Spring 2020
PSYC 520 – Graduate Statistics, Section 10/11A
Mondays and Wednesdays 9:30am – 11:20am
Social and Behavioral Sciences Building 1101

Instructor: Daniel R. Berry, PhD
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Office: SBSB 3208

Course Website: Website Link
Office Hours: Tuesdays 10:30a-12:30p

TEXT:

Judd, C. M., McClelland G. H., & Ryan, C. S. (2017). *Data analysis: A model comparison approach to regression, ANOVA, and beyond* (3rd Ed.). New York: Routledge.
*Note: if you took PSYC 424 in the fall of 2019 or in the spring of 2018 that this is the same text

COURSE OVERVIEW

Welcome to graduate statistics! This course is designed to provide you a deep understanding of advanced statistical analyses within the General Linear Model (GLM). Knowledge of statistics is critical for conducting research in psychology, in addition to understanding and evaluating research reported by others. The main emphasis of this course will be conceptual in nature – you will be asked to understand the logic of each analysis we cover, test assumptions, and make correct inferences based on the outcome(s). Another major emphasis of this course is practical in nature. Specifically, you will learn to use computer software to perform analyses, create figures and tables, and present findings in APA style. Thus, this course is designed not only to equip you with a set of advanced statistical techniques that are more frequently used in psychological science, but it will also prepare you with technical and writing skills to begin building your vita.

PROGRAMMATIC STUDENT LEARNING OUTCOMES:

The Psychology MA degree at CSUSM includes five Programmatic Student Learning Outcomes (PSLOs) that serve as expected outcomes of your classroom experiences and your broad training in the program. This course addresses the following PSLO:

PSLO 2: Identify and explain basic research designs and statistical analyses, and appropriately apply these designs and analyses to independent research leading to and including the thesis.

PSLO 3: Demonstrate proficiency in the written and oral presentation of scientific content in psychology, including the appropriate use of APA style.

COURSE STRUCTURE AND EVALUATION

"My thinking is first and last and always for the sake of my doing" – William James. In the spirit of William James' wisdom, the class structure will facilitate critical thinking that serves work that you *will do (and perhaps are already doing)* in this field. Each new technique we learn will be introduced in a lecture/discussion format. While most of these classes will be lecture-based, I expect you to read all readings prior to class and to participate actively in the learning. The other half of this course will be hands-on learning days where you analyze data using SPSS, present data using (primarily) Microsoft Excel and PowerPoint, and present findings in APA style. You do not need a sophisticated calculator for this class; one that has a square root function (available on lab computers) will work great!

This course has four major, interrelated components: participation in discussion and activities, lab homework (abbreviated HW in course schedule below), exams, and a full APA-style empirical manuscript. These are outlined as follows.

1. Class attendance and participation (200 points)

The format of this course is interactive and experiential. During most meetings I encourage "interrupted lectures," with time dedicated to in-class activities, demonstrations, and discussion. Evidence suggests that students learn material more thoroughly and retain it longer if they are actively engaged in the learning process. Getting involved in the class will not only benefit you, it will also contribute to the learning of your classmates. I want you to complete all readings before class, and to come to each class prepared to discuss the readings assigned for that class. Your participation in class discussions and activities throughout the semester will constitute 10% of your grade for the course. I will give you feedback on your class participation about halfway through the semester.

Good class participation involves coming to class on time with questions on issues that are unclear in the readings, raising questions that you think we should cover, constructively criticizing, and commenting on ideas you think are interesting. While it may seem like statistics is a hard course to discuss, as active researchers you will likely encounter issues in your own work that will apply to class. The criteria I will use in assigning points for class participation are as follows:

> 200 points: Attends all classes and actively and consistently contributes to the class discussions and exercises well beyond expectations (e.g., raises important issues based on class readings, clarifies questions raised by other participants, and consistently makes comments that display a sophisticated grasp of the relevant material).
>
> 180 points: Misses one class or attends all classes and actively and consistently contributes to the class discussions and exercises beyond expectations (e.g., makes substantial contributions to class discussions).
>
> 160 points: Misses more than one class or attends all classes and actively and consistently participants in class discussions and in the exercises
>
> 140 points: Misses more than one class or attends all class but participation is minimal or does not actively participate.
>
> <140 points: Problems with class attendance, minimal participation in discussions and exercises, and or does not appear prepared for class.

2. Lab Homework (300 points)

There will be 10 lab homework assignments throughout the semesters totaling 30 points each. I encourage you to form study groups with your classmates and to work on these assignments together. While you can discuss work with your classmates, all work turned in should reflect your individual work. Your homework will constitute 15% of your final grade. Late assignments will be accepted up until the beginning of the next class meeting time, and 20% (6 points) will be subtracted from that assignment grade. If the assignment is not turned in by the next class meeting time, the assignment will be recorded as a zero. After receiving two zeros on assignments, I will email the student to meet and discuss strategies for getting assignments in on time.

3. Exams (900 points)

You will complete three exams this semester, each worth 300 points. Together these exams will account for 45% of your final grade. The material in this course is acquired gradually because new material builds on previously learned concepts. It is very difficult to "cram" for a statistics test. Thus, it is important to read your assignments before class and complete your work on time. You should also try to keep your notes and assignments clear, organized, and legible because these resources may be valuable on exams and assignments. Because many psychologists depend on textbooks and statistical tables when they need to analyze research findings, you may use your text and other materials when working on the exams. This by no means indicates that the exams are easy – they will be fair but challenging. In fact, you should try to rely on minimal resources when taking the exams, otherwise you will spend too much time looking for information in the text and not finish the exam.

4. Full APA empirical manuscript (600 points)

You will compose one 8- to 10-page Full APA empirical manuscript that incorporates **two** statistical techniques that we will learn in this class. If necessary, you may use one analysis that you learned in PSYC 424. This will include a title page, abstract, introduction, method, results, discussion, and reference section. I will also ask for your SPSS output to accompany the paper. I understand that some of you will not have data that will permit the analyses that we learn in this class, and so I encourage you to ask your mentor/advisor if they will share their data with you. I am also glad to share data that I have; however, use of my lab's data should be minimal, unless, of course, you are colleague in my lab. Please see the manuscript grading rubric and guidelines on Cougar Courses. This assignment will account for 30% of your final grade

GRADING SYSTEM:

The table to the right details the total points available in this class. I will grade assignments quickly but carefully before returning the feedback to you. You can find your grades posted on the class website (Cougar Courses). Should you have any questions about your grades, I encourage you to share your concerns.

Assignment	Points	Percent
Class Participation	200	10%
10 Lab Homework	300	15%
3 Open Book/Note Exams	900	45%
APA Empirical Manuscript	600	30%
Total	2000	100%

GRADE DISTRIBUTION:

Points	Letter Grade	Points	Letter Grade
940 – 1000	**A**	**730 – 759**	**C**
900 – 939	**A-**	**700 – 729**	**C-**
860 – 899	**B+**	**660 – 699**	**D+**
830 – 859	**B**	**630 – 659**	**D**
800 – 829	**B-**	**600 – 629**	**D-**
760 – 799	**C+**	**0 - 599**	**F**

EXPECTATIONS, POLICIES, AND RESOURCES

CLASS EXPECTATIONS:

Come prepared. Complete all readings prior to lecture and come to class after thinking about the material. Bring your textbook and be prepared to take notes. However, when taking notes, please understand that writing down everything you hear is not a good strategy, and a very low level of learning on Bloom Taxonomy. Check Cougar Courses regularly.

Contribute. Come to class prepared with questions from the readings. All questions will be respected. Please, share your unique perspective with the class! It is an opportunity to demonstrate your competence, help clarify the material for others, and promote an engaging classroom environment.

Be respectful. People relate to psychological theories and concepts in different ways. Please remain open and respectful to alternative perspectives of the course material. Use reason and evidence to challenge ideas presented in this class.

Minimize distractions. You may use laptops/tablets in this class. For each class Dr. Berry will share a Google Doc with the class prior to lecture as a way to crowdsource notes and create an interactive learning environment. Do not surf the web, check your email, Facebook, Instagram, Twitter, IM, Snapchat, etc, during class. While these great activities are only few clicks away, they will not help you or your neighbors accomplish the course objectives. Please be mindful of your classmates when using your computers.

COURSE POLICIES:

Academic integrity. Academic dishonesty is a bad scene; don't go there. All assignments must represent your own work. However, in doing lab assignments you may find it useful to confirm your logic, phrasing, and formatting with classmates and me – just make sure you write your assignments individually. If you have any questions about what constitutes academic dishonesty (e.g., plagiarism), please ask me.

Meeting course requirements. Generally, the only reasons I consider legitimate for missing a class or assignment deadlines are: conference attendance, medical illness (appropriate documentation required), or personal/family emergencies that require you to leave school. Oversleeping, heavy work load, forgetfulness, assignment disappearance (e.g., computer meltdowns), and alien abduction will not be considered legitimate failures to meet course requirements.

WRITING REQUIREMENT:

As stated in the course catalog, all CSU students must demonstrate competency in writing skills as a requirement for graduation. This requirement mandates that every course at the university must have a writing component of a least 2500 words (approximately 10 pages). The writing requirement in this course will be satisfied through your lab assignments, in-class exercises, and the written portion of exams. Check out the Writing Center for help on writing!

THE PSYCHOLOGY ACADEMIC RESOURCE LAB (PARL):

is located in SBSB 1206 and is available for one-on- one tutoring help in statistics. Check their website for the hours that the lab is staffed at PARL WEBSITE. Everyone working in PARL right now performed exceptionally well in this class.

ACCOMMODATIONS FOR STUDENTS:
Students with disabilities who require reasonable accommodations must be approved for services by providing appropriate and recent documentation to the Office of Disabled Student Services (DDS). This office is located in Craven Hall 4300, and can be contacted by phone at (760) 750-4905, or TTY (760) 750-4909. Students authorized by DSS to receive reasonable accommodations should meet with me during my office hours in order to ensure confidentiality. Should you have any questions about services provided through Disabled Student Services, please call 760-750- 4905 or go to http://www.csusm.edu/dss/handbooks/student_book.html

MORE RESOURCES FOR AMUSEMENT, INSPIRATION, AND CONDUCTING RIGOROUS SCIENCE

Research Tools

Research Randomizer This web site is designed to assist researchers and students who want an easy way to perform random sampling or assign participants to experimental conditions. Sponsored by the Social Psychology Network

A Power Primer Jacob Cohen's 1992 *American Psychologist* article contains a useful table for determining the sample size needed for various statistical designs. See Table 2 in the article.

Threats to Internal Validity Tutorial This tutorial is a component of the courseware of the Psychology Centre of Athabasca University. It was authored by David Polson and colleagues at the University of Victoria and Athabasca University. In Part 1 of this tutorial, you are introduced to sources of threat to internal validity and examples. In Part 2, you are asked to classify the threats present in several hypothetical experiments.

Effect Size Calculator Lee Becker of the University of Colorado – Colorado Springs created this site for quick effect size computations.

General

Science The online version of the flagship journal of the American Association for the Advancement of Science. Daily news updates and some of the articles from the current edition of the journal are available.

Edge One of the coolest science sites on the web, with a good dose of psychology and psychology-relevant content.

Greater Good Magazine This online magazine sponsored by the University of California – Berkeley and disseminates positive psychology research to the public. Many positive psychologists are social psychologists by training, and this may be a good place to learn about ways to measure prosocial behavior.

Humor, Pseudoscience, and Academic Dishonesty

Ig Nobel Awards The Ig Nobel Prizes, presented annually by Harvard, honor scientists whose work "cannot or should not be reproduced. Ten prizes are given to people who have done remarkably goofy things—some of them admirable, some perhaps otherwise." For example, the 2001 prize in physics went to a researcher who examined why shower curtains billow inwards. The award for medicine went to work on injuries due to falling coconuts. The psychology prize was won with an "ecological study of glee in small groups of preschool children."

Annals of Improbable Research There is some wild stuff here; these folks issue the Ig Nobel Prizes

Retraction Watch This web site tracks academic articles that have been retracted for various reasons

COURSE SCHEDULE

*indicates that reading will be made available on Cougar Courses

Note: if you are using a statistical technique that has not been covered before the APA empirical manuscript draft deadline, you should schedule a time to meet with me so we can discuss these analyses before it is taught in class.

Section 1: GLM Review, Effect Sizes and Confidence Intervals, and Third Variables

Date	Topic	Required Readings	Assessment
1/20	No Class	Martin Luther King Jr. Day	
1/22	Review Lecture: Introduction to the Course and Review of GLM, Effect Sizes and Confidence Intervals	Recommended If you did not take PSYC 424 read the following: -Judd et al. Text Chapters 1-6 and 8-10 If you did take PSYC 424 the following are recommended readings -*Tabachnick and Fidel Chapter 4 -*Keith Chapter 6 -*Howell Chapters 10 and 11 -*Cohen (1968)	
1/27	Review Lab: Testing GLM assumptions and Sequential Multiple Regression	-Judd et al. Text Chapter 6 -*Field Chapter 8 -*Field Chapter 2 (pp. 79–83 & 54–60)	
1/29	Lecture: Introduction to Moderation in Multiple Regression	-Judd et al. Text Chapter 7	**HW 1 Due**
2/3	Lab: Moderation in Multiple Regression *Baron & Kenny Method*	-*Baron & Kenny (1986, pp. 1173–1176)	
2/5	Lab: Moderation in Multiple Regression *Hayes Method*	-*Field Chapter 10 (pp. 392–407)	
2/10	Lecture: Introduction to Mediation in Multiple Regression	-*Hayes (2013)	**HW 2 Due**
2/12	Lab: Mediation in Multiple Regression *Baron & Kenny Method*	-*Baron & Kenny (1986, pp. 1176–1181)	
2/17	Lab: Mediation in Multiple Regression *Hayes Method*	-*Field Chapter 10 (pp. 408–422)	
2/18	Special Lecture: What Does Mediation Really Tell Us? and **Exam 1 Review**	-*Mackinnon (2008) -*Rucker et al. (2001) -*Spencer et al. (2005) -*Word, Zanna, & Cooper (1974)	**HW 3 Due** **Due: <u>One paragraph description</u> of APA empirical manuscript with proposed analysis**
2/24	**GLM and Third Variables**		**Exam 1**

Section 2: Nonindependent Data with Categorical Predictors (Repeated-Measures and Mixed Model Designs) and Latent Factors

Date	Topic	Required Readings	Assessment
2/26	Berry at conference – No class		
3/2	Lecture: Introduction to Repeated-Measures ANOVA	-Judd et al Text Chapter (pp. 260–283)	
3/4	Lab: One-Way Repeated-Measures ANOVA and Planned Contrasts	-*Field Chapter 14 (pp. 543–568)	
3/9	Lab: Factorial Repeated-Measures ANOVA and Decomposing Interactions	-*Field Chapter 14 (pp. 568–587)	
3/11	Lecture: Introduction to Mixed-Model ANOVA	-Judd et al Text Chapter (pp. 283–291)	**HW 4**
3/16	Lab: Mixed-Model ANOVA and Decomposing Interactions	-*Field Chapter 15 (pp. 591–614)	
3/18	Special Lecture and Lab: Power Analysis in g*Power	-	**HW 5**
3/23	**Exam 2 Review**		**HW 6** **Due: <u>Introduction, Method, and Planned Analysis</u> Sections of APA empirical manuscript**
3/25	**Repeated and Mixed-Model Factorial ANOVA**		**Exam 2**

Section 3: Discrete Outcomes and Nonindependent data with Categorical and Continuous Predictors

Date	Topic	Required Readings	Assessment
3/30	Class Does Not Meet Spring Break		
4/1	Class Does Not Meet Spring Break		
4/6	Lecture: Introduction to Logistic Regression	-Judd et al. Text Chapter 14 -*Tabachnick and Fidel Chapter 14	
4/8	Lab: Checking Assumptions and Direct Logistic Regression	-*Field Chapter 19 (pp. 760–792)	
4/13	Lab: Sequential Logistic Regression with *Hayes Method*	-*Berry et al. (under review)	**HW 7**
4/15	**Lab: Analyze your Data**		
4/20	Lecture: Introduction to and the	-Judd et al. Text Chapter 12 -*Tabachnick and Fidel (2007) -Bickel Chapters 4 and 5	**HW 8**
4/22	Lecture: Structure of Multilevel Regression		
4/27	Lab: Multilevel Regression with Cross-Sectional Data	-*Field Chapter 20 (pp. 814–849)	
4/29	Lab: Growth Models, Short Time Series	-*Field Chapter 20 (pp. 849–860)	**HW 9**
5/4	Lab: **Exam 3 Review** and **Analyze your Data**		**HW 10** **Due @ 11:59 PM: <u>Results and Discussion</u> Sections of APA empirical manuscript**
5/6			**Exam 3**
5/11	Dr. Berry will return Results and Discussion Sections during regular class time 9:30am – 11:20am	Also Dr. Berry has office hours on Tuesdays from 10:30am – 12:30pm	
5/13			**Due: <u>Full APA</u> empirical manuscript**