

Selected Problems of Social Research: Longitudinal Data Analysis

Purdue University, Sociology 681
Syllabus, Fall 2006
T-Th 10:30-11:45; UNIV 201

Course Description

Examines common modes of longitudinal data analysis in sociology including cohort analysis, linear panel analysis, and event history analysis. Attrition and selection bias in panel studies are also considered. Working with already available data, each student will perform exercises and conduct one research project including conceptualization, operational procedures, data analysis, and report writing. Credits 3. Prerequisite: SOC 680 or PSY 600 or consent of instructor.

Instructors

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Laboratory hours (held in Stone 342): Tuesday: 12:15-1:15; Wednesday: 3:00-4:00; other times by appointment.

Required Reading

Allison, Paul D. 1984. *Event History Analysis: Regression for Longitudinal Event Data*. Beverly Hills, CA: Sage.

Elder, Glen, H., Jr., Eliza K. Pavalko and Elizabeth C. Clipp. 1993. *Working With Archival Data: Studying Lives*. Newbury Park, CA: Sage.

Glenn, Norval D. 2005. *Cohort Analysis, 2nd edition*. Beverly Hills, CA: Sage.

Menard, Scott. 2002. *Longitudinal Research, 2nd edition*. Newbury Park, CA: Sage.

Selected items are on reserve in the Undergraduate library. A set of additional required readings is available for photocopy loan during the first week of class.

Optional Reading

The syllabus lists a number of optional readings that are designed to enhance understanding of the material. The optional readings are *not* included in the packet of required readings mentioned above. You may also be interested in purchasing one or more of the Stata manuals. View the table of contents at: www.stata.com (*Stata 9.0*. College Station, Texas: Stata Corporation).

Course Content and Educational Philosophy

The course is divided into 5 sections. Representative readings are included for each section. Students should achieve a working knowledge of the major topics and expertise in at least one of the major procedures covered (see parts 3-5).

My educational philosophy emphasizes *learning by doing* rather than just learning by absorbing lectures. Class time and assignments are structured in the classical “problem solving” pedagogical approach advanced by John Dewey. Thus, laboratory assignments are a critical part of the learning process and constitute the bulk of the course evaluation.

Software

Students may be familiar with a statistical processing package that will perform the most commonly used procedures, but SPSS and SAS do not offer all of the procedures used in the course. STATA will handle all the exercises and is available at SRI. All laboratory exercises will be conducted in Stata. No prior knowledge of Stata is necessary; after completing this course, each student will be familiar with many Stata procedures. You may purchase Intercooled Stata 9.0 for \$145 through Purdue University’s “grad plan” agreement with Stata. Call 1-800-STATAPC, identify yourself as a Purdue students, and order with your credit card. It will be delivered via the Krannert School of Management (Lisa Ratliff, 4-4528).

Data

All laboratory exercises will be completed with data provided to students. The research paper may be completed on any longitudinal data set suitable for a scientific contribution. Perhaps you have a data set you are currently working with, from which assignments and your research paper may be developed. Thousands of data sets are also available to you from the Inter-university Consortium for Political and Social Research (ICPSR). If you are not familiar with ICPSR, go to: www.icpsr.umich.edu.

You will need to use more than one data set to complete the laboratory assignments—at least two, perhaps three. Data sets that are or will be available include the following.

Panel Studies	<i>Americans’ Changing Lives</i> <i>National Health and Nutrition Examination Survey I: Epidemiologic Follow-up Study</i>
Cohort Analysis	<i>General Social Survey</i>

For the research paper, the *optimal* strategy for the course is for you to find your own data and work with it so that you can develop a publishable work.

Course Requirements

- All course documents prepared with a proportional font should be printed in a font size less than 11 (10 is acceptable for non-proportional fonts). Research papers should be double spaced.
- Papers are due by 4:00pm on the assigned date. Five-percent point deductions transpire each weekday that a paper is late.
- For each laboratory assignment, number each step of the assignment. ***Attach and annotate the relevant Stata output*** for each step to highlight your method.

1. **Reading assignments, attendance, and class participation:** A reading list specifies the readings to be completed for the week or each day’s class (30 points possible).

2. **Laboratory assignments:** There are seven laboratory assignments (LA). The possible points range from 5 to 30. Although working on the STATA component of the assignments in pairs or small groups is wholly acceptable, the actual written assignment should reflect independent thought and interpretation.

3. **Research paper.** Students will write one research paper. The paper will be developed in consultation with classmates and the instructor. Papers previously or simultaneously submitted to other classes are not acceptable; this is to be an *original* work. Papers co-authored with class participants are not permitted. Co-authorship with faculty members is also not acceptable, but you are free to add a faculty member as an author after drafting the paper for the course. You are responsible to know what plagiarism is; acts of plagiarism will result in a course grade of F.

Research Paper Assignments (RPA)

There are three research paper assignments that are scheduled throughout the semester. Although the complete paper is due during finals week, the following RPAs should assist students in developing their papers.

1. Description of data (30 points)
2. Weighting and missing data (30 points)
3. Preliminary analyses and presentation (30 points)

The paper is to be an empirical report, just like a refereed journal article. (Empirical reports are the building blocks of science.) The highest goal for any student is to write a paper from the course that will result in publication in a prestigious refereed journal in one’s field of expertise. Craft the paper to resemble an article for the journal to which it would be an appropriate submission. Append copies of the pertinent Stata output for the reported analyses. You are *required* to append the frequency distribution of key variables and final models.

If you have ANY intention of *ever* publishing from the data with which you work, you must complete a form for Use of Human Subjects as soon as possible. Failure to complete the appropriate form and garner approval may result in your being unable to publish from the data. *For students outside of sociology, please check to see if your department has its own Human Subjects Committee from which you must seek prior approval.*

190 points are possible for the research paper (including the RPAs). Papers will be presented to the class near the end of the semester. Two formats are acceptable: paper or didactic poster presentation. Complete papers are due 12/12/06.

Evaluation Method

<u>Requirement</u>	<u>Points Possible</u>	<u>Due Date</u>
1. Reading assignments & class participation	30	class meetings
2. Laboratory assignments (LAs)	150	variable
3. Research paper		
RPAs	90	variable
Final paper	<u>100</u>	12/12/06
Total	<u>370</u>	

Minimum points needed for letter grades are based on the following percentages: A, 90+; B, 80-89; C, 70-79; D, 60-69; F, 0-59.

Part 1. Why Longitudinal Data?

August 22, Introduction

Chapters 1-3, Menard, Scott. 2002. *Longitudinal Research*. Newbury Park, CA: Sage.
Ferraro, Kenneth F. and Jessica A. Kelley-Moore. 2003. "A Half-Century of Longitudinal Methods in Social Gerontology: Evidence of Change in the Journal." *Journal of Gerontology: Social Sciences* 58B:S264-S270.

August 24, Modes of Analysis for Archival Data

Chapters 1-2, Elder, Glen, H., Jr., Eliza K. Pavalko and Elizabeth C. Clipp. 1993. *Working With Archival Data: Studying Lives*. Newbury Park, CA: Sage.

August 25, Laboratory exercises—meet in Stone 342. Time to be announced.

Introduction to Stata 9.0; descriptive statistics.

August 28, Laboratory Assignment 1 due, Protecting Human Subjects (5 points)

Review www.irb.purdue.edu and submit one paragraph summarizing how recent changes affect your research (including the research you plan for this course).

August 29, Recasting Archival Data

Chapters 3-5, Elder, Glen, H., Jr., Eliza K. Pavalko and Elizabeth C. Clipp. 1993. *Working With Archival Data: Studying Lives*. Newbury Park, CA: Sage.

Optional: Ferraro, Kenneth F. 1990. "Cohort Analysis of Retirement Preparation, 1974-1981." *Journal of Gerontology: Social Sciences* 45:S21-31.

August 31, Time Lags and Power

Ferraro, Kenneth F. and Janet Wilmoth. 2000. "Measuring Morbidity: Disease Counts, Binary Variables, and Statistical Power." *Journal of Gerontology: Social Sciences* 55B:S173-S189.

Optional: Review a book on statistical power. Any version of Jacob Cohen's *Statistical Power Analysis for the Behavioral Sciences*. Hillsdale, NJ: L. Erlbaum Associates.

September 5, Laboratory exercises—Statistical power; accessing data—meet in Stone 342

Kelley-Moore, Jessica. 2001. "ICPSR/NACDA Help Sheet." Purdue University.

Part 2. Data Preparation

September 7, To Weight or Not to Weight?

Winship, Christopher and Larry Radbill. 1994. "Sampling Weights and Regression Analysis." *Sociological Methods and Research* 23:230-257.

Optional: Ingram, Deborah D. and Diane M. Makuc. 1994. "Statistical Issues in Analyzing the NHANES I Epidemiologic Followup Study." *Vital and Health Statistics, Series 2*, No. 121 (94-1395). Hyattsville, MD: National Center for Health Statistics.

September 8, Laboratory Assignment 2 due, descriptive statistics and power (10 points)

September 12, Missing Data

Little, Roderick J., and Nathaniel Schenker. 1995. "Missing Data." Pp. 39-75 in *Handbook of Statistical Modeling for the Social and Behavioral Sciences*, edited by Gerhard Arminger, Clifford C. Clogg, and Michael E. Sobel. New York: Plenum Press.

Optional: Rubin, Donald A. 1987. *Multiple Imputation for Nonresponse in Surveys*. New York: Wiley.

September 14, Laboratory work, Weighting and Missing Data—meet in Stone 342

Optional readings: On the importance of care with missing data: *American Sociological Review* (a) 1978, vol. 43, 880-888; comment: 1980, vol. 45, 137-146 and (b) 1985, vol. 50:224-241; comment: 1986, vol. 51:734-737 (1986).

September 18, Laboratory Assignment 3 due, weighting and missing data (30 points)

Part 3. Linear Panel Analysis

September 19, Linear Panel Analysis—quantitative variables

Chapters 4-5, Menard, Scott. 2002. *Longitudinal Research*. Newbury Park, CA: Sage.

Optional classics: Cronbach, Lee J. and Lita Furby. 1970. "How Should We Measure Change -- Or Should We?" *Psychological Bulletin* 74:68-80.

Bohrnstedt, George W. 1969. "Observations on the Measurement of Change." Pp. 113-133 in *Sociological Methodology 1969*, edited by Edgar Borgatta. San Francisco: Jossey-Bass.

September 21, Analysis of Survivors (quantitative variables)

Allison, Paul D. 1990. "Change Scores as Dependent Variables in Regression Analysis." Pp. 93-114 in *Sociological Methodology, 1990*, edited by Clifford C. Clogg. Washington, DC: American Sociological Association.

Supplementary source: Kessler, Ronald C. and David F. Greenberg. 1981. *Linear Panel Analysis: Models of Quantitative Change*. New York: Academic Press.

September 25, Center on Aging and the Life Course Symposium (optional attendance)

Tenth Anniversary Symposium: The Legacy of Longevity, STEW 214. Speakers include: Dr. Thomas Perls, Director of the New England Centenarian Study; Dr. Sidney Stahl, National Institute of Aging/National Institutes of Health; Dr. Toni Antonucci, University of Michigan; and Dr. Janet Wilmoth, Syracuse University.

September 26, Laboratory: Change Scores; Proposed Data for Research Paper—Stone 342

September 28, Accounting for Selection Bias

Berk, Richard. 1983. "An Introduction to Sample Selection Bias in Sociological Data." *American Sociological Review* 48:386-398.

Optional: Heckman, James J. 1979. "Sample Selection Bias as a Specification Error." *Econometrica* 47:153-161.

Berk, Richard A. and Subhash C. Ray. 1982. "Selection Biases in Sociological Data." *Social Science Research* 11:352-398.

October 2, Laboratory Assignment 4 due, change scores (25 points)

October 3, Correcting for Selection Bias—meet in Stone 342

Stolzenberg, Ross M. and Daniel A. Relles. 1997. "Tools for Intuition about Sample Selection Bias and Its Correction." *American Sociological Review* 62:494-507.

Optional: Winship, Christopher and Robert D. Mare. 1992. "Models for Sample Selection Bias." *Annual Review of Sociology* 18:327-350.

October 5, Models for Non-Normal Variables: Censored and Poisson Regression

Note: This class session is intended as an *overview* of a wide range of models that are gaining application in the social sciences. The aim for this class is to gain a *basic* understanding of these models. Students who work with censored or count variables will want to pursue these models in more detail.

On reserve: Long, J. Scott. 1997. *Regression Models for Categorical and Limited Dependent Variables*. Thousand Oaks, CA: Sage. Read chapters 7-8.

Optional: Land, Kenneth C., Patricia L. McCall, and Daniel S. Nagin. 1996. "A Comparison of Poisson, Negative Binomial, and Semiparametric Mixed Poisson Regression Models." *Sociological Methods and Research* 24:387-442.

October 6 Laboratory Assignment 5 due , selection bias modeling (30 points)

October 10, No class, October Break

October 12, Research Project Assignment 1 due , Description of data and research project (30 points) Panel data selected and ready to *begin* analysis (data should be available in a form for you to read with your selected statistical package). Class time for discussing projects.

4. Event History Analysis

October 17, Why Event History Analysis?

Chapters 1-3 of Allison, Paul D. 1984. *Event History Analysis: Regression for Longitudinal Event Data*. Beverly Hills, CA: Sage.

An optional classic: Cox, David R. 1972. "Regression Models and Life Tables." *Journal of the Royal Statistical Society, Series B*, 34, 187-202.

October 19, Creating Duration State and Censoring Variables

Supplementary sources:

Allison, Paul D. 1982. "Discrete-Time Methods for the Analysis of Event Histories." Pp. 61-98 in *Sociological Methodology 1982*, ed. by Samuel Leinhardt. San Francisco: Jossey-Bass.

Cleves, Mario A., William W. Gould, and Roberto G. Gutierrez. 2004. *An Introduction to Survival Analysis Using Stata*, Revised Edition. College Station, TX: Stata Corporation.

October 24, Estimating Event History Models

Chapters 4-8 of Allison, Paul D. 1984. *Event History Analysis: Regression for Longitudinal Event Data*. Beverly Hills, CA: Sage.

Fisher, Lloyd D. and D. Y. Lin. 1999. "Time-Dependent Covariates in the Cox Proportional-Hazards Regression Model." *Annual Review of Public Health* 20:145-157.

October 26, Event History Modeling Laboratory—meet in Stone 342

October 30, Laboratory Assignment 6 due , Event History Analysis (20 points)

Part 5. Cohort Analysis

October 31, Introduction to Cohort Analysis

Pages 1-45 of Glenn, Norval D. 2005. *Cohort Analysis*. Beverly Hills, CA: Sage.

Optional: A classic and the beginning of a controversy. Ryder, Norman B. 1965. "The Cohort as a Concept in the Study of Social Change." *American Sociological Review* 30:843-861.

Optional: Mason, Karen Oppenheim, H. H. Winsborough, William M. Mason, and W. Kenneth Poole. 1973. "Some Methodological Issues in Cohort Analysis of Archival Data." *American Sociological Review* 38:242-258.

November 2, Data Preparation for Cohort Analysis and Palmore Method

Pages 46-72 of Glenn, Norval D. 2005. *Cohort Analysis*. Beverly Hills, CA: Sage.

Palmore, Erdman. 1978. "When Can Age, Period, and Cohort Be Separated?" *Social Forces* 57(1):282-295.

November 6 Research Project Assignment 2 due , Weighting and Missing Data (30 points)

November 7, Cohort Analytic Techniques—meet in Stone 342

Details on how to estimate the equations for cohort analysis.

November 9, Beyond Cohort Analysis

Rodgers, Willard L. 1982. "Estimable Functions of Age, Period, and Cohort Effects." *American Sociological Review* 47:774-787. (Commentary included with article, 787-796.)

Optional: Ferraro, Kenneth F. 1990. "Group Benefit Orientation Toward Older Adults at Work? A Comparison of Cohort Analytic Methods." *Journal of Gerontology: Social Sciences* 45:S220-227.

November 14, Open Laboratory—meet in Stone 342

November 16, Laboratory Assignment 7 due , Cohort Analysis (30 points)

November 21, Research Project Assignment 3 due , Preliminary Analysis (30 points)

November 23, Thanksgiving Break

November 28, Student Presentations

November 30, Student Presentations and Teaching Evaluations

December 5, Student Presentations

December 7, Student Presentations

December 12, Final research Paper due by 4:00pm

Summary of Important Dates

	<u>Laboratory</u>	<u>Laboratory Assignment (points)</u>	<u>Research Project Assignment</u>
8/25	Stata Intro		
8/28		LA1 (Human Subjects, 5)	
9/5	Power, Access Data		
9/8		LA2 (Power, 10)	
9/14	Weights/Missing Data		
9/18		LA3 (Weighting & Missing Data, 30)	
9/26	Change Scores		Data Set?
10/2		LA4 (Change, 25)	
10/3	Selection Bias		
10/6		LA5 (Selection Bias, 30)	
10/12			RPA1 (30)
10/26	Event History		
10/30		LA6 (Event History, 20)	
11/6			RPA2 (30)
11/7	Cohort		
11/14	Open Lab		
11/16		LA7 (Cohort, 30)	
11/21			RPA3 (30)
12/12			Complete paper (100)