Fall 2008

SOCIOLOGY 2240
Event History Analysis
Monday 9:00-11:50
Maxcy Hall 108

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Course Objective

This course is a graduate-level introduction to statistical methods for analyzing event history data. It will cover the most commonly used event history methods in the social sciences with special emphasis on model selection and interpretation. Students will learn how to organize and construct event history files, how to use the event history procedures in the statistical programs SAS and STATA, and how to interpret and present results. Methods covered by the course include, Kaplan-Meier product-limit estimates, life-table analysis, Cox's proportional hazards regression model, exponential and Weibull hazards models, the accelerated failure time model, and discrete-time logit models.

Prerequisites: Sociology 2020 Multivariate Statistical Methods II or an equivalent course in multivariate analysis.

Course Structure

The course will meet once a week for 3 hours. There will be 4-5 assignments during the first two thirds of the semester. Students will also be responsible for presenting to the class an example of the use of event history analysis taken from the sociological or demographic literature. During the last third of the semester students will work on individual analysis papers using data sets of their own or data provided by the instructor. The material is cumulative so it is essential that students do the required reading and exercises before each class. This course will be computer intensive, the exercises require the use of SAS and STATA.

Student Evaluation

(1) Problem sets (60%).
(2) Analysis paper (40%).
(3) Class presentation.

Texts

Paul D. Allison. 1995. *Survival Analysis Using the SAS System: A Practical Guide*. Cary, NC: SAS Institute Inc.

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

Hans-Peter Blossfeld, Alfred Hamerle, and Karl Ulrich Mayer. 1987. *Event History Analysis: Statistical Theory and Application in the Social Sciences*. Hillsday, NJ: Lawrence Erlbaum Associates, Publishers.

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

Elisa T. Lee. 1992. *Statistical Methods for Survival Data Analysis* (Second Edition). New York, NY: John Wiley & Sons, Inc.

Kazuo Yamaguchi. 1991. *Event History Analysis*. Newbury Park, CA: Sage Publications.

This course draws heavily from the Lee text which provides a thorough treatment of the topic with minimal use of calculus. Examples are drawn from the biomedical sciences. The Blossfeld et al. and Box-Steffensmeier and Jones texts cover much of the material found in Lee but with a greater emphasis on applications in the social sciences. The Allison and Cleves et al. texts provide excellent overviews of the most commonly used models and step by step examples of how to estimate and interpret hazard regression models in SAS and STATA.

Another accessible treatment of hazard models is given by:

David W. Hosmer, Jr. and Stanley Lemeshow. 1999. *Applied Survival Analysis: Regression Modeling of Time to Event Data*. New York, NY: John Wiley & Sons, Inc.

Examples of sociological and demographic applications of event history methods can be found in:

Karl Ulrich Mayer and Nancy Brandon Tuma (editors). 1990. *Event History Analysis in Life Course Research*. Madison, WI: The University of Wisconsin Press.

James Trussell, Richard Hankinson, and Judith Tilton (editors). 1992. *Demographic Applications of Event History Analysis*. New York, NY: Oxford University Press.

Course Outline

Week	Date	
1	Sept 8	Basic concepts and applications (Lee Chapter 1; Blossfeld et al. Chapter 2; Box-Steffensmeier and Jones Chapter 1) Functions of survival time: the survivorship function, probability density function, and the hazard function (Lee Chapter 2; Blossfeld et al. Chapter 3, pp. 26-34; Box-Steffensmeier and Jones Chapter 2; Allison Chapter 2)
2	Sept 15	Kaplan-Meier product-limit estimates of survival functions (Lee Chapter 3, pp. 19-29; Chapter 4, pp. 66-78; Allison Chapter 3, pp. 29-41)
3	Sept 22	Life-table analysis (Lee Chapter 4, pp. 78-92) Nonparametric methods for comparing survival distributions (Lee Chapter 5; Allison Chapter 3, pp. 41-60)
4	Sept 29	Exponential hazards regression model (Lee Chapter 6, pp. 131-135; Blossfeld et al. Chapter 3, pp. 50-52; Box-Steffensmeier and Jones Chapter 3, pp. 21-25) Exponential accelerated failure time model (Allison Chapter 4, pp. 61-68)
5	Oct 6	Weibull hazards regression model (Lee Chapter 6, pp. 135-139; Blossfeld et al. Chapter 3, pp. 52-53; Box-Steffensmeier and Jones Chapter 3, pp. 25-31) Graphical methods for survival distribution fitting (Lee Chapter 7, pp. 157-166; Blossfeld et al. Chapter 6, pp. 176-185)

	Oct 13	Columbus Day Holiday – no class.
6	Oct 20	Weibull accelerated failure time model (Hosmer and Lemeshow, Chapter 8, pp. 289-290; Allison Chapter 4, pp. 68-70)
7	Oct 27	Introducing time-varying covariates into hazards regression models Constructing period files: Example 1 Piecewise constant exponential hazards regression model
8	Nov 3	Maximum likelihood estimation Constructing period files: Example 2
9	Nov 10	Cox's proportional hazards regression model Method of partial likelihood (Lee Chapter 10, pp 243-263; Box-Steffensmeier and Jones Chapter 4; Allison Chapter 5; Yamaguchi Chapters 5-6)Spring Recess
10	Nov 17	Discrete-time logistic regression models (Yamaguchi Chapter 2; Box-Steffensmeier and Jones Chapter 5)
11	Nov 24	Competing Risks Incorporating Nonproportionality into discrete-time models (Box-Steffensmeier and Jones Chapter 10; Allison Chapter 6)
12	Dec 1	Incorporating Nonproportionality into continuous-time models
13	Dec 8	Controlling for unobserved heterogeneity (Box-Steffensmeier and Jones Chapter 9)
	Dec 15	Student presentations [First draft of analysis papers due]
	Dec 20	Analysis Papers Due