

Sociology 2211
Analysis of Longitudinal Data

Spring 2019

Meetings: Fridays, 9:45-11:45am

Location: WJH 450

Instructor: Alexandra Killewald

Office hours: Mondays, 2-4pm, or by appointment (WJH 438)

Email: killewald@fas.harvard.edu

Course website: <https://canvas.harvard.edu/courses/49953>

Catalog Description

This course takes an applied approach to the analysis of longitudinal data. Lectures will provide an overview of a variety of techniques, including fixed effects models, multilevel models, and duration models. Students will develop their own empirical projects and receive support as they begin to work with longitudinal datasets.

Course Overview

In this course, students will develop their skills in longitudinal data analysis. This course is not an intensive introduction to a single analytic method. Instead, it provides an overview of common approaches to longitudinal data analysis, with an emphasis on multilevel models and duration (hazard) models.

Good empirical quantitative work requires not only an understanding of statistical methods, but training in managing complex data, testing the robustness of results, and interpreting findings. Together, we will discuss these issues throughout the course.

This course intends to provide an environment in which we can all improve our skills as quantitative social scientists. Active class discussion is crucial to achieving that goal. I encourage you to raise questions in class on statistical methods, research design, and data management. My office hours are also always available to you.

This course is aimed at social science graduate students interested in pursuing quantitative, empirical research. I recommend that students have a working knowledge of regression analysis (at the level of Sociology 2202) and familiarity with one or more statistical software packages (such as Stata, SAS, or R) before enrolling in this course. If you have a question about whether this course is appropriate for you, please come see me.

Sections and Teaching Fellows

Most weeks there will be section meetings, which may cover elaboration of material from lecture, instruction in computing, and worked examples illustrating course material, including from assigned empirical readings. Please help us by providing your section time availability.

Sinn Won Han (sinnwonhan@g.harvard.edu), a doctoral student in Sociology, is the Teaching Fellow for this course. His office hours will be posted on the course website once shopping period closes and enrollment is settled.

Grades and Assignments

All assignments are due at 9:45am Fridays unless otherwise noted. Assignments will be returned to you within one week of the submission deadline. There are no graded problem sets. This does not mean that you have no weekly homework! You should spend time between meetings reviewing the lecture and section notes and assigned readings. Learning statistics takes time and often requires reviewing material multiple times.

The major course requirement is a quantitative, empirical research paper. The length is flexible, but a good guideline is about 8,000 words, exclusive of tables, figures, and references. Your paper may be longer or shorter. You are welcome to work with any dataset you wish. If you would like assistance finding an appropriate dataset, come talk to me or Sinn Won.

Research proposal (due February 15)

In approximately 500 words, describe your research question. Motivate the question with reference to the existing literature and suggest a possible dataset. It is not necessary at this point to specify an analytic approach, although you may do so. Post your proposal to the Discussions tab of the course website.

Comments on other students' proposals (due February 22, 5%, credit/no credit)

Read at least three proposals submitted by other students and provide constructive comments and suggestions in the Discussions tab of the course website.

Data, methods, and sample statistics (due March 29)

The goal of this assignment is to provide a check-in point for both your research design and your data work. Submit a description of your dataset, sample selection criteria, variable specifications, and analytic approach, mimicking the kind of information found in data and methods sections in journal articles. Write down your main hypothesis in words and an equation representing the model you will estimate to test the hypothesis. Also submit one or more illustrative tables or figures of descriptive statistics for your sample and key variables of interest. Downloading data and formatting it as you want for analysis can take a long time, particularly when you are using a dataset for the first time. Start early! Submit your work in the Assignments tab of the course website.

Midterm (April 12, 25%)

Your research paper allows you to become deeply familiar with a particular analytic method. The midterm is intended to encourage you to be familiar with the logic, assumptions, and interpretations of the broader set of methods discussed in this course. The midterm exam will be held in class on April 12. You will be allowed to use your notes.

Paper presentations (in section beginning week of April 15, 10%, credit/no credit)

Social scientists are expected to present their research orally as well as in writing. In section, you will deliver a 12-minute oral presentation describing your in-progress paper (5%). Students are expected to attend each other's presentations and provide feedback (5%).

First draft of paper (due April 19)

Please submit a first draft of your paper to me in the Assignments tab of the course website. Email your draft to your two student reviewers, cc'ing me and Sinn Won.

Comments on fellow students' drafts (due April 26, 5%, credit/no credit)

Each student will be assigned two other students' papers to read and respond to with comments. I expect that you will provide comments on all aspects of the paper, including the appropriateness of the data and methods, the clarity of the exposition, and how convincing you find the argument. For one paper, you will provide standard track-changes comments, including suggesting alternative wording, deletions, restructuring, etc. For the second paper, you will provide comments in the style of a journal review. I suggest that you complete the reading associated with the lecture on April 19 before beginning this assignment. Send your comments to your fellow students by email, cc'ing me and Sinn Won.

Final paper (due May 16, 11:59pm, 50%)

Please submit your final draft to the Assignments tab of the course website.

Class discussion (5%, credit/no credit)

In general, the material from a given lecture will be discussed in two class sessions. In the first session, the lecture is presented. Then, students are expected to read the materials associated with that lecture date. The next course session will begin with questions on the material covered in the previous lecture and discussion of the associated readings. Come to class prepared to ask questions and discuss the readings. All students are expected to participate in discussion throughout the semester.

Logistics and Other Notes

Late assignments. Late assignments are particularly disruptive when they impede another student's ability to complete assignments. If extenuating circumstances prevent you from completing an assignment on time, please let me know as soon as possible.

Collaboration. Discussion and the exchange of ideas are essential to academic work. For assignments in this course, you are encouraged to consult with your classmates on the choice of paper topics and to share sources. You may find it useful to discuss your chosen topic with your peers or course instructional staff (TF or faculty), particularly if you are working on the same topic as a classmate. However, you should ensure that any written work you submit for evaluation is the result of your own research and writing and that it reflects your own approach to the topic. You must also adhere to standard citation practices in this discipline and properly cite any books, articles, websites, lectures, etc. that have helped you with your work. If you received any help with your writing (feedback on drafts, etc. from peers or course instructional staff), you must also acknowledge this assistance.

Academic integrity. Evidence of plagiarism or other forms of academic dishonesty will be dealt with severely. All students are expected to read and comply with GSAS's Academic Integrity policies (<https://gsas.harvard.edu/codes-conduct/academic-integrity>). Please especially note the policies surrounding submission of the same or similar work to more than one course.

Accommodations. Any student needing academic adjustments or accommodations is requested to present his or her letter from the Accessible Education Office (AEO) and speak with the professor by the end of the second week of the term. Failure to do so may result in the Course Head's inability to respond in a timely manner. All discussions will remain confidential, although AEO may be consulted to discuss appropriate implementation.

Materials

The primary material for this course is a series of lecture notes posted to the course website.

I have ordered one required text for this course at The Coop (<https://tinyurl.com/300-W19-SOCI-2211-1>):

Singer, Judith D. and John B. Willett. 2003. *Applied Longitudinal Data Analysis: Modeling Change and Event Occurrence*. New York: Oxford University Press.

There are many textbooks that treat the topics we will cover, with varying emphases and levels of statistical sophistication. I encourage you to peruse the textbooks listed below and choose those that you find most valuable given your particular background and the analytical design you intend to employ in your project. The goal of this list is not to suggest that you should purchase or read each item. It is designed to provide you with a range of materials you may find useful.

Allison, Paul D. 2014. *Event History and Survival Analysis*. Second Edition. Thousand Oaks, CA: Sage Publications.

Box-Steffensmeier, Janet M. and Bradford S. Jones. 2004. *Event History Modeling: A Guide for Social Scientists*. New York: Cambridge University Press.

Cleves, Mario, William W. Gould, and Yulia V. Marchenko. 2016. *An Introduction to Survival Analysis Using Stata*. Revised Third Edition. College Station, TX: Stata Press.

Rabe-Hesketh, Sophia and Anders Skrondal. 2012. *Multilevel and Longitudinal Modeling Using Stata*. Vol. 1, *Continuous Responses*. Third Edition. College Station, TX: Stata Press.

Raudenbush, Stephen W. and Anthony S. Bryk. 2002. *Hierarchical Linear Models: Applications and Data Analysis Methods*. Second Edition. Thousand Oaks, CA: Sage Publications.

Typically, the reading list associated with each lecture includes both textbook material and journal articles. The journal articles are examples of scholarship that has employed the methods we discuss. When writing your own paper, use the content and style of these articles as a guide. Harvard Sociology faculty are overrepresented among the authors so that reading these articles has the bonus of giving you familiarity with the research interests of faculty in this department.

Readings marked with an asterisk are required, and we will discuss them in class the week *after* the lecture on that topic. For example, the reading assignments associated with February 1 are “due” February 8. Depending on your substantive interests, you may find optional readings associated with a particular week helpful or interesting.

Topics and Weekly Resource List

* *denotes required reading*

February 1: Introduction and math refresher

*Singer and Willett, Chapters 1, 2.1

Raudenbush and Bryk, Chapter 1

Bono, Joyce E. and Gerry McNamara. 2011. “Publishing in *AMJ* – Part 2: Research Design.” *Academy of Management Journal* 54(4):657-60.

Colquitt, Jason A. and Gerard George. 2011. “Publishing in *AMJ* – Part 1: Topic Choice.” *Academy of Management Journal* 54(3):432-35.

King, Gary. “Publication, Publication.” 2006. *PS: Political Science and Politics* 39(1): 119-125.

February 8: Random-effects and fixed-effects models

- *Dougherty, Christopher. 2006. "The Marriage Earnings Premium as a Distributed Fixed Effect." *Journal of Human Resources* 41(2): 433-43.
- *Mun, Eunmi and Mary C. Brinton. 2017. "Revisiting the Welfare State Paradox: A Firm-Level Analysis from Japan." *Research in Social Stratification and Mobility* 47:33-43.
- *Sosnaud, Benjamin and Jason Beckfield. 2017. "Trading Equality for Health? Evaluating the Trade-off and Institutional Hypotheses on Health Inequalities in the Global South." *Journal of Health and Social Behavior* 58(3):340-56.
- *Western, Bruce. 2002. "The Impact of Incarceration on Wage Mobility and Inequality." *American Sociological Review* 67(4):526-46.

February 15: Hierarchical linear models, part 1

- *Singer and Willett, Chapters 3.1-3.3, 4.1-4.2
- Raudenbush and Bryk, Chapter 2 (skip "Choosing the Location of X and W (Centering)")
- Jæger, Mads Meier. 2012. "The Extended Family and Children's Educational Success." *American Sociological Review* 77(6):903-22.
- *Kim, Harris Hyun-soo and Paul Y. Chang. 2018. "The Impact of Delinquent Friendship Networks and Neighborhood Context on Suicidal Ideation among South Korean Youths." *Social Forces* 97(1):347-76.
- *Ruiter, Stijn and Nan Dirk De Graaf. 2006. "National Context, Religiosity, and Volunteering: Results from 53 Countries." *American Sociological Review* 71(2):191-210.
 - *Van der Meer, Tom, Manfred Te Grotenhuis, and Ben Pelzer. 2010. "Influential Cases in Multilevel Modeling: A Methodological Comment." *American Sociological Review* 75(1):173-8.
- *Small, Mario Luis and Monica McDermott. 2006. "The Presence of Organizational Resources in Poor Urban Neighborhoods: An Analysis of Average and Contextual Effects." *Social Forces* 84(3):1697-1724.

February 22: Hierarchical linear models, part 2

*Singer and Willett, Chapters 4.9, 7.1-7.2

Raudenbush and Bryk, Chapters 3-5

*Harris, Alexes, Heather Evans, and Katherine Beckett. 2011. "Courtesy Stigma and Monetary Sanctions: Toward a Socio-Cultural Theory of Punishment." *American Sociological Review* 76(2):234-264.

Huffman, Matt L. and Philip N. Cohen. 2004. "Racial Wage Inequality: Job Segregation and Devaluation across U.S. Labor Markets." *American Journal of Sociology* 109(4):902-36.

*Killewald, Alexandra and Javier García-Manglano. 2016. "Tethered Lives: A Couple-Based Perspective on the Consequences of Parenthood for Time Use, Occupation, and Wages." *Social Science Research* 60: 266-82.

March 1: Hierarchical linear models, part 3

*Singer and Willett, Chapters 3.4-3.6, 4.3-4.8, 5.3-5.4, 7.3

Rabe-Hesketh and Skrondal, as needed

Raudenbush and Bryk, Chapters 2 ("Choosing the Location of X and W (Centering)"), 6, and 9

Singer and Willet, Chapters 5.1-5.2, 6

*Downey, Douglas B., Paul T. von Hippel, and Beckett A. Broh. 2004. "Are Schools the Great Equalizer? Cognitive Inequality during the Summer Months and the School Year." *American Sociological Review* 69(5):613-35.

*Sampson, Robert J. and Patrick Sharkey. 2008. "Neighborhood Selection and the Social Reproduction of Concentrated Racial Inequality." *Demography* 45(1):1-29.

March 8: Discrete-time duration models

*Singer and Willett, Chapters 9-11, 12.1-12.5

Allison, Chapters 1-2

Box-Steffensmeier and Jones, Chapter 1, 2, and 5

Chen, Anthony S. 2007. "The Party of Lincoln and the Politics of State Fair Employment Practices Legislation in the North, 1945-1964." *American Journal of Sociology* 112(6):1713-74.

*Dobbin, Frank, Soohan Kim, and Alexandra Kalev. 2011. "You Can't Always Get What You Need: Organizational Determinants of Diversity Programs." *American Sociological Review* 76(3):386-411.

*Schneider, Daniel. 2011. "Wealth and the Marital Divide." *American Journal of Sociology* 117(2):627-67.

March 15: Continuous-time duration models

*Singer and Willett Chapters 13.1, 13.3, 13.4, 14, 15.1-15.3, 15.6

Allison, Chapters 3-4

Box-Steffensmeier and Jones, Chapter 3-4 and 6-7

Cleves et al., as needed

Elwert, Felix and Nicholas A. Christakis. 2006. "Widowhood and Race." *American Sociological Review* 71(1):16-41.

*Schram, Sanford F., Joe Soss, Richard C. Fording, and Linda Houser. 2009. "Deciding to Discipline: Race, Choice, and Punishment at the Frontlines of Welfare Reform." *American Sociological Review* 74(3):398-422.

*Uggen, Christopher. 2000. "Work as a Turning Point in the Life Course of Criminals: A Duration Model of Age, Employment, and Recidivism." *American Sociological Review* 65(4):529-46.

March 22: Spring break

March 29: Duration models: heterogeneity, repeatable events, competing risks, and diagnostics

*Singer and Willett, Chapters 12.6-12.7, 15.4-15.5

Allison, Chapters 5-6

Box-Steffensmeier and Jones, Chapters 8-11

Cleves et al., as needed

*Guo, Guang and Yuying Tong. 2006. "Age at First Sexual Intercourse, Genes, and Social Context: Evidence from Twins and the Dopamine D4 Receptor Gene." *Demography* 43(4):747-69.

*Sayer, Liana C., Paula England, Paul D. Allison, and Nicole Kangas. 2011. "She Left, He Left: How Employment and Satisfaction Affect Women's and Men's Decisions to Leave Marriages." *American Journal of Sociology* 116(6):1982-2018.

April 5: Longitudinal data and causal inference

*Morgan, Stephen L. and Christopher Winship. 2015. *Counterfactuals and Causal Inference*. Second Edition. New York: Cambridge University Press. Chapter 11.3-11.4.

*Legewie, Joscha and Jeffrey Fagan. Forthcoming. "Aggressive Policing and the Educational Performance of Minority Youth." *American Sociological Review*.

April 12: Midterm

April 19: Being your own reviewer

*Blattman, Chris. "How to Read and Review an Empirical Paper." Pages 13-14 of Blattman's dissertation workshop syllabus (<http://chrisblattman.com/files/2009/07/PLSC508-Syllabus-Spring2010.pdf?9d7bd4>).

Geletkanycz, Marta and Bennett J. Tepper. 2012. "Publishing in *AMJ* – Part 6: Discussing the Implications." 2012. *Academy of Management Journal* 55(2):256-60.

Grant, Adam M. and Timothy G. Pollock. 2011. "Publishing in *AMJ* – Part 3: Setting the Hook." *Academy of Management Journal* 54(5):873-79.

Sparrowe, Raymond T. and Kyle J. Mayer. 2011. "Publishing in *AMJ* – Part 4: Grounding Hypotheses." *Academy of Management Journal* 54(6):1098-1102.

Zhang, Yan (Anthea) and Jason D. Shaw. 2012. "Publishing in *AMJ* – Part 5: Crafting the Methods and Results." *Academy of Management Journal* 55(1):8-12.

April 26: Special topics and wrap-up