

QUANTITATIVE METHODS I (834:607)

This course covers the design, production and analysis of quantitative data for research in public affairs and administration. It reviews the scientific method, quantitative theory and models, measurement, sampling, experiments and quasi-experiments, and the logic of causal inference. The course will focus on multiple regression as a tool for data analysis as well as a framework for answering substantive, causal questions. But it will also introduce students to some additional multivariate methods, such as reliability analysis, factor analysis, and path analysis (including a brief introduction to structural equation modeling). Emphasis will be on the use of statistical software and the interpretation of results, with applications to substantive research questions.

A major goal of this course is to encourage students to develop enough familiarity with the ideas and techniques of quantitative research to apply them appropriately in their own work. Thus, students will practice the application of these methods using Stata, and they are encouraged to use their own data and to address topics of substantive interest to them. Various sources of public use microdata will be suggested for students still looking for data to work with.

Another goal of this course is to provide an opportunity for students to evaluate published articles in terms of quantitative methods. Thus we will be reading recent articles in the PA and related social science literature that provide examples of the techniques we are learning about. This is also a good way to reinforce an understanding of a given method or statistical technique.

SCHEDULE

1) Introduction / theory and method in the social sciences

Goals of the course; Requirements; Statistical software; Theory and method

Required reading:

- Remler & Van Ryzin, Chapters 1-2
- Boudon, R. (1991). What middle-range theories are. *Contemporary Sociology*, 20 (4): 519-522.
- Freedman, D. (1991). Statistical models and shoe leather. *Sociological Methodology* 21: 291-313.

2) Sampling / statistical inference

***DUE DATE: Assignment 1a

Generalizability; Statistical sampling; Effect size and statistical power

Required readings:

- Remler & Van Ryzin, Chapters 5 and 8
- Acock, Chapter 7 (review as needed)
- Cohen, J. (1992). A power primer. *Quantitative Methods in Psychology*, 112(2): 155-159
- Denis, D. L. (2003). Alternatives to Null Hypothesis Significance Testing. *Theory and Science*, 4(1)

Supplemental readings:

- Ellis (2010), *The essential guide to effect sizes* (Cambridge).
- Kalton (1983), *Introduction to survey sampling* (SAGE)
- Ziliak & McCloskey (2007), *The cult of statistical significance* (Michigan).

3) Survey research

Secondary data; Modes of primary data collection; Crafting questionnaires

Required reading:

- Remler & Van Ryzin, Chapters 6-7
- Bouckaert, Van de Walle, & Kampen, (2005). Potential for comparative public opinion research in public administration. *International Review of Administrative Sciences* 71: 229-240.
- Lee, Benoit-Bryan, & Johnson (2012). Survey research in public administration: Assessing mainstream journals with a total survey error framework. *Public Administration Review*, 72(1), 87-97.

Supplemental reading:

- Converse & Presser (1986), *Survey questions: Handcrafting the standardized questionnaire* (SAGE).
- Dillman et al (2008), *Internet, mail, and mixed-mode surveys*, 3e (SAGE).
- Fowler (2008), *Survey research methods*, 4e (SAGE).
- Goves et al (2009), *Survey methodology*, 2e (Wiley).

4) Measurement, reliability and validity

Reliability and item analysis; Measurement validity; Multi-item scales

Required reading:

- Remler & Van Ryzin, Chapter 4
- Acock, Chapter 12 (up to 12.5)
- Van Ryzin (2004), The Measurement of overall citizen satisfaction. *Public Performance & Management Review*, 27(3), 9-28.

Supplemental reading:

- Carmines & Zeller (1979), *Reliability and validity assessment* (SAGE)
- Spector (1992), *Summated rating scale construction: An introduction* (SAGE).

5) Data reduction—factor analysis

***DUE DATE: Assignment 1b

The need for data reduction; Exploratory factor analysis

Required readings:

- Acock, Chapter 12 (12.5 to end)
- Considine & Lewis (1999). Governance at ground level: The frontline bureaucrat in the age of markets and networks. *Public Administration Review*, 59(6), 467-480.

Supplemental reading:

- Kim & Mueller (1978), *Introduction to factor analysis: What it is and how to do it* (SAGE).

6) Lab day

- Practice with factor analysis, reliability analysis, and scales using STATA

7) Causation and experimentation

Counterfactual definition of causation; Exogeneity and endogeneity; Randomized experiments

Required reading:

- Remler & Van Ryzin, Chapters 10 and 12
- Acock, Chapter 9 (review as needed)
- Brewer & Brewer (2011). Parsing public/private differences in work motivation and performance: An experimental study. *Journal of Public Administration Research and Theory*, 21:i347–i362.
- Margetts, H. Z. (2011). Experiments for public management research, *Public Management Review*, 13(2):189-208

Supplemental readings:

- Morgan & Winship (2007), *Counterfactuals and causal inference: Methods and principles for social research*
- Morton & Williams (2010), *Experimental political science and the study of causality*.

8) Natural and quasi experiments / difference in differences

Required reading:

- Remler & Van Ryzin, Chapter 13
- Vicente, P. C. (in press). Does oil corrupt? Evidence from a natural experiment in West Africa. *Journal of Development Economics*.

Supplemental reading:

- Shadish, Cook, & Campbell (2002), *Experimental and quasi-experimental designs for generalized causal inference*.

9) Regression analysis I: Applications and interpretation

***DUE DATE: Assignment 2

Review of regression; Interpretation; Stepwise regression

Required readings:

- Remler & Van Ryzin, Chapter 11
- Acock, Chapters 8 and 10
- Lewis-Beck (1980) Applied regression: An introduction (SAGE).

Supplementary reading:

- Angrist & Pischke (2009). Mostly harmless econometrics (Princeton).
- Freedman, D.A. (2009), Statistical models: Theory and practice (Cambridge).
- Poister & Streib (2005). Elements of strategic planning and management in municipal government: Status after two decades. *Public Administration Review*, 65(1), 45-56.

10) Regression analysis II: Dummy variables and transformations

Required reading:

- Remler & Van Ryzin, Chapter 9
- Achen (1982) Interpreting and using regression (SAGE)

Supplementary reading:

- Hardy (1993) Regression with dummy variables (QASS no. 93).
- Van Ryzin, G. G., Muzzio, D., & Immerwahr, S. (2004). Explaining the Race Gap in Satisfaction with Urban Services. *Urban Affairs Review*, 39(5), 613-632.

11) Path analysis and mediation

Required reading:

- Davis, J. A. (1985). The logic of causal order (SAGE)
- Wang, X., & Wart, M. W. (2007). When public participation in administration leads to trust: An empirical assessment of managers' perceptions. *Public Administration Review*, 67(2), 265-278.
- Cole, R. L. (1973). "Toward a model of political trust: A causal analysis." *American Journal of Political Science*, 19(4): 761-781.

Supplemental reading:

- Kenny, D. A. (2008). Mediation webpage. Available at: <http://davidakenny.net/cm/mediate.htm>

12) Lab day

- Practice with regression and path analysis

13) Regression diagnostics / writing a research paper

***DUE DATE: Assignment 3 (first draft)

The problems of multicollinearity, influential observations, and missing data

Required reading

- Miller, J. E. (2005). Writing about multivariate analysis. Part I, and other chapters as needed.

14) Structural equation modeling (a brief introduction)

***DUE DATE FOR ASSIGNMENT 3 (final draft)

A brief introduction to structural equation modeling; Specifying and interpreting an SEM model in Stata

Suggested reading:

- Hox & Bechger (1998). An introduction to structural equation modeling.
- Considine, M., & Lewis, J. M. (2003). Bureaucracy, Network, or Enterprise? Comparing Models of Governance in Australia, Britain, the Netherlands, and New Zealand. *Public Administration Review*, 63(2), 131-140.
- Parent, M., Vandebeek, C. A., & Gemino, A. C. (2005). Building Citizen Trust Through E-government. *Government Information Quarterly*, 22(4), 720-736.

REQUIREMENTS

Grades in the course will be based on the following:

- 45% for assignments 1, 2 and 3 (15% each)
- 45% for assignment 4, the final paper
- 10% for class participation

Instructions for each assignment can be found on Blackboard and will be discussed in class.

BOOKS AND MATERIALS

Required:

Achen, Christopher H. (1982). *Interpreting and using regression* (QASS no. 29). SAGE Publications. Provides very good and useful coverage of important conceptual and practical issues in the use of regression for social research.

Acock, Alan C. (2008). *A gentle introduction to Stata* (2nd edition). College Station, TX: Stata Press. Provides a nice, readable introduction to both statistics and the Stata software program.

Davis, J. A. (1985). *The logic of causal order* (QASS no. 72). SAGE Publications, Inc. A thoughtful treatment of fundamental issues in quantitative research—the order of variables, causation, and statistical control (also covers path analysis).

Lewis-Beck, M. (1980). *Applied regression: An introduction*. (QASS no.22). SAGE Publications. Very good introduction to basic regression as applied in the social sciences.

Remler, D.K., & Van Ryzin, G.G. (2011). *Research methods in practice*. SAGE Publications. Comprehensive introduction to research design and methods in the applied social sciences.

Supplementary:

Ariely, D. (2010). *Predictably irrational*. Harper Books. Fascinating and fun book about a wide range of experiments conducted by the author and his colleagues in the field of behavioral economics.

Aldenderfer, M. S., & Blashfield, R. K. (1984). *Cluster analysis* (QASS no. 44). Sage Publications, Inc. A good introduction to methods for empirical classification or clustering of cases—an overlooked but potentially very useful form of analysis.

Byrne, B. M. (2001). *Structural equation modeling with AMOS: Basic concepts, applications, and programming*. Mahwah, NJ: Lawrence Erlbaum. Readable, comprehensive introduction to this important form of multivariate modeling using AMOS software.

Carmines, E. G., & Zeller, R. A. (1979). *Reliability and validity assessment* (QASS no. 17). Sage Publications, Inc. Reviews the concepts of reliability and validity and, importantly, covers the methods for empirically assessing these important measurement qualities.

Converse, J.M., & Presser, S. (1986). *Survey questions: Handcrafting the standardized questionnaire* (QASS no. 63). Sage Publications, Inc. Advice on writing survey questions and designing questionnaires from two of the leading experts in the field.

Fowler, F.J. (2008). *Survey research methods* (4th ed.). Sage Publications. Clear, accessible, and current introduction to doing survey research by a leading expert in the field.

Gelman, A., & Hill, J. (2006). *Data analysis using regression and multilevel/hierarchical models*. Cambridge University Press. A new, advanced (but clear and interesting) text from one of the luminaries in statistical social science.

Hardy, M. A. (1993). *Regression with dummy variables* (QASS no. 93). Sage Publications, Inc. Explains how to use and interpret dummy variables, which are widely used in regression but often misunderstood.

Kalton, G. (1983). *Introduction to survey sampling* (QASS no. 35). Sage Publications, Inc. How to design and conduct random samples in social research (written by a leading sampling statistician).

Kim, J., & Mueller, C. W.. (1978). *Introduction to factor analysis: What it is and how to do it* (QASS no. 13). Sage publications, Inc. Provides a basic introduction to exploratory factor analysis—a widely useful data reduction and scale-development technique.

Langbein, L. H. (2006). *Public program evaluation: A statistical guide*. ME Sharpe. An innovative introduction to statistical methods for estimating program impacts.

Miller, Jane E. (2005). *The Chicago guide to writing about multivariate analysis*. University of Chicago Press. A wonderful reference not only to the varied art of writing about statistics but to statistical reasoning as well.

Mohr, L. B. (1996). *Impact analysis for program evaluation*. SAGE Publications. A useful, clear, and thoughtful guide to research designs and related statistical analysis for program evaluation.

Mooney, C. Z., & Duval, R. D. (1993). *Bootstrapping: A nonparametric approach to statistical inference* (QASS no. 95). Sage Publications, Inc. Covers alternative, computer-intensive re-sampling approaches to statistical inference.

Morgan, S.L., & Winship, C. (2007). *Counterfactuals and causal inference: Methods and principles for social research*. Cambridge University Press. A new, important and insightful book on the logic of quantitative causal research.

Shadish, W.R., Cook, T.D., & Campbell, D.T. (2001). *Experimental and quasi-experimental designs for generalized causal inference*. Wadsworth, Inc. Latest edition of the classic text on experimental and quasi-experimental research in the social sciences.

Ziliak, S.T., & McCloskey, D.N. (2007). *The cult of statistical significance: How the standard error costs us jobs, justice and lives*. University of Michigan Press. An in-depth, historical, and at times entertaining argument against the tradition of null hypothesis significance testing.