhar, R. (2006). Licensing effect in consumer choice. *Journal of Marketing Research*, 43, 259-266.
- Fishbach, A., & Dhar, R. (2005). Goals as excuses or guides: The liberating effect of perceived goal progress on choice. *Journal of Consumer Research*, 32(3), 370-377.

## February 22: Dual-Process and Dual-Systems

- Hofmann, W., Friese, M., & Strack, F. (2009). Impulse and self-control from a dual-systems perspective. *Perspectives on Psychological Science*, 4, 162-176.
- Heatherton, T. F., & Wagner, D. D. (2011). Cognitive neuroscience of self-regulation failure. *Trends in Cognitive Sciences*, 15(3), 132-139.
- Fishbach, A., & Shen, L. (2014). The explicit and implicit ways of overcoming temptation. In Sherman, J. W., Gawronski, B., & Trope, Y. (Eds.), *Dual process theories of the social mind*. (pp. 454-467). New York: Guilford Press.

## March 1: Ego-Depletion I

- Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M. (1998). Ego depletion: Is the active self a limited resource? *Journal of Personality and Social Psychology*, 74(5), 1252-1265.
- Gailliot, M. T., Baumeister, R. F., DeWall, C. N., Maner, J. K., Plant, E. A., Tice, D. M., Brewer, L. E., & Schmeichel, B. J. (2007). Self-control relies on glucose as a limited energy source: Willpower is more than a metaphor. *Journal of Personality and Social Psychology*, 92, 325-336.
- Job, V., Walton, G. M., Bernecker, K., & Dweck, C. S. (2013). Beliefs about willpower determine the impact of glucose on self-control. *Proceedings of the National Academy of Sciences*, 110(37), 14837-14842.

## March 8: Ego-Depletion II

- Clarkson, J.J. Otto, A.S., Hassey, R.V., & Hirt, E.R. (2016). Perceived mental fatigue and self-control. In E.R. Hirt, J.J. Clarkson, & L. Jia (Eds.), *Self-regulation and ego control* (pp. 185-202). San Diego, CA: Elsevier.
- Inzlicht, M., Schmeichel, B. J., & Macrae, C. N. (2014). Why self-control seems (but may not be) limited. *Trends in Cognitive Sciences*, 18(3), 127-133.
- Hagger, M. S., et al. (2016). A multi-lab pre-registered replication of the ego-depletion effect. *Perspectives on Psychological Science*, 2, 546-573.

## March 15: Hot vs. Cool

- Metcalfe, J., & Mischel, W. (1999). A hot/cool system analysis of delay of gratification: Dynamics of willpower. *Psychological Review*, 106, 3-19.
- Loewenstein, G. (1996). Out of control: Visceral influences on behavior. *Organizational and Human Decision Processes*, 65, 272-292.
- Kross, E., & Ayduk, O. (2011). Making meaning out of negative experiences by self-distancing. *Current Directions in Psychological Science*, 20, 187-191
- White, R. E., Prager, E. O., Schaefer, C., Kross, E., Duckworth, A. L., & Carlson, S. M. (in press). The "Batman Effect": Improving perseverance in young children. *Child Development*.

### **March 29: “Level” Approaches**

- Kalkstein, D., Fujita, K. & Trope, Y. (in press). Broadening mental horizons to resist temptation: Construal level and self-control. In de Ridder, D. T. D., Adriaanse, M. A., & Fujita, K. (Eds.), *Handbook of self-control in health and well-being*. London: Routledge Press.
- Gollwitzer, P. M. (1999). Implementation intentions: strong effects of simple plans. *American Psychologist*, *54*(7), 493-503.
- Scholer, A.A. (2014). When saying yes to the doughnut is not saying no to self-control: A hierarchical approach to flexibility in conflict representation. In J. Forgas & E. Harmon-Jones (Eds.), *The control within: Motivation and its regulation* (pp. 247-262). New York, NY: Psychology Press.
- Woolley, K., & Fishbach, A. (2016). For the fun of it: Harnessing immediate rewards to increase persistence in long-term goals. *Journal of Consumer Research*, *42*(6), 952-966.

### **April 5: Overcoming Self-Threats**

- Burson, A., Crocker, J., & Mischkowski, D. (2012). Two types of value affirmation: Implications for self-control following social exclusion. *Social Psychological and Personality Science*, *3*, 510-516.
- Trope, Y., & Neter, E. (1994). Reconciling competing motives in self-evaluation: The role of self-control in feedback seeking. *Journal of Personality and Social Psychology*, *66*, 646-657.
- Fishbach, A., Eyal, T., & Finkelstein, S. R. (2010). How positive and negative feedback motivate goal pursuit. *Social and Personality Psychology Compass*, *4*(8), 517-530.

### **April 12: Self-Control in the Social Context**

- Koval, C. Z., Vandellen, M. R., Fitzsimons, G. M., & Ranby, K. W. (2015). The burden of responsibility: Interpersonal costs of high self-control. *Journal of Personality and Social Psychology*, *108*(5), 750-766.
- Sheldon, O. J., & Fishbach, A. (2011). Resisting the temptation to compete: Self-control promotes cooperation in mixed-motive interactions. *Journal of Experimental Social Psychology*, *47*, 403-410.
- Johnson, I. R., & Fujita, K. (2012). Using perceptions of changeability to promote system-change motives over system-justification motives in information search. *Psychological Science*, *23*, 133-140.

### **April 19: \*\*\*NO CLASS\*\*\* (Midwestern Psychological Association)**

**FINAL PAPER DUE FRIDAY, MAY 5, NOON**

# Psychology 7872

## Social Motivation

Wednesdays 2:15-5:00pm  
Psychology 219

### Instructor

Kentaro Fujita  
Email: fujita.5@osu.edu  
Phone: 247-2751  
Office: 128 Lazenby

### Course description

This seminar provides an overview of classic and contemporary research in the domain of social motivation. We will begin by investigating some basic human motivations: approach and avoidance, consistency, control, self-enhancement, and belongingness. We will then explore the implications of these motivations in a number of research areas, including the self, relationships, judgment-and-decision-making, and goal pursuit.

### Course requirements

The goals in this course are to exercise critical thinking, integrate existing research into novel frameworks, and generate new hypotheses. Although many of the topics will be introduced with a brief background lecture, the main thrust of the course will be through active discussion of ideas and frameworks. The course requirements are designed to facilitate this process.

#### Thought Papers (30% of final grade)

Each week, students will submit to the instructor a one-page, single-spaced thought paper. These papers are due at NOON on MONDAY of the week class meets. These papers are to be emailed to instructor, AND to the discussion leaders (see below) to facilitate discussion preparation. Thought papers should record your reactions to the readings of the week, particularly questions or comments you would like to discuss in class.

#### Discussion Participation (30% of final grade)

This course is meant to be one in which all students share ideas and participate equally. As added encouragement to speak up, 30% of your final grade in the course will be based on your participation in class.

#### Discussion Leaders (10% of final grade)

Two students each week will be assigned to lead discussion in class. The format of the discussion is at the discretion of the discussion leader in consultation with the instructor. Discussion leaders are not to rehash the reading material. Rather, discussion leaders should raise questions and highlight areas of interest as starting points for discussion and dialogue. Grading of this portion will be based on preparation and organization of discussion points. Discussion leaders will also compile all thought papers submitted in a given week into a single document, which will be made available to the class via the Canvas website for the course.

#### Final Paper (30% of final grade)

A term paper is due on Monday, December 11. This paper can take one of two forms. The first is an empirical proposal that would begin with a coherent argument based on some issue covered in the course and end with a proposal for future research. You do not have to collect actual data to test your ideas, but doing so will not be discouraged as long as it does not

violate any ethical guidelines. A second options is to write a theoretical review paper in which you present a coherent argument extending, reinterpreting, or resolving contradictions in research that we have covered in the course. These papers should not simply be restatements of material we have already considered but need to be an original contribution to our understanding of social motivation, broadly construed. You are encouraged to discuss your term paper idea with me before you begin writing. Note that there is no explicit page limit for these term papers, but do not add length under the illusion that it is necessarily increasing quality. Make every word count.

### **Academic Misconduct**

All students at the Ohio State University are bound by the Code of Student Conduct (see <http://oaa.ohio-state.edu/coam/code.html>). Violations of the code in this class will be dealt with according to the procedures detailed in that code. Specifically, any alleged cases of misconduct will be referred to the Committee on Academic Misconduct.

## **STUDENTS WITH DISABILITIES**

Any student who feels she or he may need an accommodation based on the impact of a disability should contact the instructors privately to discuss your specific needs. Also, please contact the Office of Disability Services at 614-292-3307 in room 150 of Pomerene Hall to coordinate reasonable accommodations for your documented disability. Their website is [www.ods.ohio-state.edu](http://www.ods.ohio-state.edu).

### **Sexual Harrassment/Misconduct**

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at <http://titleix.osu.edu> or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at [titleix@osu.edu](mailto:titleix@osu.edu)

### **On Accessing Syllabus & Readings**

The course syllabus, readings, and other course materials can be accessed online on OSU's Canvas website at <https://carmen.osu.edu>. You will need to login using your OSU username and password. Once logged in, select "Psych 7897" and click the information you wish to access. If you have trouble accessing your account, please call 614-688-HELP (4357) with any questions about Canvas.

## SCHEDULE

### August 23: Introduction

### August 30: Approach vs. Avoidance

- Miller, N. E. (1944). Experimental studies of conflict. In J. Hunt (Ed.), *Personality and the behavioral disorders*. Oxford: Ronald Press, 431-465.
- Atkinson, J. W. (1957). Motivational determinants of risk-taking behavior. *Psychological Review*, *64*, 359-372.
- Higgins, E. T. (1997). Beyond pleasure and pain. *American Psychologist*, *52*, 1280-1300.

### September 6: Intrinsic vs. Extrinsic Motivation and Other Determinants of Engagement

- Lepper, M. R., Greene, D., & Nisbett, R. E. (1973). Undermining children's intrinsic interest with extrinsic reward: A test of the "overjustification" hypothesis. *Journal of Personality and Social Psychology*, *28*, 129-137.
- Ryan, R. M. & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist*, *55*, 68-78.
- Woolley, K., & Fishbach, A. (2015). The experience matters more than you think: People value intrinsic incentives more inside than outside an activity. *Journal of Personality and Social Psychology*, *109*, 968-982.
- Higgins, E. T. (2005). Value from regulatory fit. *Current Directions in Psychological Science*, *14*, 209-213.

### September 13: Consistency

- Festinger, L. (1957). *A theory of cognitive dissonance* (Chapter 1). Oxford: Stanford University Press.
- Zanna, M. P., & Cooper, J. (1974). Dissonance and the pill: An attribution approach to studying the arousal properties of dissonance. *Journal of Personality and Social Psychology*, *29*, 703-709.
- Cooper, J., & Fazio, R. H. (1984). A new look at dissonance theory. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 17, pp. 229-266). New York: Academic Press.

### September 20: Control

- Langer, E. & Rodin, J. (1976). The effects of choice and enhanced personal responsibility for the aged: A field experiment in an institutional setting. *Journal of Personality and Social Psychology*, *34*, 191-198.
- Alloy, L. B., & Abramson. (1979). Judgment of contingency in depressed and nondepressed students: Sadder but wiser? *Journal of Experimental Psychology: General*, *108*, 441-485.
- Kay, A. C., Gaucher, D., Napier, J. L., Callan, M. J., & Laurin, K. (2008). God and the government: Testing a compensatory control mechanism for the support of external systems. *Journal of Personality and Social Psychology*, *95*, 18-35.

### September 27: Belongingness & Social Connectedness

- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, *117*, 497-529.
- Brewer, M. B., (1991). The social self: On being the same and different at the same time. *Personality and Social Psychology Bulletin*, *17*, 475-482.
- Walton, G. M. & Cohen, G. L. (2007). A question of belonging: Race, social fit, and achievement. *Journal of Personality and Social Psychology*, *92*, 82-96.

#### **October 4: Shared Reality**

- Gollwitzer, P. M. & Wicklund, R. A. (1985). Self-symbolizing and the neglect of others' perspectives. *Journal of Personality and Social Psychology*, 48, 702-715.
- Ledgerwood, A., Liviatan, I., & Carnevale, P. J. (2007). Group identity completion and the symbolic value of property. *Psychological Science*, 18, 873-878.
- Echterhoff, G., Higgins, E. T., & Levine, J. M. (2009). Shared reality: Experiencing commonality with others' inner states about the world. *Perspectives on Psychological Science*, 4, 496-521.

#### **October 11: \*\*\*NO CLASS\*\*\* -- Society for Experimental Social Psychology**

#### **October 18: Self-Enhancement**

- Sedikides, C. & Strube, M. J. (1997). Self-evaluation: To thine own self be good, to thine own self be sure, to thine own self be true, and to thine own self be better. In M. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 29, pp. 209-269). New York: Academic Press.
- Tesser, A. (2000). On the confluence of self-esteem maintenance mechanisms. *Personality and Social Psychology Review*, 4, 290-299.
- Crocker, J. & Park, L. E. (2004). The costly pursuit of self-esteem. *Psychological Bulletin*, 130, 392-414.

#### **October 25: Functions of Self-Esteem**

- Taylor, S. E., & Brown, J.D. (1988). Illusion and well-being: A social psychological perspective on mental health. *Psychological Bulletin*, 103, 193-210.
- Greenberg, J., Solomon, S., & Pyszczynski, T. (1997). Terror management theory of self-esteem and cultural worldviews: Empirical assessments and conceptual refinements. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 29, pp. 61-139). Orlando, FL: Academic Press.
- Leary, M.R., & Baumeister, R.F. (2000). The nature and function of self-esteem: Sociometer theory. In M. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 32, pp. 1-62). San Diego, CA: Academic Press.

#### **November 1: Motivational Conflict in Response to Negative Feedback**

- Swann, W. B., Griffin, J. J., Predmore, S. C., Gaines, B. (1987). The cognitive-affective crossfire: When self-consistency confronts self-enhancement. *Journal of Personality and Social Psychology*, 52, 881-889.
- Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review*, 95, 256-273.
- Trope, Y., & Neter, E. (1994). Reconciling competing motives in self-evaluation: The role of self-control in feedback seeking. *Journal of Personality and Social Psychology*, 66, 646-657.

#### **November 8: Defending the Status Quo**

- Jost, J.T., & Hunyady, O. (2002). The psychology of system justification and the palliative function of ideology. In W. Stroebe & M. Hewstone (Eds.), *European review of social psychology* (Vol. 13, pp. 111-153). Hove, England: Psychology Press.
- Jost, J. T., & Amodio, D. M. (2012). Political ideology as motivated social cognition: Behavioral and neuroscientific evidence. *Motivation and Emotion*, 36, 55-64.
- Packer, D. J., & Miners, C. T. (2014). Tough love: The normative conflict model and a goal system approach to dissent decisions. *Social and Personality Psychology Compass*, 8, 354-373.

### **November 15: Dyadic Relationship Motivations**

- Hazan, C., & Shaver, P. (1994). Attachment as an organizational framework for research on close relationships. *Psychological Inquiry*, 5, 1-22.
- Murray, S. L., Derrick, J. L., Leder, S., & Holmes, J. G. (2008). Balancing connectedness and self-protection goals in close relationships: A levels-of-processing perspective on risk regulation. *Journal of Personality and Social Psychology*, 92, 429-459.
- Ayduk, A., Mendoza-Denton, R., Mischel, W., Downey, G., Peake, P. K., & Rodriguez, M. (2000). Regulating the interpersonal self: Strategic self-regulation for coping with rejection sensitivity. *Journal of Personality and Social Psychology*, 79, 776-792.

### **November 29: Motivated Judgment & Decision-Making**

- Kunda, Z. (1990). The case for motivated reasoning. *Psychological Bulletin*, 108, 480-498.
- Trope, Y. & Liberman, A. (1996). Social hypothesis testing: Cognitive and motivational mechanisms. In E. T. Higgins & A. Kruglanski (Eds.), *Handbook of social psychology: Basic principles* (pp. 239-270). New York: Guilford Press.

### **December 6: Goal Structure & Dynamics**

- Carver, C. S., & Scheier, M. F. (1982). Control theory: A useful conceptual framework for personality-social, clinical, and health psychology. *Psychological Bulletin*, 92(1), 111-135.
- Kruglanski, A. W., Shah, J. Y., Fishbach, A., Friedman, R., Chun, W. Y., Sleeth-Keppler, D. (2002). A theory of goal systems. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 34. pp. 331-378). San Diego, CA: Academic Press.
- Forster, J., & Liberman, N. (2004). A motivational model of post-suppressional rebound. *European Review of Social Psychology*, 15, 1-32.



## Psych 7845: Cognitive Development

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3 Credit Hours

TR 12:35 – 02:05p

Psychology Bldg 217

<http://developmentalcognitivescience.org/lab/7845.html>

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John Opfer (opfer.7@osu.edu)

245 Psychology Building

614.292.9547

M 3 – 4p

This course will review research findings from the study of cognitive development, particularly the development of thinking in the first decade of life. The goal of the class is to further our understanding of what is known about cognition in children, how changes in children's thinking occurs, and how knowledge about changes in children's thinking can be applied to improve children's well-being.

The fact that this is a relatively small class, rather than a large lecture, presents us with some opportunities and some risks. The opportunities are for people to express themselves actively on a regular basis, rather than sitting back and just taking in what a lecturer tells them. The risk is that with no one giving a two-hour lecture, the quality of the class depends at least as much on what you do as on what I do.

For this reason, we need some ground rules to help us meet our goals. First, everyone should attend each class meeting. (If you experience a true emergency, let me know beforehand that you won't be attending class.) Second, everyone is expected to actively participate in the discussion. This is essential if the class is to be a true seminar, rather than degenerating into a rotating lectureship. Third, everyone is expected to be at class on time.

Grades in the course will be based on class participation (30%), two take-home midterms (30%), and a take-home final (40%).

Class participation. Each of you will present and lead a discussion of two focus articles on a contemporary problem in cognitive development. The typical presentation is 15 minutes long and contains at least 5 substantive slides. Additionally, each of you should send discussion questions for each class to me and to the discussion leader *at least 24 hours prior to class*. The key criteria for my grading class participation will be high quality and reasonable quantity of contributions when you are not leading the discussion and posing important and stimulating questions and leading an interesting discussion when you are.

Midterms and final. The midterms and final will be based on the readings and the discussions. The midterms will include 5 short essay questions, each worth 20 points; the questions will be taken from the questions posed in the class, both by me and by you. The final exam will be similar to the midterm, but it will include 10 questions. Among these, 7 will be specific to the material after the midterm and 3 will be on material covered before the midterm. Due dates of midterms are indicated below.

*Primary Text:*

**Siegler, R. S., & Alibali, M. W.** (2005). *Children's Thinking (4th Edition)*. Saddle River, NJ: Prentice-Hall

Class Number	Class Date	Topic	Readings
		Core Issues in Cognitive	
1	11-Jan	Development	Siegler, R. S., & Alibali, M. W. (2005). Chapter 1.
2	16-Jan	Piaget's Theory	Siegler, R. S., & Alibali, M. W. (2005). Chapter 2.
		18-Jan	
3	23-Jan	Contemporary Theories	Piaget, J. (1964). Development and learning. In R. E. Ripple & N. Rockcastle (Eds.), <i>Piaget Rediscovered</i> (pp. 7 – 20).
		Genes and Neural	
4	25-Jan	Development	Siegler, R. S., & Alibali, M. W. (2005). Chapters 3 and 4.
		Johnson, M. H. (2005). Developmental cognitive neuroscience. Chapter 2. Building a brain.	
		Polderman, T. J. C., Benyamin, B., de Leeuw, C. A., Sullivan, P. F., van Bochoven, A., Visscher, P. M., & Posthuma, D. (2015). Meta-analysis of the heritability of human traits based on fifty years of twin studies. <i>Nature Genetics</i> , 47(7), 702–709. <a href="http://doi.org/10.1038/ng.3285">http://doi.org/10.1038/ng.3285</a>	
5	30-Jan	Atypical Neural Development	Nelson, C. A., & McCleery, J. P. (2008). Use of event-related potentials in the study of typical and atypical development.
		Dennis, E. L., & Thompson, P. M. (2013). Typical and atypical brain development: a review of neuroimaging studies. <i>Dialogues in Clinical Neuroscience</i> , 15(3), 359–384.	
		Perceptual Development 1:	
6	1-Feb	Classic Findings	Siegler, R. S., & Alibali, M. W. (2005). Chapter 5. Perceptual development
		Perceptual Development 2:	
7	6-Feb	Contemporary Problems	Spelke, E. S., Breinlinger, K., Macomber, J., & Jacobson, K. (1992). Origins of knowledge. <i>Psychological Review</i> , 99, 605-632.
		Bremner, J. G., Slater, A. M., & Johnson, S. P. (2015). Perception of Object Persistence: The Origins of Object Permanence in Infancy. <i>Child Development Perspectives</i> , 9(1), 7–13. <a href="http://doi.org/10.1111/cdep.12098">http://doi.org/10.1111/cdep.12098</a>	
		Wood JN, Wood SMW. 2016 The development of newborn object recognition in fast and slow visual worlds. <i>Proc. R. Soc. B</i> 283: 20160166. <a href="http://dx.doi.org/10.1098/rspb.2016.0166">http://dx.doi.org/10.1098/rspb.2016.0166</a>	
		Language Development 1:	
8	8-Feb	Classic Findings	Siegler, R. S., & Alibali, M. W. (2005). Chapter 6.
		Language Development 2:	
9	13-Feb	Classic Findings	Siegler, R. S., & Alibali, M. W. (2005). Chapter 6.
		Language Development 3:	
10	15-Feb	Contemporary Problems	MacWhinney, B. (1975). Rules, rote, and analogy in morphological formations by Hungarian children. <i>Journal of Child Language</i> , 65 -77.
		Saffran, J. R., Aslin, R. N., & Newport, E. L. (1996). Statistical learning by 8-month-old infants. <i>Science</i> , 274, 1926-1928.	
		Marcus, G. F., Vijayan, S., Bandi Rao, S., and Vishton, P. M. (1999). Rule-learning in seven-month-old infants. <i>Science</i> , 283, 77-80	
11	20-Feb	Midterm 1	
		Conceptual Development 1:	
12	22-Feb	Object Concepts	Siegler, R. S., & Alibali, M. W. (2005). Chapter 8.
		Sloutsky, V. S. (2015). Conceptual development. <i>Handbook in Child Psychology and Developmental Science</i> .	
		Conceptual Development 2:	
13	27-Feb	Space, Number, & Time	Siegler, R. S., & Alibali, M. W. (2005). Chapter 8.
		Conceptual Development 3:	
14	1-Mar	Causality	Siegler, R. S., & Alibali, M. W. (2005). Chapter 8.
		Learning and Memory 1:	
15	6-Mar	Classic Findings	Siegler, R. S., & Alibali, M. W. (2005). Chapter 7.
		Learning and Memory 2:	
16	8-Mar	Classic Findings	Siegler, R. S., & Alibali, M. W. (2005). Chapter 7.
		Learning and Memory 3:	
17	20-Mar	Contemporary Problems	Brainerd, C. J., Reyna, V. F., & Ceci, S. J. (2008). Developmental reversals in false memory: A review of data and theory. <i>Psychological bulletin</i> , 134(3), 343.
		Howe, M. L. (2008). What is false memory development the development of? Comment on Brainerd, Reyna, and Ceci (2008).	
		Ghetti, S. (2008). Processes underlying developmental reversals in false-memory formation: Comment on Brainerd, Reyna, and Ceci (2008).	
		Brainerd, C. J., Reyna, V. F., Ceci, S. J., & Holliday, R. E. (2008). Understanding developmental reversals in false memory: Reply to Ghetti (2008) and Howe (2008).	
18	22-Mar	Midterm 2	
		Social Cognition 1: Classic	
19	27-Mar	Findings	Siegler, R. S., & Alibali, M. W. (2005). Chapter 9.
		Social Cognition 2:	
20	29-Mar	Contemporary Problems	Johnson, S. C. (2003). Detecting agents. <i>Philosophical transactions of the Royal Society</i> , 358, 549 - 559.
		Yamaguchi, M., Kuhlmeier, V., Wynn, K., and vanMarle, K. (2009). Continuity in social cognition from infancy to childhood. <i>Developmental Science</i> , 12, 746–752	
		Heyes, C. (2014). False belief in infancy: a fresh look. <i>Developmental Science</i> , 17(5), 647–659. <a href="http://doi.org/10.1111/desc.12148">http://doi.org/10.1111/desc.12148</a>	
		Development of Reasoning 1:	
21	3-Apr	Classic Findings	Siegler, R. S., & Alibali, M. W. (2005). Chapter 10.
		Development of Reasoning 2:	
22	5-Apr	Contemporary Problems	Gentner, D. (1993). Why we're so smart. In D. Gentner and S. Goldin-Meadow (Eds.), <i>Language in mind: Advances in the study of language and thought</i> (pp. 195 – 235). Cambridge, MA: MIT Press.
		Bullock, M. J., & Opfer, J. E. (2009). What makes relational reasoning smart? Revisiting the perceptual-to-relational shift in the development of generalization. <i>Developmental Science</i> , 12, 114 – 122.	
		Badger, JR, & Shapiro, LR (2012). Evidence of a transition from perceptual to category induction in 3- to 9-year-old children. <i>Journal of Experimental Child Psychology</i> , 113, 131 - 146	
23	10-Apr	Intelligence	TBA
24	12-Apr	Academic Skills	Siegler, R. S., & Alibali, M. W. (2005). Chapter 11.
		Academic Skills:	
25	17-Apr	Contemporary Issues	Anderson, J. R., Reder, L. M., & Simon, H. A. (1996). Situated learning and education. <i>Education researcher</i>
		Greeno, J. G. (1997). On claims that answer the wrong question. <i>Education Researcher</i> .	
		Anderson, J. R., Reder, L. M., & Simon, H. A. (1997). Situative versus Cognitive Perspectives: Form Versus Substance.	
		Core Issues in Cognitive	
26	19-Apr	Development Revisited	
		26-Apr	Final Exam Due

Disability Services: Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated, and they should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; <http://www.ods.ohio-state.edu/>.

Academic Misconduct: It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct ([http://studentaffairs.osu.edu/info\\_for\\_students/csc.asp](http://studentaffairs.osu.edu/info_for_students/csc.asp)).

Cognitive and Affective Influences in Decision Making  
Psychology 8896 – 3 units  
Dr. Ellen Peters

**Overview**

This course will provide an introduction to recent trends in decision research. We make choices and perceive risks in the world around us based on cognitive, affective, and motivational factors that influence how we perceive meaning and (sometimes) influence how we construct our preferences. The present course will cover theoretical distinctions starting with the role of valenced affect and discrete emotions in decisions. Integral as well as incidental sources of affect and emotion will be considered. Although recent research has discussed risk perceptions as primarily based in feelings, we will also cover important cognitive influences such as the role of number processing in risk perceptions and decisions. Both situational factors as well as individual differences will be considered in this course because, as the eminent learning theorist Hobart Mowrer once said, “To understand or predict what a rat will learn to do in a maze, one has to ‘know both the rat and the maze’ (Mowrer, 1960, p. 10). Finally, we will discuss descriptive theory as well as its application to practical domains such as health and the environment, including the recently popularized notion of “choice architecture.”

**Meetings**

Thursdays 2:15-5:00pm  
Room 117 Psychology  
Class number 9951, 3 units

**Instructor E. Peters**

235 Psychology  
688-3477  
peters.498@osu.edu

**Requirements**

In addition to class attendance, readings, and participation, students will be required to prepare a proposal involving a focused literature review combined with a proposed empirical project that will shed light on an existing question in the literature.

**Goals and procedures**

Do we have well-established preference or labile ones? Can emotions be rational? Are cognition and emotion separate systems? How does your numeric ability influence your feelings about choice options? How does it influence some common judgment and decision biases? What does psychological theory say about how to help people to improve their decisions? These are some of the questions we will explore in this course, an introduction to emerging themes in judgment and decision making. The lectures and discussions will be coordinated to complement your weekly reading, which you should do before each class session.

## Course components and grading

Grading will be based on your cumulative point total for the components listed below. There will be no grading curve; all students can earn an “A” if they acquire enough points.

### (1) **A brief proposal** = 50% of your grade

You will write a mini-NSF-style proposal (typed, double-spaced, and up to 15 pages).

Alternative: You can work with another student in class on this proposal, but note that I will expect joint projects to be significantly better than individual ones and will grade accordingly. Joint proposals, I think, have the potential to produce something much more interesting, but they are also more difficult to do well, so choose carefully.

The final proposal is due April 18 at the beginning of class (Week 15). The paper will count for 50 points. Further details on the assignment are on the last page of this syllabus.

### (2) **Class participation** = 50% of your grade

- A sizable portion of material covered in class will supplement the assigned readings. It is important, therefore, to attend and participate in each class. Although I will lecture for part of the time, each class will include some discussion of interesting questions and ideas. I expect that everyone will have something to contribute and I encourage you to come to class prepared to discuss the readings either by raising questions and comments about the articles or by relating the material to your own research, experience, or current events.
- Finally, on the Tuesday prior to each class time (by 5pm), you should email me with 2-3 comments or questions about the readings. You should bring a written copy of your comments or questions to each class period as well.
- Your class participation will be worth the other 50 points of your final grade. I will determine your points based on your comments/questions above and how much effort you put into making the class work. If you feel uncomfortable about class participation, for whatever reason, come see me in the first 2 weeks of class and we will find some way around that.

Grades for all components of the course will be converted to percentages and averaged using the weights given above. Your final grade will be computed using the OSU standard grading scheme summarized below.

E	D	D+	C-	C	C+	B-	B	B+	A-	A
<60%	≥60%	≥67%	≥70%	≥73%	≥77%	≥80%	≥83%	≥87%	≥90%	≥93%

**Overview of topics and schedule** – All required readings will be posted on Carmen.  
Note: There may be some changes to the reading schedule. Material sometimes takes longer than expected and sometimes students want to stay with particular topics for more time than originally allotted. Any schedule adjustments will be announced in class.

**Weeks 1 and 2 (1/10 and 1/17): Introduction/Overview**

Readings for Week 2:

1. Weber, E.U. & Johnson, E.J. (2009). Mindful judgment and decision making. *Annual Review of Psychology*, 60, 53-85. Read all sections except Memory (p 62-65), Learning (p70-72), and subsections Choice From External Search through Goal Framing (p 60-62).
2. Over, D. (2004). Rationality and the normative/descriptive distinction. In D.J. Koehler & Harvey, N. *Blackwell Handbook of Judgment and Decision Making* (pp 3-18). Malden MA: Blackwell Publishing Ltd.

**Week 3 (1/24): How does integral affect (a faint whisper of emotion) influence risk perceptions and decisions?**

1. Slovic, P., Finucane, M.L., Peters, E., & MacGregor, D.G. (2002). The affect heuristic. In T. Gilovich, D. Griffin, & D. Kahneman (Eds.), *Heuristics and Biases: The Psychology of Intuitive Judgments* (pp. 397-420). New York: Cambridge University Press.
2. Loewenstein, G.F., Weber, E.U., Hsee, C. K., & Welch, E.S. (2001). Risk as feelings. *Psychological Bulletin*, 127(2), 267-286.

**Week 4 (1/31): Four functions of affect. How does the act of judging and deciding influence affect and choice in turn?**

1. Peters, E. (2006). The functions of affect in the construction of preferences. In S. Lichtenstein & P. Slovic (Eds.), *The construction of preference*, (pp. 454-463). New York: Cambridge University Press.
2. Luce, M.F., Payne, J.W., & Bettman, J.R. (1999). Emotional trade-off difficulty and choice. *Journal of Marketing Research*, 36, 143-159.

**Week 5 (2/7): Do incidental affect and arousal unknowingly shape risk perceptions and decisions?**

As information:

1. Johnson, E. J., & Tversky, A. (1983). Affect, generalization, and the perception of risk. *Journal of Personality and Social Psychology*, 45, 20-31.

As a motivator of information processing and decisions:

2. Ariely, D. & Loewenstein, G. (2006). The heat of the moment: The effect of sexual arousal on sexual decision making. *Journal of Behavioral Decision Making*, 19, 87-98.
3. Isen, A. (2008). Some ways in which positive affect influences decision making and problem solving. In M. Lewis, Haviland-Jones, J.M., & Barrett, L.F. (Eds.), *Handbook of Emotions* (Vol. 3, pp. 548-573). New York, NY: Guilford Press.

### **Week 6 (2/14): Does valenced affect matter?: The role of discrete emotions**

(We'll end class with Christopher Hsee at 4pm in PSY035)

1. Lerner, J.S. & Tiedens, L.Z. (2006). Portrait of the angry decision maker: How appraisal tendencies shape anger's influence on cognition. *Journal of Behavioral Decision Making*, 19, 115-137.
2. Peters, E., Burraston, B., & Mertz, C.K. (2004). An emotion-based model of stigma susceptibility: Appraisals, affective reactivity, and worldviews in the generation of a stigma response. *Risk Analysis*, 24, 1349-1367.
3. Connolly, T. & Zeelenberg, M. (2002). Regret in decision making. *Current Directions in Psychological Science*, 11, 212-216.

### **Week 7 (2/21): Dual process theories and criticisms**

1. Kahneman (2003). Maps of bounded rationality: Psychology for behavioral economics. *The American Economic Review*, 93, 1449-1475.
2. Keren, G. & Schul, Y. (2009). Two is not always better than one: A critical evaluation of two-system theories. *Perspectives on Psychological Science*, 4, 533-550.
3. Frank, M.J., Cohen, M.X., & Sanfey, A.G. (2009). Multiple systems in decision making: A neurocomputational perspective. *Current Directions in Psychological Science*, 18, 73-77.

### **Week 8 (2/28): Numeracy goes beyond comprehension**

1. Peters, E., Vastfjall, D., Slovic, P., Mertz, C. K., Mazzocco, K., & Dickert, S. (2006). Numeracy and decision making. *Psychological Science*, 17(5), 407-413.
2. Cokely, E.T. & Kelley, C.M. (2009). Cognitive abilities and superior decision making under risk: A protocol analysis and process model evaluation. *Judgment and Decision Making*, 4, 20-33.

### **Week 9 (3/7): Numeracy goes beyond comprehension (cont)**

(The short paragraph for your proposal is due prior to the beginning of class. Send it electronically in .doc or .docx format)

1. Galesic, M. & Garcia-Retamero, R. (2011). Do low-numeracy people avoid shared decision making? *Health Psychology*, 30, 336-341.
2. Keller, C. (2011). Using a familiar risk comparison within a risk ladder to improve risk understanding by low numerates: A study of visual attention. *Risk Analysis*, 31, 1043-1054.

### **Week 10 (3/14) No class - Spring break**

### **Week 11 (3/21) No class – I am at a professional conference**

### **Week 12 (3/28) Numeracy impact on health, finances, and the environment**

1. Zikmund-Fisher, B.J., Mayman, G., Fagerlin, A. (2013, in press). Patient numeracy: What do patients need to recognize, think or do with health numbers? In J. Schulkin and B. Anderson (Eds.), *Numerical Reasoning in Judgments and Decision Making about Health*.
2. Soll, J.B., Keeney, R.L., & Larrick, R.P. (2012, in press). Consumer misunderstanding of credit card use, payments, and debt: Causes and solutions. *Journal of Public Policy & Marketing*.

3. Kahan, D. M., Peters, E., Wittlin, M., Slovic, P., Ouellette, L. L., Braman, D., & Mandel, G. (2012). The polarizing impact of science literacy and numeracy on perceived climate change risks. *Nature Climate Change*, 2, 732-745.

**Week 13 (4/4): Numeracy and improving comprehension and use of numbers**

1. Peters, E., Dieckmann, N.F., Västfjäll, D., Mertz, C.K., Slovic, P., & Hibbard, J. (2009). Bringing meaning to numbers: The impact of evaluative categories on decisions. *Journal of Experimental Psychology: Applied*, 15, 3, 213–227.
2. Fagerlin, A., Ubel, P.A., Smith, D.M., & Zikmund-Fisher, B.J. (2007). Making numbers matter: Present and future research in risk communication. *American Journal of Health Behavior*, 31, 47–56.
3. Peters, E., Baker, D.P., Dieckmann, N.F., Leon, J., & Collins, J. (2010). Explaining the effect of education on health: A field study in Ghana. *Psychological Science*, 21(10) 1369–1376.

**Week 14 (4/11): Number intuitions**

1. Furlong, E.E. & Opfer, J.E. (2009). Cognitive constraints on how economic rewards affect cooperation. *Psychological Science*, 20, 11-16.
2. Peters, E., Slovic, P., Västfjäll, D., & Mertz, C.K. (2008). Intuitive numbers guide decisions. *Judgment and Decision Making*, 3(8), 619-635.

**Week 15 (4/18): Choice architecture and papers due**

1. Sunstein, C.R. & Thaler, R.H. (2003). Libertarian paternalism is not an oxymoron. *The University of Chicago Law Review*, 70(4), 1159-1202.
2. Marteau, T.M., Ogilvie, D., Roland, M., Suhrccke, M., & Kelly, M.P. (2011). Judging nudging: Can nudging improve population health? *British Medical Journal*, 342, 263-265.
3. Whitman, G. (2010). The risk of the new paternalism. *Cato Unbound*. Lead essay.

## Optional readings

### Week 2 - Optional reading (Introduction/Overview):

- Lichtenstein, S., & Slovic, P. (Eds.) *The construction of preference*. New York: Cambridge University Press. 2006.
- Baron (2004). Normative models of judgment and decision making. In D.J. Koehler & Harvey, N. *Blackwell Handbook of Judgment and Decision Making* (pp 19-36). Malden MA: Blackwell Publishing Ltd.

### Week 3 – Optional reading (Integral affect):

- Loewenstein, G. & Lerner, JS. (2003). The role of affect in decision making. In Davidson R, Goldsmith H, & Scherer K. *Handbook of Affective Science*. Oxford: Oxford University Press; 2003. p. 619-642.
- Wilson, R. & Arvai, J. (2006). When less is more: How affect influences preferences when comparing low and high-risk options. *Journal of Risk Research*, 9(2), 165–178.
- Oatley, K. & Jenkins, J.M. (1996). Chapter 4: What is an emotion? p. 95-132. In *Understanding Emotions*.
- Russell, J.A. (2003). Core affect and the psychological construction of emotion. *Psychological Review*, 110, 145-172. (see affective quality)

### Week 4 - Optional reading (Functions and Act of judging/deciding):

- Han, P.K.J., Klein, W.M.P., Lehman, T., Killam, B., Massett, H., & Freedman, A.N. (2011). Communication of uncertainty regarding individualized cancer risk estimates: Effects and influential factors, *Medical Decision Making*, 31, 354-366.
- Hsee, C. K., & Rottenstreich, Y. (2004). Music, pandas, and muggers: On the affective psychology of value. *Journal of Experimental Psychology: General*, 133, 23-30.
- Rottenstreich, Y., & Hsee, C. K. (2001). Money, kisses, and electric shocks: On the affective psychology of risk. *Psychological Science*, 12(3), 185-190.
- Shiv, B., & Fedorikhin, A. (1999). Heart and mind in conflict: The interplay of affect and cognition in consumer decision making. *Journal of Consumer Research*, 26(3), 278-292.
- van Dijk, E. & Zeelenberg, M. (2006). The dampening effect of uncertainty on positive and negative emotions. *Journal of Behavioral Decision Making*, 19, 171–176.

### Week 5 - Optional reading (Incidental affect and arousal):

- Bodenhausen, G. V., Kramer, G. P., & Süsner, K. (1994). Happiness and stereotypic thinking in social judgment. *Journal of Personality and Social Psychology*, 66, 621-632.
- Ditto, P. H., Pizarro, D. A., Epstein, E. B., Jacobson, J. A., & MacDonald, T. K. (2006). Visceral influences on risk taking behavior. *Journal of Behavioral Decision Making*, 19(2), 99–113.

### Week 6 – Optional reading (Discrete emotions):

- DeSteno, D., Petty, R.E., Wegener, D.T., & Rucker, D.D. (2000). Beyond valence in the perception of likelihood: The role of emotion specificity. *Journal of Personality and Social Psychology*, 78, 397-416.
- Lerner, J. S., Keltner, D. (2000). Beyond valence: Toward a model of emotion-specific influences on judgment and choice. *Cognition & Emotion*, 14, 473-493.



- Lerner, J.S., Gonzalez, R.M., Small, D.A., & Fischhoff, B. (2003). Effects of fear and anger on perceived risks of terrorism: A national field experiment. *Psychological Science*, 14, 144-150.
- Smith & Ellsworth (1985).
- Wardman, J.K. (2006). Toward a critical discourse on affect and risk perception *Journal of Risk Research*, 9(2), 109–124.

Week 7 - Optional reading (Dual process theories and criticisms):

- Cunningham, W. A., & Zelazo, P. D. (2007). Attitudes and evaluations: a social cognitive neuroscience perspective. *TRENDS in Cognitive Sciences*, 11, 97-104.
- Kruglanski, A.W. & Gigerenzer, G. (2011). Intuitive and deliberate judgments are based on common principles. *Psychological Review*, 118, 97-109.
- Petty, R.E. & Wegener, D.T. (1999). The elaboration likelihood model: Current status and controversies. (pp. 37-72) In S. Chaiken & Y. Trope (Eds). *Dual-process theories in social psychology*.
- de Neys, W. (2006). Dual processing in reasoning: Two systems but one reasoner. *Psychological Science*, 17, 428-433.
- Carpenter, S., Peters, E., Isen, A. M., & Västfjäll, D. (2013). Positive feelings facilitate working memory and complex decision making among older adults. *Cognition & Emotion*, 27(1), 184-192.

Weeks 8 and 9 - Optional reading (Numeracy):

- Lipkus, I.M., Peters, E., Kimmick, G., Liotcheva, V., & Marcom, P. (2010). Breast cancer patients' treatment expectations after exposure to the decision aid program, Adjuvant Online: The influence of numeracy. *Medical Decision Making*, 30(4), 464-73.
- Dieckmann, N.F., Slovic, P., & Peters, E. (2009). The use of narrative evidence and explicit probability by decision makers varying in numeracy. *Risk Analysis*, 29(10), 1473-1488.
- Bruine de Bruin, W., Parker, A. M., & Fischhoff, B. (2007). Individual differences in adult decision-making competence. *Journal of Personality and Social Psychology*, 92, 938-956.
- Lyons, I.M. & Beilock, S.L. (2012). When math hurts: Math anxiety predicts pain network activation in anticipation of doing math. *PloS ONE*, 7, e48076, 1-6.
- Fagerlin, A., Zikmund-Fisher, B. J., Ubel, P. A., Jankovic, A., Derry, H. A., & Smith, D. M. (2007). Measuring numeracy without a math test: Development of the subjective numeracy scale. *Medical Decision Making*, 27(5), 672-680.
- Lipkus, I. M., Samsa, G., & Rimer, B. K. (2001). General performance on a numeracy scale among highly educated samples. *Medical Decision Making*, 21(1), 37-44.
- Cokely, E.T., Galesic, M., Schulz, E., Ghazal, S., Garcia-Retamero, R. (2012). Measuring risk literacy: The Berlin Numeracy Test. *Judgment and Decision Making*, 7, 25-47.
- Ask me if you're interested in other reading about numeracy measures

Week 12 - Optional reading (Impact of numeracy):

- Nelson, W., Reyna, V.F., Fagerlin, A., Lipkus, I.M., & Peters, E. (2008). Clinical implications of numeracy: Theory and practice. *Annals of Behavioral Medicine*, 35, 261–274.

- Gigerenzer, G., Gaissmaier, W., Kurz-Milcke, E., Schwartz, L.M., & Woloshin, S. (2008). Helping doctors and patients make sense of health statistics. *Psychological Science in the Public Interest*, 8(2), 53-96.
- Reyna, V. F., Nelson, W.L., Han, P.K., & Dieckmann, N.F. (2009). How numeracy influences risk comprehension and medical decision making. *Psychological Bulletin*, 135 (6) 943-973.
- Smith, J.P., McArdle, J.J., Willis, R. (2010). Financial decision making and cognition in a family context. *The Economic Journal*, 120(548), F363-F380.
- Rowell, A. & Bregant, J. (October 15, 2012). Numeracy and legal decision making. Available at SSRN: <http://ssrn.com/abstract=2163645> or <http://dx.doi.org/10.2139/ssrn.2163645>

Week 13 - Optional reading (Numeracy and improving comprehension/use):

- Lipkus, I. (2007). Numeric, verbal, and visual formats of conveying health risks: Suggested best practices and future recommendations. *Medical Decision Making*, 27(5), 696-713.
- Peters, E., Hibbard, J.H., Slovic, P., & Dieckmann, N.F. (2007). Numeracy skill and the communication, comprehension, and use of risk and benefit information. *Health Affairs*, 26(3), 741-748.
- Garcia-Retamero, R. & Galesic, G. (2009). Communicating treatment risk reduction to people with low numeracy skills: A cross-cultural comparison. *American Journal of Public Health*, 99, 2196-2202.
- Hibbard, J.H. & Peters, E. (2003). Supporting informed consumer health care choices: Data presentation approaches that facilitate the use of information in choice. *Annual Review of Public Health*, 24, 413-433.
- Fong, G.T., Krantz, D.H., & Nisbett, R.E. (1986). The effects of statistical training on thinking about everyday problems. *Cognitive Psychology*, 18, 253-292.
- Miyake, A., Kost-Smith, L.E., Finkelstein, N.D., Pollock, S.J., Cohen, G.L., & Ito, T.A. (2010). Reducing the gender achievement gap in college science: A classroom study of values affirmation. *Science*, 330, 1234-1237.

Week 14 - Optional reading:

- Thomas, M. & Morwitz, V. (2009). Heuristics in numerical cognition: Implications for pricing. In V.R. Rao (Ed.), *Handbook of Pricing Research in Marketing* (pp 132-149). Cheltenham UK: Edward Elgar.
- Dehaene, S. (2009). Origins of mathematical intuitions: The case of arithmetic. *The Year in Cognitive Neuroscience, Annals of the New York Academy of Sciences*, 1156, 232-259.
- Dehaene, S. & Marques, J.F. (2002). Cognitive Euroscience: Scalar variability in price estimation and the cognitive consequences of switching to the Euro. *Quarterly Journal of Experimental Psychology*, 55(3), 705-731.
- Dehaene, S. (1997). Chapter 1: Talented and gifted animals. *Number Sense*. New York: Oxford University Press.

Week 15 - Optional reading:

- Johnson, E. J., Suzanne, S., Dellaert, B. G. C., Fox, C. R., Goldstein, D. G., Haubl, G., Larrick, R. P., Peters, E., Payne, J. W., Schkade, D., Wansink, B., & Weber, E. U. (2012). Beyond nudges: Tools of a choice architecture. *Marketing Letters*, 23, 487-504.
- Johnson, E.J. & Goldstein, D. (2003). Do defaults save lives? *Science*, 302, 1338-1339.

- Fisman, R. (2010). Nudges go wrong. *Slate*. Retrieved from: <http://www.slate.com/toolbar.aspx?action=print&id=2251658>

### **Academic Misconduct:**

All students at the Ohio State University are bound by the Code of Student Conduct (see [http://studentaffairs.osu.edu/pdfs/csc\\_12-31-07.pdf](http://studentaffairs.osu.edu/pdfs/csc_12-31-07.pdf)). Violations of the code in this class will be dealt with according to the procedures detailed in that code. Specifically, alleged cases of misconduct will be referred to the Committee on Academic Misconduct. It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct.

For good, concise, plain-English advice on how to stay out of academic trouble, see Ten Suggestions for Preserving Academic Integrity at <http://oaa.osu.edu/coamtensuggestions.html>

### **If you miss a deadline:**

Students missing the weekly question/comment, final paper, or other deadline because of legitimate illness, injury, or serious emergency must do both of the following things:

1. Contact me in person, by email, or by phone (email is best) before the deadline.
2. Provide written documentation of your illness, injury, or emergency from an authoritative source (e.g., a physician’s note, a police report, a funeral announcement).

Remedial actions (if any) are at my discretion. Deadline extensions are not guaranteed, even if both of the above actions are taken.

### **Students with disabilities:**

Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated, and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; <http://www.ods.ohiostate.edu/>. To ensure fairness to all students, requests for special accommodations will not be granted in the absence of ODS certification.

## **Your Proposal (Submit electronically in .doc or .docx format)**

You will write a mini-NSF-style proposal (typed, double-spaced, and up to 15 pages) on a topic related to this course. The proposal will count for half your grade. It is intended to get you to think more deeply about the research topics in this course and to consider their relevance for your own research. The proposal should relate clearly to one or more of our course topics.

- A short paragraph in .doc or .docx format proposing your topic and a reading list (of 3-5 scholarly references) is **due before class in Week 9, March 7th**. Be sure to tell me how it relates to this course (if it's not obvious) and that it is independent of proposals done for other courses (e.g., 708).
- **The final proposal is due before class on Week 15, April 18th.**

Your Project Description (see below) should be a maximum of 15 pages long. The paper should be double spaced in 12-point font. Figures and tables should be integrated into the text rather than being placed at the end. Cite and format references in APA style. Include page numbers in bottom right corner of each page.

Your early drafts are likely to be longer, and you should revise your paper multiple times so that it is tighter in its construction and better written. Quality of writing is important and will affect proposal grades. Quality of writing includes spelling and proofreading, clarity of expression, good sentence structure, logical organization, and many other intangibles. You should credit other authors for ideas that you use, but put it in your own words, where possible, rather than relying on a lot of quotes. It will read better if you do this.

### Suggested number of pages (this is only a guideline):

Title page (separate page)

Project summary (1/2 – 1 page; see below for description)

Project description (see below for description; 15 pages maximum)

    Introduction: Background and Theory (3-5 pages)

    Proposed Research with figures and tables embedded (7-11 pages)

    Significance and Broader Impacts (1/2 - 1 page)

References (separate pages)

Project Summary: The proposal must contain a summary of the proposed research, not more than one page in length. It should be written in the third person and include an overview of your rationale for the proposed study(ies), a statement of hypotheses to be tested, methods to be employed, and anticipated results. It must clearly address in separate statements (within the one-page summary): the intellectual merit of the proposed activity and its potential broader impacts.

The Project Description should provide a clear statement of the work being proposed and must include: (1) a review of the relevant literature and rationale for the proposed research including hypotheses (and the relation of the proposed studies to your own work in progress, if applicable), (2) descriptions of your proposed study or studies (e.g., conditions, sample sizes, procedures, measures), (3) proposed analyses and anticipated results, and (4) a brief discussion of the potential implications of the research. On this last point, up to a page of the proposal should be devoted to the project's potential broader impacts, including its potential benefits to the advancement of science and/or to society at large.

**Let me know if you would like to see an example of a previously-funded NSF proposal focused on affect or on numeracy.**

**Psychology 7871: Social Cognition**  
**Autumn 2016**  
**Tuesday & Thursday 12:45PM - 2:05PM**  
**Smith Lab 2186**

Instructor

Russell Fazio  
100c Lazenby Hall  
Phone: 688-5408  
E-mail: [fazio.11@osu.edu](mailto:fazio.11@osu.edu)

Course Overview

This course is intended to provide an introduction to research in social cognition. Social cognition is the study of the cognitive underpinnings of social behavior and the ways individuals think about our social world.

This class will meet for two 80-minute sessions a week. Approximately two-thirds of the sessions will be devoted to a lecture, although adequate time will be allotted for questions and commentary. These lectures will provide an overview of the historical developments with respect to a given issue within the social cognition literature. The other class sessions will be devoted to a discussion of a set of recent articles related to the general issues covered in the preceding meeting(s).

Course Textbook

Hamilton, D. (2005). *Social Cognition: Key Readings*. New York: Psychology Press.

This book of readings is a collection of classic journal articles from the social psychological literature on social cognition. It also includes valuable ancillary material introducing each major topic area.

Additional readings, including those pertaining to the discussion sessions, are available on the course's Carmen website.

The following are excellent texts that can provide useful background information, if you desire additional information about any given topic.

Fiske, S. T., & Taylor, S. E. (2013). *Social Cognition: From Brains to Culture*. London: Sage.

Bless, H., Fiedler, K., & Strack, F. (2004). *Social Cognition: How Individuals Construct Social Reality*. New York: Psychology Press.

Moskowitz, G. B. (2004). *Social Cognition: Understanding Self and Others*. New York: Guilford.

### Course Requirements

Readings are assigned for each class meeting, and are to be read prior to the class with which they are associated. Readings consist of journal articles reprinted in Hamilton's reader or provided on Carmen.

Grades will be based on:

1. Midterm exam covering the first half of the syllabus and weighted 35% of the course grade. The midterm will be administered during class on **October 18**.
2. Final exam covering the second half of the syllabus and weighted 35%. The final will be administered during finals week. According to the Registrar's final exam schedule, the exam is scheduled for **Tuesday, December 13, 2:00-3:45**.
3. Class participation weighted 20%. This includes contributions to the discussions in general, as well as the discussion that each student will be leading. Each of the discussion articles will be assigned to a student, who will assume the responsibility of: (a) preparing a single-page handout summarizing the reading for distribution to the class, (b) presenting a brief overview of the article, (c) offering observations about the research, and (d) generating issues or questions for class discussion.
4. Thought paper weighted 10%. Details regarding this brief (1000 words or less) paper will be provided approximately two weeks prior to the due date of **September 30**.

### Academic Misconduct

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term "academic misconduct" includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335--5--487). For additional information, see the Code of Student Conduct [http://studentlife.osu.edu/pdfs/csc\\_12---31---07.pdf](http://studentlife.osu.edu/pdfs/csc_12---31---07.pdf).

### Students with disabilities

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know immediately so that we can privately discuss options. You are also welcome to register with Student Life Disability Services to establish reasonable accommodations. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. **SLDS contact information:** [slds@osu.edu](mailto:slds@osu.edu); 614-292-3307; [slds.osu.edu](http://slds.osu.edu); 098 Baker Hall, 113 W. 12<sup>th</sup> Avenue.

**Tentative schedule (subject to change)**

**August 23: Course introduction**

**August 25: Social perception and impression formation – Historical overview**

From Heider/Bruner/Asch to modern social cognition; Some basic concepts;  
The constructive nature of perception

Hamilton: Introductory Overview; Readings 1, 6, 22

Bruner, J. S. (1957). On perceptual readiness. *Psychological Review*, 64, 123-152. [Note: Reading 6 from the Hamilton volume is an abridged version of this article. I recommend reading the original article in its entirety.]

**August 30: The rise of social cognition**

Priming and category accessibility

Hamilton: Readings 4, 9

**September 1: Person memory**

Recall of expectancy-congruent versus incongruent information; Information processing goals

Hamilton: Preview Part 6; Readings 2, 7, 23, 24, 25

**September 6: Discussion session**

Kendrick, R. V., & Olson, M. A. (2012). When feeling right leads to being right in the reporting of implicitly-formed attitudes, or how I learned to stop worrying and trust my gut. *Journal of Experimental Social Psychology*, 48, 1316-1321.

Santos, A. F., Garcia-Marques, L., Mackie, D. M., Ferreira, M. B., Payne, B. K., & Moreira, S. (2012). Implicit open-mindedness: Evidence for and limits on stereotype malleability. *Journal of Experimental Social Psychology*, 48, 1257-1266.

Meyer, M. L. & Lieberman, M. D. (2016). Social working memory training improves perspective-taking accuracy. *Social Psychological and Personality Science*, 7, 381-389.

**September 8: Memory as re-constructions of the past**

Expectancy-guided retrieval; False memories

Hamilton: Readings 33, 34



**September 13: Discussion session**

Frenda, S. J., Knowles, E.D., Saletan, W., & Loftus, E.F. (2013). False memories of fabricated political events. *Journal of Experimental Social Psychology, 49*, 280-286.

Sahdra, B., & Ross, M. (2007). Group identification and historical memory. *Personality and Social Psychology Bulletin, 33*, 384-395.

Chatard, A., Guimond, S., & Selimbegović, L. (2007). "How good are you in math?" The effect of gender stereotypes on students' recollection of their school marks. *Journal of Experimental Social Psychology, 43*, 1017-1024.

**September 15: Probability estimation**

Judgments under uncertainty; Heuristics

Hamilton: Preview Part 3; Readings 10, 11

**September 20 & 22: Automaticity**

Nonconscious processing; Automatically-driven attention, categorization, and behavior

Hamilton: Preview Part 4; Readings 13, 14, 15, 16

**September 27 & 29: No Class – SESP**

**September 30: Thought paper**, Due electronically by 5:00 PM

**October 4: Discussion session**

Critcher, C., & Gilovich, T. (2008). Incidental environmental anchors. *Journal of Behavioral Decision Making, 21*, 241–251.

Loersch, C., & Payne, B. K. (2014). Situated inferences and the what, who, and where of priming. *Social Cognition, 32*, 137–151.

Cian, L., Krishna, A., & Schwarz, N. (2015), Positioning rationality and emotion: Rationality is up and emotion is down. *Journal of Consumer Research, 42*, 632-651.

**October 6: Dispositional Inferences**

Attribution processes; Biases and errors; Spontaneous trait inferences; Self-inferences

Hamilton: Preview Part 5; Readings 17, 18, 19, 20, 21

**October 11: Discussion session**

Carlston, D. E. & Skowronski, J.J. (2005). Linking Versus thinking: Evidence for the different associative and attributional bases of spontaneous trait transference and spontaneous trait inference. *Journal of Personality and Social Psychology*, *89*, 884-898.

Bryan, C. J., Walton, G. M., Rogers, T., & Dweck, C. S. (2011). Motivating voter turnout by invoking the self. *Proceedings of the National Academy of Sciences*, *108*, 12653-12656.

Harrington, J. R., & Gelfand, M. J. (2014). Tightness–looseness across the 50 united states. *Proceedings of the National Academy of Sciences*, *111*, 7990-7995.

**October 13: No Class – Fall Break****October 18: MIDTERM****October 20: Review of Midterm****October 25: Stereotypes**

Stereotype activation; The consequences of stereotypes for information processing; Their functional value

Hamilton: Preview Part 2; Readings 3, 8, 28, 29

**October 27: Stereotype development**

Hamilton: Preview Part 7; Reading 26

**November 1: Discussion session**

Jung, K., Shavitt, S., Viswanathan, M., Hilbe, J. (2014). Female hurricanes are deadlier than male hurricanes. *Proceedings of the National Academy of Sciences*, *111*, 8782-8787.

Crandall, C. S., Bahns, A. J., Warner, R., & Schaller, M. (2011). Stereotypes as justifications of prejudice. *Personality and Social Psychology Bulletin*, *37*, 1488-1498.

Williams, K. E. G., Sng, O., & Neuberg, S. L. (2016). Ecology-driven stereotypes override race stereotypes. *Proceedings of the National Academy of Sciences*, *113*, 310-315.

**November 3: Stereotyping from the perspective of the target**

Attributional ambiguity; Stereotype threat

**November 8: Discussion session**

Walton, G. M., & Cohen, G. L. (2011). A brief social-belonging intervention improves academic and health outcomes of minority students. *Science*, *331*, 1447-1451.

Emerson, K.T.U., & Murphy, M.C. (2015). A company I can trust? Organizational lay theories moderate stereotype threat for women. *Personality and Social Psychology Bulletin*, *41*, 295-307.

Deutsch, R., & Fazio, R. H. (2008). How subtyping shapes perception: Predictable exceptions to the rule reduce attention to stereotype-associated dimensions. *Journal of Experimental Social Psychology*, *44*, 1020-1034.

**November 10: Hypothesis testing**

Confirmatory testing; Diagnosticity; Self-serving reasoning

Hamilton: Preview Part 8; Readings 30, 31, 32

**November 15: Expectancies and social interaction**

The impact of expectancies on social interaction; Expectancy maintenance and confirmation

Hamilton: Readings 12, 27, 37

**November 17: Discussion session**

Otto, A. S., Clarkson, J. J., & Kardes, F. R. (2016). Decision sidestepping: how the motivation for closure prompts individuals to bypass decision making. *Journal of Personality and Social Psychology*, *111*, 1-16.

Lemay, E. P., Jr., & Wolf, N. R. (2016). Projection of romantic and sexual desire in opposite-sex friendships: How wishful thinking creates a self-fulfilling prophecy. *Personality and Social Psychology Bulletin*, *42*, 864-878.

Neel, R., Neufeld, S.L., & Neuberg, S.L. (2013). Would an obese person whistle Vivaldi? Targets of prejudice self-present to minimize appearance of specific threats. *Psychological Science*, *24*, 678-687.

**November 22: The affect ↔ cognition interface**

Effects of cognition on affect; Misattribution and emotion

Hamilton: Preview Part 9; Reading 38

**November 24: No Class – Thanksgiving**

**November 29: The affect ↔ cognition interface**

Effects of affect on cognition; Affective consequences of counterfactual thinking; Emotion-congruent processing; Feelings as information; Affect and creativity

Hamilton: Readings 35, 36

**December 1: Discussion session**

Otto, A. R., Fleming, S.M., & Glimcher, P.W. (2016). Unexpected but incidental positive outcomes predict real-world gambling. *Psychological Science, 27*, 299-311.

Jamieson, J.P., Peters, B.P., Greenwood, E.J., & Altose, A.J. (2016). Reappraising stress arousal improves performance and reduces evaluation anxiety in classroom exam situations. *Social Psychological and Personality Science, 7*, 579-587.

Shiner, R. (2015). Maximizers, satisficers, and their satisfaction with and preferences for reversible versus irreversible decisions. *Social Psychological and Personality Science, 6*, 896-903.

**December 6: Wrap Up**

**December 13: Final Exam, 2:00-3:45**