Instructor

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Course Overview

This seminar will explore different methods typically used across various social science disciplines for modeling and describing longitudinal data. The main objective of this course is to turn students into educated users and consumers of these different methods. Importantly, this often means understanding what the method cannot do, as much as what it can. Topics to be covered include latent growth curves, latent class and group-based trajectory models (GBTM), growth mixture models (GMM), item response models, curve registration, transition models and difference estimators. Additionally, related topics including treating missing data, risk factors and dual trajectory models will be discussed. Time permitting, we will also cover nonparametric regression. Though the theoretical treatment of all topics will be covered, empirical applications of all methods will be stressed, with an emphasis in criminological research.

The framework of the course is intended to be 1/3 statistics/methods course and 2/3 critical review seminar focusing on dissection of relevant empirical applications (both good and bad) in criminological literature. The general format of each topic will be as follows: the first half of a topic will typically focus on learning the methodology, including using various statistical packages (mainly Stata) to implement, and interpretation. The second half will focus on critically reviewing the usage of the methodology in empirical crime applications.

Prerequisites

Proficiency in basic statistics and regression (e.g., the material that covered in CCJS 620 and 621, or something equivalent to a first-year MA sequence) is essential to go forward in this course. If you are not current or proficient, I strongly suggest that you review that material and/or revisit this course at a later point in your doctoral studies. Given the advanced nature of this course, a strong willingness to put in appropriate time and effort to do quality, quantitative empirical research in criminology/criminal justice is also a necessity. This means spending time outside of the lectures and assignments to learn and master the material. If you have questions about this, be sure to speak to me as soon as possible. I will treat this course as a responsibility and opportunity to train future colleagues; thus, I expect you to reciprocate and take this responsibility and opportunity seriously.

#1 Prerequisite

The most important thing needed to do well in this course is a healthy level of skepticism. This will often involve you coming to different conclusion than I do about the validity of some empirical approaches and results we discuss. If you take all the findings as being perfectly valid or agree with me all of the time, chances are you are not thinking through these issues in enough depth!!
Software

I will demonstrate in class and provide examples and support for most applications using Stata. Time permitting we may use R for some applications, too. However, you are welcome to use any statistical software you wish to complete the assignments, although I cannot guarantee I will be able to help you with all other packages.

Though I will not cover it in class (for a variety of reasons), some of you who are interested in estimating some of these models may wish to learn to use MPlus, which allows for estimation of most covered in this course. The website associated with the MPlus software contains a variety of materials that will be helpful to you in learning about and applying these models (www.statmodel.com). This website also includes good examples, webcasts and handouts that you may find helpful. Also, the full MPlus User’s Guide is available on the website as a pdf file and examples associated with that manual are posted there as well.

Textbook

There is no required text for this course. Most weeks, I will assign papers which would be useful for learning the methods, on top of the class notes that I will provide. However, if you are serious about using these methods in your own research, you should consider investing in any of the following reference books:


Finally, there is a webpage for estimating group-based trajectory models in SAS and Stata that will be extremely helpful in providing examples, code and helpful papers:

http://www.andrew.cmu.edu/user/bjones/

You can get to this website by simply googling 'proc traj' and going to the first link.
Course Policies

Class Attendance

All students are expected to attend class regularly and **come prepared to participate**. While you will not directly lose points for missing class, note that too many absences will affect your participation, and hence, your final grade.

Disability Accommodations

Persons with a documented disability requesting reasonable accommodations should contact me *by the second class meeting*. We will then work with Disability Support Services (DSS) to make arrangements with you to determine and implement appropriate academic accommodations.

Religious Observances

Any student who anticipates the necessity of being absent from class due to the observation of a major religious observance must provide notice of the date(s) to me, in writing, *by the second class meeting*. The request should not include travel time.

Late Work and Incomplete Grades

Extensions for assignments of exams will not be given except in cases of a medical or family emergency. Proper accompanying written documentation is required. Any problems that a student encounters must be brought to my attention as soon as possible. Incomplete grades are strongly discouraged and will be given only in situations where (a) a student has completed a majority of the course requirements and (b) shows substantial proof of hardship that necessitates more time to meet those requirements. As noted elsewhere, no late homework will be accepted. In the event of either of the above circumstances, a make-up assignment will be given. **To be clear, I have a strong prejudice against the use of “incompletes” to allow for more time to complete the requirements of graduate courses, and I reserve the right to decide on the appropriate extension case-by-case.**

Academic Dishonesty

Plagiarism will not be tolerated in this course under any circumstances. All instances of academic dishonesty will be reported directly to the Honor Council. If you engage in it, I will take the proper actions to ensure that you receive a failing grade in the course and are disciplined by the University to the fullest extent possible.

Grading Criteria

Your final grade for the course will be determined using the following formula:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Empirical Project</td>
<td>25%</td>
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<tr>
<td>Midterm Exam</td>
<td>25%</td>
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<tr>
<td>Final Term Paper</td>
<td>25%</td>
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<tr>
<td>Participation</td>
<td>25%</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
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Notice that equal weight is given to your class participation as is everything else. This should stress to you that you will be expected to be prepared and participate in each class. Given the advanced nature of the course, this is essential for learning the material. Your final grade will be derived from this percentage (90-100%, A; 80-89.9%, B; 70-79.9%, C; < 70%, F).

Empirical Project

There will be one problem set during the first half of the semester designed to give you practice applying some of the methods. Due to the nature of the methodology, this assignment will be largely unstructured, requiring you to apply your knowledge in a creative way. I will provide you a dataset and some guidance on how to proceed, and you will have to analyze the data as you would if you were preparing analysis for an empirical paper. You may, and in fact are encouraged, to discuss solution strategies in groups. However, each student must turn in individually written answers to the homework assignment (this includes your own set of interpretations of any joint results). The project will be due at the beginning of class on the due date. Late homework will not be accepted and will count as a zero for that assignment.

Midterm Exam

I will make more information, including the format, available to you as the date nears.

Participation

Participation is the key element of this course. Though by nature of the material, some of the meetings will involve a lot of lecturing, questions and discussion are highly encouraged. In weeks where we shift to more of a seminar environment, excessive participation is vital. I want you to be obsessive about the readings, and do all readings prior to coming to class. Not all of the material you will find to be straightforward, so you are encouraged to discuss them with one another if you are having difficulty understanding them. My door is always open, so you are welcome to discuss things with me, too (whenever I am in the office with my door opened, you are free to stop in and talk, “office hours” or not.) I will reserve the right to randomly call on you to lead the class in a discussion of an empirical paper that we discuss, so be prepared to do this.

Also, a good reason not to talk is NOT because you think you’ll say something stupid and embarrass yourself. Believe me—I have been put in my place many times for making incorrect assertions! We’ll try to keep the environment respectful and light so you feel comfortable speaking up. But saying ‘I did the reading but was too intimidated to talk’ is not a proper excuse.

Term Project

In lieu of a final exam, you will be required to submit your own research paper. You are encouraged to choose an empirical strategy that we cover in class, based on a topic and dataset that you are interested in studying. The focus of this assignment will be in selecting a research question which is appropriate and displaying proper mastery of the methodology. You are welcome (and in fact encouraged) to use this assignment as an opportunity to craft a project which is ultimately publishable.

You should begin thinking about your research questions immediately, and at some point mid semester, will be required to hand in a brief abstract to demonstrate sufficient progress. I will provide more detail on this nearer to the due date, although I can tell you that I will provide feedback and this will be ungraded.
Tentative Schedule and Readings

This is an extremely aggressive list of topics which may need to be modified. Thus, I reserve the right to adjust the schedule of topics. Also, notice while the empirical articles deal with crime as much as possible, there are some readings which do not deal explicitly with crime.

Readings marked with a “*” mean that you should at least be familiar with them, although they will likely be less important in the context of the week’s discussion.

Week 1 (26 Jan): Course Introduction; Thinking Longitudinally

Week 2 (2 Feb): Latent Growth Curve Models


Week 3 (9 Feb): Latent Class Models


Week 4 (16 Feb): Group Based Trajectory Models, part 1


Week 5 (23 Feb): Group Based Trajectory Models, part 2


Week 6 (1 Mar): A Critical Overview of Growth Modeling


**Week 7 (8 Mar): Midterm Exam**

**Week 8 (15 Mar): No Class—Spring Break**

**Week 9 (22 Mar): Growth Mixture Models, part 1**


**Week 10 (29 Mar): Growth Mixture Models, part 2**


*At this point in the course, I will take stock of the pace we are making and reevaluate the rest of the semester. Once this is finalized I will assign readings. As of now, here are a tentative list of topics I will plan to cover:

**Week 11 (5 Apr): Item Response Theory**
**Week 12 (12 Apr): Transition Models and Markov Chains**
**Week 13 (19 Apr): Missing Data in Longitudinal Studies**
**Week 14 (26 Apr): Difference Estimators**
**Week 15 (3 May): Nonparametric Regression**
**Week 16 (10 May): Curve Registration**