(SYA5407-0001.fa20) Advanced Quantitative Methods

Instructor: Miles Taylor, mtaylor3@fsu.edu
Office Hours: By appointment (email to schedule)
Time: Tue 1-3 PM, Fri. 10-11AM
TA: Ladanya Ramirez Surmeier, LRamirez2@fsu.edu

Course Description

This course introduces a broad class of commonly used models often referred to as generalized linear models (GLM). These models are an extension of the linear regression model you have already learned applied to non-normally distributed outcomes. We will discuss four major models within this class: models for categorical outcomes, ordered outcomes, count outcomes, and event outcomes. Upon successful completion of the course you will be able to: (a) read and evaluate published or presented research that uses GLM’s; (b) use Stata to reproduce existing GLM results from the textbook and create your own results from secondary data; and (c) translate the results into useful summaries through discussion of findings and tables and figures of predicted outcomes. You will be assessed with five assignments, five in-class quizzes, 8-15 surveys, and a take home final exam. Completion of SYA 5406 is required for admission to the course; other graduate-level multiple regression courses may fulfill this prerequisite with instructor’s approval. The course also requires skills that would be covered in a basic college algebra course.

***PLEASE NOTE: I RESERVE THE RIGHT TO ALTER THE SYLLABUS, WE WILL NEED TO BE FLEXIBLE AS THESE MODELS ARE ADVANCED AND WE MAY NOT BE ABLE TO COVER EVERYTHING***

Course Learning Objectives

1. Read and understand published research using GLMs
2. In a given situation, use appropriate criteria to determine if a GLM is appropriate, and if so, which GLM should be used.
3. Use Stata syntax files to generate regression results for each type of GLM covered.
4. Interpret the output from Stata, both in terms of individual coefficients and in terms of overall measures of model fit.
5. Translate Stata’s output into more useful formats (tables, graphs, etc. of probabilities).
6. Demonstrate good research skills through research logs

A Critical View of Statistical Applications in the Social Sciences
Many of us are led to believe that science is objective. However, much of science is subjective and is historically built on a small subset of privileged voices that are legitimized by power structures. I acknowledge that the primary readings for this course, including the textbook and the methods described therein, were created by privileged individuals from elite institutions. Furthermore, the course often focuses on empirical examples in the literature which were also substantially conducted by this elite and non-representative group. Recent edits to the course readings were undertaken by myself and checked by students to reflect diversity in voices and topics. I have also aimed throughout the syllabus to incorporate critical readings and evolving methods/techniques on statistics as tools for social justice, including those that challenge the way we define social statuses, talk about coefficient effects in regression models, highlight the slippery slope of "residual as deficiency" interpretations, and call into question the possibility of causality in social science research. Some of these readings are required and some are a curated set of suggested readings, but I am happy to discuss these topics throughout the semester as time permits. I myself was originally trained to value the "objectivity" that is called into question in some of these texts, but I was also trained to be very critical of numbers, their production, and interpretation. My own approach to statistical applications and interpretations continues to evolve. I must acknowledge that beyond these edits there may be both overt and covert biases in the required material due to the lens with which they were written, even though the material is primarily describing mathematical models and computer software (which we know are not free of bias because they are created by humans). Integrating a diverse set of experiences is important for a comprehensive understanding of social and all sciences. Please contact me or your TA (in person or electronically) or submit anonymous feedback (Links to an external site.) if you have any suggestions to improve the quality of the course materials.

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**Required Texts and Materials**


Recommended Texts and Materials:


Additional readings: Articles, chapters, and handouts to be downloaded from Canvas.
Optional but useful: scientific calculator

Course Requirements

1. Five assignments will be required throughout the semester. The assignments include a computer-based analysis, your interpretation of the results, Stata syntax and Stata output. Each assignment is worth 12 points, and together they account for 60 percent of your course grade. The assignments are due by midnight of the due date and should be submitted electronically through the course Blackboard site. It is your responsibility to confirm that you have successfully submitted the assignment. Late assignments will be penalized 1 point per day they are late (see grading rubric below), unless you have written beforehand with a valid excuse for the delay and a specific plan for when it will be submitted.

2. There will be five short in-class quizzes that assess your knowledge of the material and/or your ability to read published research using GLM’s. The five quizzes are each worth 3 points, and as a group they make up 15 percent of your grade. The grading criteria are described on the next page.

3. For each unit of the course (not each week), you will be responsible for reading two to three published research articles that demonstrate the statistical techniques and specific critiques relevant to the unit. I recommend you take notes that include the following: (a) a complete reference to the article; (b) a 1-2 sentence summary of the research topic and question; (c) the data set used in this paper, mentioning something about the population (e.g., adolescents born between 1958 and 1965); (d) the statistical modeling technique used in the paper that corresponds to the technique we cover in class; (e) the authors’ rationale for using this technique; and (f) an example of an interpretation of the results from the relevant statistical analyses. I may draw from these readings in lecture, in the surveys, in quizzes, and in the final exam.

4. You will complete 8-15 “surveys” throughout the semester (online this semester). The surveys serve a variety of functions and are graded on a credit/no credit basis. The only time you will not receive credit for these surveys is if you are absent, do not complete them, or it is obvious you put no thought into your responses. Sometimes these surveys are to determine if students have the skills needed for us to move on in the course; other surveys are to generate feedback for use in lectures; other surveys may follow a more traditional skills quiz format. To receive credit for online surveys, complete the survey by the next day of class. These are worth 1 to 2 points each and together make up 15 percent of your course grade.

5. The course will have a take-home cumulative final exam. The final exam is due by midnight of Dec. 9. The final is worth 10 points.

<p>| Grading Summary | A | 90 – 100% of total points |</p>
<table>
<thead>
<tr>
<th>Assignment Type</th>
<th>Points</th>
<th>Grade Range</th>
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<tbody>
<tr>
<td>Assignments</td>
<td>60 pts</td>
<td>B 80 – 89%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>15 pts</td>
<td>C 70 – 79%</td>
</tr>
<tr>
<td>Surveys</td>
<td>15 pts</td>
<td>D 60 – 69%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>10 pts</td>
<td>F below</td>
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<tr>
<td>TOTAL</td>
<td>100 pts</td>
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I also assign pluses and minuses according to standard FSU guidelines. For grades A through D, the bottom 3 points in each grade range will receive a “-“ (e.g., 80 to 82 = B-). For a grade of B, C, or D, the top 3 points in each grade range will receive a “+“ (e.g., 77 to 79 = C+).

**Assignments**
- 12 pts – no errors or, at most, very minor mistakes in math or in wording; great job
- 11 pts – no errors but did not fully address what one of the questions was asking; or a single error in terms of interpretation or model/test execution; a good job overall
- 10 pts – two major errors in execution or interpretation, or incomplete answers; shows a good level of effort but inadequate attention to or knowledge of some details
- 9 pts – more than two major errors in execution or interpretation; suggests inadequate effort or serious confusion about the methods featured in the assignment
- 0 pts – if you copy another student’s syntax or report, you will receive no credit

(1 pt deduction for late assignments per day they are late without prior authorization)

**Quizzes**
- 3 pts – no errors or, at most, very minor mistakes in math or in wording
- 2 pts – one or two questions missed; you get the general idea, but not all the details
- 1 pt – half or more of the questions are missed; indicates large deficit in understanding
- 0 pts – the only way to get no credit for a quiz is in the case of an unexcused absence

**Surveys**
Surveys are graded on credit/no-credit basis, with credit given for on-time completion. They cannot be made up in case of absence.

**Final Exam**
There are 10 questions on the final exam. Each question is worth 1 point.

**Computer Assignments**

**Data Sets**
The core of this course entails completion of five computer assignments: the first assignment is intended to get you up to speed using Stata to generate statistical output.
and to use Long and Freese’s updated post-estimation commands for GLM’s. The other assignments cover four major types of GLMs—logit/probit, ordered probit, Poisson/NBR, and event history analysis.

You’ll submit three separate documents for each assignment: a Stata syntax file used to generate the output; the output; and an answer sheet including answers to the assignment’s questions, any relevant tables/figures, and a summary of the data and measures you used in the assignment.

Throughout the class, I encourage you to work with your classmates when grappling with the text, when debugging syntax problems, or when attempting to reproduce the examples from lecture or either of our two textbooks. However, the work you complete on the assignment must be your own work, and each of you is responsible for analyzing a unique set of variables. Ideally the data set will be one with which you are currently working. I also have a large number of data sets handy for your use (ACL, NSFH, GSS, etc.). The main requirement is that you analyze unique variables and that you estimate regression models that have significant results and require interpretation. Failure to analyze a unique topic or estimate models with significant findings will result in having to redo the assignment and/or receiving a lower grade (significant finding means b ≠ 0, p<.05). Note: If you do plan to use your own data set, it needs to be one with which I am familiar in order to make it possible for me to grade your work fairly.

Where to Use/Purchase Stata: The sociology graduate student computer lab and FSU’s Virtual Lab have recent copies of Stata. Sign in to the FSU Virtual Lab here: https://myfsuvlab.its.fsu.edu/vpn/index.html Links to an external site.

Also, see the resources in the Help Module I created here: Stata Virtual Lab Help

***NOTE CANVAS IS HAVING SOME ISSUES WITH EXTERNAL LINKS. MAKE SURE TO CLICK THE TOP/TITLE OF THE LINK AGAIN IF YOU ARE NOT DIRECTED CORRECTLY*****

If you would like to obtain a copy for your personal computer or laptop, you can purchase either a one-year license or a perpetual license for Intercooled Stata v.18 as a graduate student for <$200 at http://www.stata.com/order/new/edu/gradplan.html. Stata/SE is also available. Either version will work for this class. The main limitation of Intercooled Stata is this: “Intercooled Stata allows datasets with up to 2,047 variables. The limit of observations is based on the amount of RAM in your computer. Intercooled Stata allows string variables to contain a maximum of 80 characters.” For further information, consult http://www.stata.com/order/options-e.html#difference.

Problems with Stata: When you run into errors while running Stata, try these sources of help.

1. Consult the in-program Help menu and use the search function to examine the syntax rules for the type of command you are trying to run.
2. Ask a classmate for assistance with your error, many students have some experience using Stata and will be able to provide some assistance.
Guidelines on Submitting Assignments

Over the course of the semester we will be grading five computer assignments x 15-20 students, so I can expect around 100 assignments. In order to do the best possible grading job, I need your assignments to be submitted in a very standardized format. For example, when you submit components of the assignment to the course website, name your files using the convention: **your last name, a dash, the assignment #, a dash, and the document type**. And unless I inform you otherwise, each assignment should consist of the following, and in the order and format listed.

1. Your Stata syntax file used to generate the output. E.g., for the first assignment you would name this `lastname-hw1-syntax.do`, plugging in your last name at the front of the filename
2. Your Stata output file used to answer the questions. E.g., name this `lastname-hw1-output.txt`.
3. Your answer document one, e.g., named `lastname-hw1-answers.doc`. This is a Word document to which you will add brief answers. You can download the blank answer document from Canvas along with the assignment instructions. If a question in the answer document asks for specific numbers from Stata, copy and paste those numbers directly from your Stata output log file to the answer document. It is VERY important that you keep these numbers in a fixed font and that the lines do not wrap (e.g., Courier, 9 or 10pt font). If your homework is difficult to grade due to formatting problems, I will request that you redo it. In the answer document you’ll also describe what you did generally, what data set you used, and how you constructed the measures used in the assignment and dealt with things like missing data.

You should submit all three files to the course Blackboard site by midnight of the due date.

Final Exam – Though not a favorite form of assessment among most of the students I teach, I’ve come to firmly believe in the pedagogical value of a well-written, cumulative final exam.

Canvas Technical Matters: **It is your responsibility to make sure your assignments and papers are properly submitted in Canvas. Remember it is fine to EMAIL them also as a backup if you have any problems.**

Part I.  Aug. 25; 28 Sept. 3, 8

Topics: OLS Regression, Probability Distributions, ML Estimation, and Stata

Reading:  1. [H] Chap. 1-2,  2. Ch. 11 "Quants and Crits" 2019.  in Understanding Critical Race (Links to an external site.).... by: Crawford, Demack, Gillborn, & Warmington.  3. "On Racism (Links to an external site.)." Boyd et al. 2020. Health Affairs.

Optional = [LF] Chap. 1-4, [ZBS] Chap. 2


Quiz 1:  Sept. 3 or Sept. 8

Assnmt 1:  Due Wednesday, Sept.16, by midnight

Part II.  Sept. 15, 18, 22, 25

Topics: Binary Outcomes: Logit & Probit Models, Hyp. Testing, Goodness of Fit

Reading:  1. [H] Chap. 3, optional = [LF] Chap. 5-6, [ZBS] Chapter 8


Quiz 2:  Sept. 22 or 25

Assnmt 2:  Due Wednesday, Sept. 30, by midnight

Part III.  Sept. 29, Oct. 2, 6, 9, 13

Topics: Ordinal Outcomes: Ordered Probit and Ordered Logit

Reading:  1. [H] Chap. 4; optional = [LF] Chap. 7, [ZBS] Chapter 5


Quiz 3:  Oct. 9 or 13
Assnmt 3: Due Wednesday, Oct 22, by midnight

Part IV. Oct. 16, 20, 23, 27

Topics: Count Outcomes: Poisson and Negative Binomial Regression

Reading: 1. [H] Chap. 6, optional = [LF] Chap. 9


Quiz 4: Oct. 23 or 27

Assnmt 4: Due Wednesday, Nov. 4, by midnight

Part V. Oct. 30, Nov. 3, 6, 10, 13, 17 (note no class on Nov. 20)

Topics: Analysis of Durations and Events: Discrete Time & Hazard Models

Reading: 1. [H] Chap. 7


Quiz 5: Nov. 13 or 17

Assnmt 5: Due Tuesday, November 24, by midnight (before Thanksgiving)

Part VI. Nov. 24, 27, Dec. 1

Topics: Overview of Other Models: Multinomial Logit, Sample Selection, Etc.

Reading: [H] Chap. 5 + reread [H] Chap. 2, optional = [LF] Chap. 8

Articles: Quesnel-Vallée and Morgan, 2003 [Links to an external site.]; McFarland et al. 2018 [Links to an external site.]

Final Exam: Due Wednesday, Dec. 9, by midnight

Note: Due dates for assignments (Wednesday by midnight except for near Thanksgiving) are intended to give you the weekend if need be. I encourage you to finish and submit assignments before the deadline, to avoid delays that are beyond your control and to leave time for questions.
In addition to my own policies for classroom comportment described above, you are expected to abide by the following policies that have been developed by the College of Social Sciences at Florida State University:

UNIVERSITY ATTENDANCE POLICY: Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness.

ACADEMIC HONOR POLICY: The Florida State University Academic Honor Policy outlines the University’s expectations for the integrity of students’ academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to "...be honest and truthful and...[to] strive for personal and institutional integrity at Florida State University."• (Florida State University Academic Honor Policy, found at http://fda.fsu.edu/Academics/Academic-Honor-PolicyLinks to an external site.)

AMERICANS WITH DISABILITIES ACT: Download PDF VersionLinks to an external site.

Students with disabilities needing academic accommodation should:
(1) register with and provide documentation to the Office of Accessibility Services; and
(2) request a letter from the Office of Accessibility Services to be sent to the instructor indicating the need for accommodation and what type; and
(3) meet (in person, via phone, email, skype, zoom, etc…) with each instructor to whom a letter of accommodation was sent to review approved accommodations.

This syllabus and other class materials are available in alternative format upon request.

For the latest version of this statement and more information about services available to FSU students with disabilities, contact the: Office of Accessibility Services
https://dsst.fsu.edu/oas/Links to an external site.

FREE TUTORING FROM FSU: On-campus tutoring and writing assistance is available for many courses at Florida State University. For more information, visit the Academic Center for Excellence (ACE) Tutoring Services’ comprehensive list of on-campus tutoring options - see http://ace.fsu.edu/tutoringLinks to an external site, or contact tutor@fsu.edu. High-quality tutoring is available by appointment and on a walk-in basis. These services are offered by tutors trained to encourage the highest level of individual academic success while upholding personal academic integrity.

SYLLABUS CHANGE POLICY "Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice."•

Classroom Courtesy: Classroom courtesy is necessary to ensure that all students have the opportunity to learn without distractions. This means no cell phones, talking during lectures (unless recognized by the professor or discussion leader), reading newspapers, etc. during class. If you must have a cell phone to receive emergency

**Incomplete Grades:** Missing work or uncompleted assignments are insufficient reasons for me to give a grade of Incomplete. Incompletes will not be given except under extenuating circumstances at the instructor's discretion. Note that College of Social Science guidelines require that students seeking an “I” must be passing the course.

Finally, students in the course will be held to the highest standards of academic integrity. Any form of academic dishonesty will result in a "zero" for that particular assignment or possibly an "F" for the course and may be reported to the University Judicial Office. Cheating and plagiarism will not be tolerated.