Sociology 620: Aging and Cohort Analysis in Social and Epidemiologic Research: Models, Methods, and Innovations

Syllabus

Spring 2014: TTH 2 – 3:15pm HM151

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Course Description. This seminar surveys the major methodological tools and empirical studies of aging and cohort analysis that are of enduring importance to the understanding of social change, epidemiologic trends, and related population and life course processes and dynamics. It aims to provide useful guidelines on how to conduct such analysis. It first introduces the theoretical background and principles of the aging and cohort analysis paradigm. This is followed by an introduction of key models and methods within the frameworks of three common research designs in empirical research. Discussion within each design emphasizes the substantive problems that result from the lack of adequate analytic strategies and the developments of new models and methods that address these problems. The objectives are for students to obtain an understanding of key concepts, theories, methods, and research findings so that they can begin contributing to current research in a broad range of areas in which time and change are of concerns such as cancer, chronic diseases, mortality, fertility, migration, marriage and family, quality of life, and longevity.

Course Materials.
1. Text book:
2. Selected journal articles and book chapters. The PDFs of most readings are available at the course website. Others are accessible through the university library. Sample codes using Stata and SAS for data analysis will be provided. Students should be proficient in Excel and are free to use other statistical software packages such as R. More readings and sample codes using standard statistical software packages are available for public access at http://www.unc.edu/~yangy819/apc/index.html.
Course Requirements and Grading. Students are required to attend all class meetings. Students will be assigned the task of summarizing the readings each week and leading a discussion/study thereof. It is imperative that assigned chapters be read before class for class discussion to be productive. Graduate students will be required to replicate analyses introduced in each lecture and carry out new analyses and present findings following the lecture each week. Given the substantial quantitative background necessary to understand certain course materials, undergraduate students will have a reduced reading load. They will only be required to do readings marked by “***” below and two selected assignments which can be completed in Excel. Grades will be based on class participation and assignments during the semester (60%), the final research paper (35%), and the final exam (5%).

Schedule

Week 1: Jan. 9: Syllabus; introduction of class participants and identification of areas of interest and research questions
  o  *Book: Chapter 1

Week 2
  I.  An Overview of Early Literature: Concepts, measures, and methods
  • Jan. 14.1: Why Age-period-cohort (APC) Analysis?
    o  *Book: Chapter 2
  • Jan. 14.2: Distinguishing Age, Period, and Cohort
    o  Distribution of Assignment 1

  • Jan. 16.1: Descriptive APC Analysis
    o  *Book: Chapter 3.1 & 4.1
  • Jan. 16.2: What is the Model Identification Problem?
    o  Book: Chapter 4.2

Week 3:
- **Jan. 21**: *Class discussion of Assignment 1*
  - Find examples that confound age and period effects or period and cohort effects
  - Descriptive analysis of rates of 1) lung cancer mortality and 2) colorectal cancer mortality in the U.S. from SEER and NCHS.
  - Distribution of Assignment 2
- **Jan. 23.1**: *Linear constrained coefficients approach: CGLIM*
  - Book: Chapter 4.3
- **Jan. 23.2**: *Proxy variables approach*
- **Nonlinear constraints approach** (optional)

II. New Developments: Generalized Linear Mixed Models (GLMM) Framework and Substantive Research

Research Design I: Age-by-Time Period Tables of Rates and the Intrinsic Estimator (IE)

Week 4:
- **Jan. 28**: *Class discussion of Assignment 2*
  - Model fitting comparison;
  - Estimation of the APC accounting models using the constrained coefficients (CGLM) approach
  - Distribution of Assignment 3
- **Jan. 30**: Definitions and Properties
  - Book: Chapter 5.1, 5.2

Week 5:
- **Feb. 4**: Empirical applications:

- Cancer incidence and mortality trends: Chapter 6.1

- **Feb. 6:** Class discussion of Assignment 3
  - A three-step analytic procedure: descriptive graphics – model fitting – the IE for APC models of cancer mortality data
  - Comparison of results from earlier methods
  - Distribution of Assignment 4

**Week 6:**

- **Feb. 11:** APC model based demographic projection and forecasting
  - Book: Chapter 6.2

**Research Design II: Repeated Cross-sectional Surveys**

**The Basics of Hierarchical Age-Period-Cohort (HAPC) Models**

- **Feb. 13:** CCREM Model Specification and Interpretation of Model Estimates
  - Background: Hierarchical Linear Models (HLM):
  - Book: Chapter 7.1, 7.2

**Week 7:**

- **Feb. 18:** CCREM (cont.)
  - Book: Chapter 3.3, 7.3 – 7.6
  - Introducing prototypical datasets: GSS, NHIS, and NHANES

- **Feb. 20:** Class discussion of Assignment 4:
  - The HAPC analysis of the NHIS Self-rated health data
  - Distribution of Assignment 5

**Week 8:**

The Advanced Hierarchical Age-Period-Cohort (HAPC) Analyses
• **Feb. 25:** CCREM with level-two covariates across research designs  
  o Book: Chapter 8.1  
  o Cancer incidence and mortality revisited: Book Chapter 8.2

• **Feb. 27:** HAPC Analysis of Aggregate Rates Data  
  o Class discussion of Assignment 5:  
    - HAPC analysis of SEER-NCHS data on lung cancer and breast cancer  
    - Model validation: Comparison with results from Assignment 3  
    - Period and cohort mechanisms  
  o Distribution of Assignment 6

**Week 9:**

**March 4:** Extensions to the HAPC Models  
  o Book: Chapter 8.3, 8.4  
  o Small sample sizes  
  o Between-group and within-group inequality  

**Research Design III: Accelerated Longitudinal Panels**

**Growth Curve Models of Aging and Cohort Effects**  
  • **March 6:** Basic Model Specification: Intercohort Variations in Age Trajectories  
    o Book: Chapter 3.4, 9.1  

**Week 10:** Spring Break

**Week 11:**  
  • **March 18:** Intracohort Heterogeneity in Age Trajectories  
    o Book: Chapter 9.2  
    o Cumulative Advantage/Disadvantage Theory  

• **March 20:** Class discussion of Assignment 6
  o Growth curve analysis of the Americans’ Changing Lives study: Aging and Cohort Effects on Health
  o Distribution of Assignment 7

**Week 12:**

• **March 25:** Intercohort Variations in Intracohort Heterogeneity Patterns
  o Book: Chapter 9.3

• **March 27:** Class discussion of Assignment 7
  o Growth curve analysis of the Americans’ Changing Lives study: Cohort Differences in Social Disparities in Aging

**III. The Future of APC Analysis**

**Week 13**

• **April 1:** Directions for future research
  o Book: Chapter 10
  o Brain-storming new ideas

• **April 3:** No class (Travel to the Southern Sociological Association Annual Meetings)

**Week 14**

• **April 8:** Presentation of final paper: Group 1

• **April 10:** Presentation of final paper: Group 2

**Week 15**
• **April 15:** Presentation of final paper: Group 3

• **April 17:** Individual meetings on final papers

**Week 16: April 22 – 25 Reading period**

April 25: Final paper due

April 27: Final in-class exam