UNIVERSITY OF SOUTH CAROLINA
DEPARTMENT OF CRIMINOLOGY & CRIMINAL JUSTICE

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Advanced Quantitative Analysis for Criminology & Criminal Justice
CRJU706 – Fall 2022
Thursdays 6:00-8:45p
Gambrell Hall, Room 150

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Professor:	Ashley Mancik, Ph.D. (she/her/hers)
Office:	Currell College, Room 206
Office Hours:	Thurs, 4:00-6:00p (in Gambrell) and by appointment
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Academic Bulletin Description

Please note the course is transitioning from CRJU706 to CRJU812. Given this change, the course aligns with the updated course description for CRJU812 included below.

CRJU706 – A detailed treatment of the general linear model, logistic regression analysis, and statistical models for event count data with applications in criminology and criminal justice. Restricted to criminology and criminal justice majors.

CRJU812 – A detailed treatment of the general linear model and logistic regression analysis with applications in criminology and criminal justice. Restricted to criminology and criminal justice majors.

Detailed Course Description

This course is roughly split into two main parts. The first half of the course will focus primarily on the ordinary least squares (OLS) linear regression model and its assumptions. The latter half of the course will be an introduction to regression models for categorical dependent variables (logistic regression, ordered logistic regression, and multinomial logistic regression). All analyses will be conducted using the statistical software package, Stata. In addition to in-depth coverage of these modeling strategies, including when they're appropriate to use and advantages and limitations of the models, students will gain hands-on experience estimating linear and generalized linear models (i.e., OLS regression, logistic regression, ordinal regression, and multinomial regression) in Stata and correctly interpreting Stata output. Emphasis will be placed on proper model specification and interpretation and presentation of results. This is an "applied" course. As such, discussion of advanced statistical theory, estimation algorithms, and complex formulas will be limited. Baseline familiarity with the linear regression model is assumed.

Prerequisites: CRJU703 (Research Methods) and CRJU705 (Introductory Quantitative Methods) or equivalent courses.

Student Learning Outcomes

Upon successful completion of this course, students will be able to:
1. Know when it is appropriate and to use linear regression and recognize when it has been used inappropriately.
2. Estimate linear and logistic regression models in Stata and correctly interpret the output in both statistical and layman's terms.

3. Understand the assumptions underlying multiple linear regression and why they are important/how violations impact our confidence in the results.
4. Use statistical techniques and/or theory to assess whether any of the assumptions have been violated and know how to correct for violations.
5. Understand the concept of moderation and be able to interpret interaction terms in statistical models.
6. Assess the strengths and weaknesses of published research that uses any of the methods covered in this course.
7. Independently analyze a dataset using one or more of the modeling strategies covered in the course.
8. Successfully convey results from original statistical analyses both in writing (in the form of a publication-quality journal article) and orally (through a conference-style presentation to your peers).

Course Delivery and Format

Attendance and participation are crucial for success in this course. Unless documented in the course schedule below or announced in class or on Blackboard, this class will meet in-person in Gambrell Hall (Room 150) during our regularly scheduled class time (Thurs. 6:00-8:45p). Every effort will be made to not change the method of course delivery, particularly given the importance of hands-on experience in the computer lab. However, in very rare circumstances, such as if 30% or more of the students in class have documented excused absences or if I test positive for COVID-19, we may hold class online for a short period of time.

Generally, courses will follow a similar format and include:
- Time at the beginning of the course to answer questions about material from the previous week
- Discussion of common errors made in the most-recently graded and returned problem sets (when applicable)
- An overview of new material, including running models and interpreting output in Stata together
- In-class labs where you try out the various techniques on your own/with a classmate and then we will go over them together (typically 2 labs per class following a lecture-lab-lecture-lab sequence with a short BREAK in between)
- Discussion of the assigned reading for the week, answering any technical questions from the textbook readings not covered in lecture and discussing the strengths and weaknesses in the journal articles
  - The journal articles are good (sometimes bad!) examples to follow for your own research paper. I anticipate using our discussion of the journal articles to also include things such as how the results are conveyed and ease of interpretation for the reader, the methodological information that needs to be included in the article, sensitivity analyses, amount of justification and detail provided, and more general professional development related to writing and critiquing scholarly articles.
- Concluding remarks and questions

Occasionally, if the data are easily accessible (e.g., the author provides a link to a website with the data and code used), we may try to replicate the author(s)' analysis or portions of their analysis.

Course Materials

Required readings will come from a mixture of journal articles and textbook chapters. PDFs of journal articles or links to retrieve them will be provided on Blackboard. This course has two (2) REQUIRED textbooks and several RECOMMENDED texts for further reading. Additionally, students may choose to purchase their own Stata license for use on their personal computer (purchasing information included below).

Required Texts
Kohler, U., & Kreuter, F. (2012). *Data analysis using Stata, 3rd ed.* College Station, TX: Stata Press.

Long, S. J., & Freese, J. (2014). *Regression models for categorical dependent variables using Stata, 3rd*

ed. College Station, TX: Stata Press.

Recommended Texts*

    Allison, P. D. (1999). *Multiple regression: A primer.* Thousand Oaks, CA: Pine Forge.

    Hardin, J. M., & Hilbe, J. M. (2018). *Generalized linear models and extensions, 4th ed.* College Station, TX: Stata Press.

    Hoffmann, J. P. (2016). *Regression models for categorical, count, and related variables: An applied approach.* Oakland, CA: University of California Press.

*A more detailed list of recommended texts is included on Blackboard for those interested in more technical or in-depth approaches to these methods.

Software and Other Course Materials

Students are not required to purchase Stata and may choose to use Stata on any of the computers in Gambrell or the graduate student lounge in Currell to complete assignments and analyses outside of class. Students who do wish to purchase their own Stata license can choose from several different versions and choose a temporary license (six- or twelve-months) or a perpetual license. Student Stata licenses can be purchased for a discounted rate at https://www.stata.com/order/new/edu/profplus/student-pricing/. Note, you will have to provide proof of student status. The "Getting Started with Stata" document on Blackboard has additional information on purchasing Stata and the different options.

You do not need a calculator for this course, although you may find one with basic mathematical operators (e.g., log and exponent buttons) useful.

Course Requirements and Grading
Below is a list of course requirements and the weight that each component is assigned in your final grade. These requirements are discussed in more detail below. Additional instruction will be provided in course materials throughout the semester and discussed in class.

Class Participation	10%
Problem Sets	40%
Final Paper Presentation	15%
Final Research Paper	35%

Grading Scale
I do not use a curve in calculating final grades nor do I give extra credit. However, I will take into account improvement in your assignments throughout the semester. *Note that a grade below a B in a graduate level course signals serious problems and you should come talk to me so we can get you back on track.*

Letter Grade	Percentage Range
A	90-100
B+	85-89
B	80-84
C+	75-79
C	70-74
D+	65-69
D	60-64
F	0-59

Class Participation (10%)

Class participation is vital to the learning process. Your grade for class participation will be based on four things: 1) class preparation (e.g., completing assigned readings and assignments before class); 2) class attendance (e.g., coming to class regularly); 3) participation in class discussions (e.g., asking and answering questions); and 4) active engagement in the course (e.g., following along with lecture, completing in-class lab exercises). Most weeks have required readings from one or both textbooks as well as a relevant academic journal article. The textbook chapters allow for an introduction to the topic and more technical information related to model estimation and interpretation. The scholarly article provides a substantive application of one or more concepts or techniques emphasized that week. Students should read or skim the full article but should pay particular attention to the Methods and Results sections (especially noting any strengths or weaknesses in these areas).

Problem Sets (40%)

You will complete five (5) problem sets covering course material at various points throughout the semester (8% each). Unless stated otherwise, **you are to submit your problem set BEFORE class on the days indicated in the course schedule below.** The purpose of the problem sets is three-fold: 1) they allow you to gain additional experience working with Stata; 2) they provide an opportunity for you to independently apply the concepts and techniques covered in class; and 3) they allow for me to assess your understanding of the material and identify common areas that need clarification. As such, you are expected to complete your problem sets individually (e.g., not in groups or with the help of a classmate), but you are able to use your textbooks, lecture notes, and any other resources available to you. We will also practice the skills needed for each problem set in class and lab examples. Along with your answers, you are required to submit your corresponding do- and log-files with each problem set. Problem sets will be graded for accuracy both in content and execution in Stata. Problem sets and any associated materials (e.g., datasets) will be provided electronically on Blackboard by noon on Friday the week before they are due (i.e., the day after we finish covering the content of the problem set). A schedule of problem set topics and due dates is included below for easy reference*.

Problem Set #1 (avail 8/26): intro to Stata/review/basic OLS estimation and interpretation (due 9/1)

Problem Set #2 (avail 9/9): regression diagnostics and corrections (due 9/15)

Problem Set #3 (avail 9/23): more advanced linear regression topics (due 9/29)

Problem Set #4 (avail 10/7): GLM and basic logistic estimation and interpretation (due 10/20)

Problem Set #5 (avail 11/11): ordinal, multinomial, & more complex logistic regression topics (due 12/1)

*Due dates and included content subject to change based on how we progress through the material.

Final Research Paper (35%)

Students will conduct original analyses, culminating in a final research paper (35%) and presentation (15%). Together, the final project is worth half (50%) of your grade in this course. The goal of the final research paper is for you to pose a research question(s) relevant to your interests, identify an appropriate dataset to use, and answer the proposed research question(s) using one or more of the analytic strategies covered in the course. More detailed information on some of the requirements are included below. Additional information and guidance will be provided throughout the semester.

Topic Approval

Students have wide discretion in choosing their paper topic, research question(s), dataset, and analytic strategy, but all students must **schedule an individual meeting with me** to discuss their proposed topic (and dataset) and all **topics must be approved by me in advance. Meetings need to take place and topics must be approved by week 5 of the course (September 15).** After approval, any change to your topic will require a written request to change your topic, justification/rationale for the change, revised

topic proposal, and my approval of your new topic.

Identifying a Dataset

You may use one of the datasets used in class examples or the problem sets, or you may opt to find a dataset better suited to your particular research interests. The Inter-university Consortium for Political and Social Research (ICPSR) provides access to an extensive collection of publicly downloadable data. You will need to identify a data set that you want to use for your final paper. See www.icpsr.umich.edu/ for available data. If you are working on a project or have your own previously collected data, you may use that data for your final paper, but the analysis **CANNOT** be an analysis you have previously completed. As with your research topic, **datasets must be approved by me in advance (also by September 15).** Similarly, any change to your proposed dataset will require a written request to change your dataset, justification/rationale for the change, new dataset you propose to use instead, and my approval of the change. If you choose to use your own data, you MUST have your dataset cleaned and coded and ready for preliminary analysis by **week 7 of the course (September 29)**; if the data are not readily accessible or not already cleaned, you should consider an alternate source of data.

**WHILE THE TOPIC AND DATASET APPROVAL AND MEETING ARE NOT PART OF YOUR GRADE, <u>AT LEAST</u> ONE LETTER GRADE WILL BE DEDUCTED FROM YOUR FINAL PAPER.

The Final Paper

Your final paper will consist of a condensed introduction and literature review to situate your research question in the broader literature and demonstrate its importance and contribution, a methods section that describes the methods used and why they were selected/are appropriate for the current research question, a data and variables section, results section including applicable tables and figures and a write-up of your findings, and a short conclusion section, documenting the implications and limitations. While all parts of the paper are necessary, the focus of the paper should be on the methods and results sections. Ideally, this paper should serve as an initial draft of a research paper that can be revised for submission as an article or used as the beginning of a dissertation proposal. The paper should be, at a minimum, 15 pages in length, but will likely need to be longer. Papers should be double-spaced, include a title page, and follow the most recent APA formatting guidelines. In lieu of a final exam, final papers will be **due on December 8 by 6:00p (submitted electronically on Blackboard). Late papers will not be accepted.**

Research Paper Presentation (15%)

Each student will present preliminary findings in a conference-style presentation to the class during the **first two weeks of November (11/3 and 11/10).** Students will sign up for one of these two dates on the first day of class. Conference presentations usually run about 12-15 minutes and should be accompanied by a PowerPoint. Your presentation will be followed by a short Q&A session (3 questions from myself or your peers). Presentation grades will be based on presentation quality, accuracy of content, ability to answer, questions, and contribution to the Q&A section of your peers' presentations.

Course Policies and Disclaimers

Attendance

Attendance is mandatory. Although you do not receive a separate attendance "grade," attendance is factored into your participation grade, and it will also be difficult to do well if you do not attend class. If you are unable to attend class, you must notify me in advance via email and provide justification for your absence. In accordance with university policy, I reserve the right to lower your final course grade by one or more letter grades if you have three or more unexcused absences.

Course Communication
Class announcements will be posted on Blackboard and emailed to your USC email address. If you primarily use another email account, you should make sure that your Blackboard account is linked to that email address. It is your responsibility to ensure that your email account works properly to receive announcements and emails from me via Blackboard.

If you are trying to get in touch with me, email is the best way to contact me. Include the course title (i.e., CRJU706) in the subject line of the email. I generally respond to emails within 24-48 hours, with the exception of holidays and university breaks. If I do not respond within this time frame, please resend your email. All email correspondence should be done in a professional manner. This includes respectful communication, complete sentences, and no texting language. Due to the ongoing and evolving situation with COVID-19, time in my office will be sporadic and you are not likely to reach me on my office phone.

Blackboard
Supplemental readings, announcements, additional resources, homework assignments, class datasets and do-files, and additional course material will be posted to Blackboard. Your grades will also be posted to Blackboard. Check often for updates. https://blackboard.sc.edu/.

Academic Integrity
Cheating, plagiarism, and other forms of academic misconduct will not be tolerated. Any act or attempted act will be reported to USC's Office of Academic Integrity and is considered a VERY serious matter. The University of South Carolina has clearly articulated its policies governing academic integrity and students are encouraged to carefully review the policy on the Honor Code in the Carolina Community. If you have questions about academic integrity issues, contact me or see the University policy handbook. https://www.sc.edu/about/offices_and_divisions/student_conduct_and_academic_integrity/index.php.

Grades
If you wish to dispute a grade, you must submit a request in writing within one week of receiving the grade, explaining the discrepancy and the reason you think your grade should be changed. I will review your request and let you know my decision. All decisions are final.

Inclusion of Diverse Learning Needs
This course is open to all students who meet the academic requirements for participation. Any student who has a documented disability and need for an accommodation in this course should contact the Student Disability Resource Center (SDRC) and the instructor privately to discuss the specific circumstances as soon as possible (within the first week of the semester). In order to receive reasonable accommodations from me, you must be registered with the SDRC (1523 Greene Street, LeConte Room 112A; 803-777-6142; sadrc@mailbox.sc.edu). SDRC staff will coordinate accommodations for students. See the SDRC website for more information: http://www.sa.sc.edu/sds/.

Harassment
It is unacceptable and a violation of university policy to harass, discriminate against, or abuse any person on the basis of race, sex, gender, age, color, religion, national origin, disability, sexual orientation, genetics, or veteran status. Such behavior threatens to destroy the environment of tolerance and mutual respect that must prevail for this university to fulfill its educational mission. Contact the Office of Equal Opportunity Programs if you believe a violation has occurred (1600 Hampton Street, Suite 805, Columbia, SC, 29208; 803-777-3854). See https://www.sc.edu/about/offices_and_divisions/equal_opportunities_programs/documents/complaint_processing_procedure.pdf for more detailed information on filing a complaint and the complaint process.

Faculty Statement on Disclosures of Instances of Sexual Misconduct

If, at any time during this course, I happen to be made aware that a student may have been the victim of sexual misconduct (including sexual harassment, sexual violence, domestic/dating violence, or stalking), I am obligated to inform the University's Title IX Coordinator. The University needs to know information about such incidents in order to offer resources to victims and to ensure a safe campus environment for everyone. The Title IX Coordinator will decide if the incident should be examined further. If such a situation is disclosed to me in class, in an assignment, or in office hours, I promise to protect your privacy – I will not disclose the incident to anyone but the Title IX Coordinator. For more information on interpersonal violence policies, where to get help, and how to report information, please refer to www.sc.edu/sexualassault. USC provides 24-hour crisis assistance and victim advocacy and counseling. Contact USCPD (803-777-4215) and they can put you in touch with Sexual Assault and Violence Intervention and Prevention (SAVIP) trained advocates, who are on call 24/7 and can provide support, information, referrals, and temporary housing. You can also call the SAVIP office directly during regular business hours (803-777-8248).

Diversity and Inclusion
The University of South Carolina is committed to a campus environment that is inclusive, safe, and respectful for all persons, and one that fully embraces the Carolina Creed. I concur with that commitment and expect to maintain a positive learning environment based upon open communication, mutual respect, and nondiscrimination. To that end, all course activities will be conducted in an atmosphere of friendly participation and interaction among colleagues, recognizing and appreciating the unique experiences, background, and point of view each student brings. You are expected at all times to apply the highest academic standards to this course and to treat others with dignity and respect. Any suggestions as to how to further such a positive and open environment in this class will be appreciated and given serious consideration.

Course Evaluations
Participating in the end of course evaluation is your opportunity to provide constructive feedback. I use the information you provide to revise my assignments, and to modify my teaching strategies. My department uses your feedback to evaluate my teaching, as well. I appreciate you taking the time to thoughtfully complete the evaluation form. An email with more information on completing course evaluations will be sent out towards the end of the semester.

Unsolicited Advice
This course is very rigorous and involves a lot of work from beginning to end – not in a sporadic burst at the end. The best strategy for completing this course successfully is to pace yourself carefully and avoid falling behind. The nature of the material is such that one topic typically builds on another. Therefore, if you have trouble with concepts and particular statistics early on, please come see me right away. I will spend as much time as needed to help clarify so you can be successful moving forward. I cannot help, though, if I do not know you are struggling. I will hold office hours each week immediately before class (from 4:00-6:00p in Gambrell) and by appointment. If you are struggling or confused, please ask for help early and often!

Schedule of Topics and Readings*
You are expected to complete all assigned readings before coming to class each day.
L&F = the Long and Freese textbook; K&K = the Kohler and Kreuter textbook; BB = Blackboard

The schedule below is **tentative. Modifications will be made as necessary and announced in class or via an announcement on Blackboard.*

Date	Topic	Readings	Assignments
Aug. 18	Intro to the course and Stata Review of basic stats	L&F (Ch. 2) Getting Started with Stata (BB) Recommended: K&K (Ch. 1-5)	Purchase Textbooks (Optional – Stata)
Aug. 25	OLS I – estimation and interpretation	K&K (Ch. 9)	

Date	Topic	Readings	Assignment Due
Sept. 1	OLS II – regression assumptions and diagnostics	Gordon (1967) (BB)	Problem Set 1
Sept. 8	OLS III – collinearity, outliers, and other potential problems	Land et al. (1990) (BB) Bollen & Jackman (1990) (BB)	
Sept. 15	OLS IV – dummy variables and interaction terms	Allison (1997) (BB) Steffensmeier & Demuth (2006) (BB)	Problem Set 2; Final Paper Topic & Dataset Approved (requires proposal meeting with me)
Sept. 22	OLS V – predicted values and non-linear relationships	Hannon & Knapp (2003) (BB) Recommended: Osborne (2002) (BB)	
Sept. 29	Intro to GLM and MLE	L&F (Ch. 3-4)	Problem Set 3 Dataset Cleaned and Ready for Analysis
Oct. 6	Logistic I – estimation and interpretation	L&F (Ch. 5) Bachman et al. (2002) (BB)	
Oct. 13	**Fall Break – NO CLASS**		
Oct. 20	Logistic II – intro to ordinal and multinomial logistic regression	L&F (Ch. 7-8) Powers & Simpson (2012) (BB) Recommended: Richards et al. (2019) (BB)	Problem Set 4
Oct. 27	Logistic III – more complex topics	L&F (Ch. 6) Addington (2007) Recommended: Powers (2015) (BB)	
Nov. 3	Presentations I	None	PowerPoint Slides (for those presenting today)
Nov. 10	Presentations II	None	PowerPoint Slides (for those presenting today)
Nov. 17	**Conference Travel – NO CLASS**		
Nov. 24	**Thanksgiving Break – NO CLASS**		
Dec. 1	Missing data	Fox & Swatt (2009) (BB) Recommended: Brame & Paternoster (2003) (BB)	Problem Set 5
Dec. 8	NO CLASS		Final Paper