



EDPL 703 (0101)
Quantitative Applications for Education Policy Analysis

Fall 2006
Monday, 7:00 pm - 9:45 pm
2101 (Lecture) & 304 (Lab) Benjamin Bldg.

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Course Overview

Description

Quantitative investigations of social problems apply statistical methods to examine policy-relevant propositions about public life. Such investigations may include calculations of health risks for specific populations, descriptions of traffic patterns, assessments of educational opportunities, or evaluations of the effectiveness of specific instructional practices. By quantifying observations and comparing numeric representations of social phenomena against statistical (and often moral) standards, quantitative researchers seek to inform policymakers and influence the policymaking process.

The purpose of this course is to help students expand their knowledge of quantitative methods, apply their knowledge to policy-relevant questions (especially in the area of education), and evaluate critically the claims of those who use quantitative research to promote policies and practices. Students examine a range of methodological strategies used by quantitative researchers to investigate social problems and programs using secondary data analysis and quasi-experimental designs. Issues of validity will be explored, as well as

questions about the usefulness of quantitative evidence in promoting just and effective public policies. Although the focus of the course will be on educational matters, students from other disciplines with applied quantitative traditions will also find the course relevant to their area of study.

Pedagogical Approach

A basic premise of the course is that students acquire a deeper understanding (and hopefully appreciation) of quantitative methods through actual investigations of education problems and policies. Consequently, students are required to design relevant analyses, implement these analyses, interpret results, and communicate policy considerations to classmates and the instructors. The basic datasets for the course are the National Education Longitudinal Study (NELS) and the Civic Education Study (CivEd). NELS is a general-purpose, longitudinal survey conducted by the National Center for Education Statistics (NCES). It is the third in a series of major studies conducted by NCES to investigate “the educational, vocational, and personal development of students at various grade levels, and the personal, familial, social, institutional, and cultural factors that may affect that development.” CivEd is a cross-national survey designed to “identify and examine, in a comparative framework, the ways in which young people are prepared to undertake their role as citizens in democracies.”

We derived two datasets from NELS:88. The first dataset focuses on three waves of student data: 1988, 1990, and 1992, when students were 8th, 10th, and 12th graders. Students can use these data to examine student learning over time, as well as the role of family background and school experiences in shaping achievement and academic development. The second dataset focuses on postsecondary concerns. This dataset includes two waves of student data: 1992 and 1994, when students were 12th graders and two years out of high school. Students can use these data to examine the role of family background and high school experiences on postsecondary attitudes and behaviors, including employment and participation in postsecondary institutions. The CivEd dataset includes survey data from students and teachers in the United States, Poland, England, and the Czech Republic. These data were collected in 1999 and 2000 and may be used to examine the role of family background and school experiences on students’ civic attitudes and knowledge. Students may gain access to the full NELS:88 dataset from NCES and the full CivEd dataset from the International Association for the Evaluation of Student Achievement (IES). For more information about the NELS study, go to <http://nces.ed.gov/surveys/nels88/>; for information about the CivEd study, go to <http://www.wam.umd.edu/~jtpurta/>.

Prerequisites

Because this is *not* a course in statistics, students must already have acquired an understanding of statistical reasoning and basic statistical techniques before enrolling in the course. At a minimum, students should have a statistical background that includes a basic understanding of theories of measurement, measures of central tendencies and variance, theories of probability, population sampling, and hypothesis testing. We require that students complete EDMS 645 (or its equivalent) and recommend (strongly) that students complete EDMS 646 (or its equivalent) prior to taking this course. Students who have completed EDMS 651 and other students who have a more advanced knowledge of ordinary least squares (OLS) and logistic regression may find the course especially useful if they have not had an opportunity to apply these techniques to an investigation of social or educational issues. A basic understanding of quantitative research designs and statistical software (e.g., SPSS) is also very helpful, though not a prerequisite for the course. Students who are uncertain about whether they have the necessary prerequisites should discuss their prior preparation with the instructors.

Student Responsibilities

Students should plan not only on attending all classes but also on setting aside additional time to complete required readings, analytic exercises, and a final project. Because the course places a heavy emphasis on the actual application of statistical techniques, students will have to spend time outside of class exploring datasets, constructing measures, running statistical analyses, and writing up results. Students are asked to complete six analytic exercises, a take-home midterm examination, and a final study or project. Because most assignments are sequential, keeping up with assigned deadlines is critical. Late assignments may result in the lowering of a student's grade. We strongly discourage incompletes.

1. Analytic exercises – 30%

The six analytic exercises involve completion of tasks associated with quantitative studies of policy-relevant phenomena. The exercises include: (1) exploratory data analysis, (2) missing data analysis, (3) construction of composite measures, (4) interpretation and presentation of quantitative analyses (two exercises), and (5) the development of a brief research proposal. Each exercise involves writing a 3-4 page memorandum (more about these below and in class). Analytic exercises may be performed individually or, with the permission of the instructors, in teams of two. Each exercise represents 5% of the student's grade.

2. Midterm examination – 30%

The take-home examination is designed to assess students' knowledge of material covered during the first part of the course. The examination assesses a student's ability to conceptualize research models; to interpret the results of SPSS output, including the possible implications of results for policy and practice;

and to apply basic standards of validity in assessing the credibility of quantitative research. Students will be given the examination at the end of class on Monday, October 23rd; the completed examination will be due at 7 pm on November 6th (at the beginning of class). During the examination period, students will be on their honor to complete the course midterm without assistance from others. Students may, however, use class materials or books in completing the examination – in other words, the midterm will be “open book” and “open notes”.

3. Final study – 40%

The final study or project is meant to be a summative experience for students who take the course. Students will design and complete a quantitative analysis of a policy-relevant question using one of the class datasets, or, with the approval of the instructors, an alternative dataset. The results of the study are to be presented in a 15-20 page paper suitable for presentation at a professional conference. Papers should mirror the format of a journal article and include a brief description of the problem or phenomena under investigation, a brief overview of the theoretical framework guiding the research, a description of the data and relevant measures used in the study, an explanation of the analytic strategy or method, a presentation of results, and a brief discussion of the study’s implications. Students will present their papers to classmates during the final two weeks of the course. As with the analytic exercises, students may complete their final projects individually or, with the permission of the instructors, in teams of two. The paper will account for 35% of the student’s grade and the in-class presentation will account for 5%.

Grading Scale

We’ll use the following rubric in assigning letter grades to your assignments and midterm. The final grade for the course will be the weighted average of these grades (as specified under student responsibilities).

99-100 points.....	A+
92—98 points.....	A
90—91 points.....	A-
88—89 points.....	B+
82—87 points.....	B
80—81 points.....	B-
78—79 points.....	C+
72—77 points.....	C
70—71 points.....	C-

Instructor Responsibilities

Just as we have high expectations for students, we also have high expectations for ourselves. This is a demanding course for everyone, students and instructors alike. Students should expect that we will be prepared for class, read and return your work in

a timely manner, and be interested and engaged in your research interests. We will try to help students develop your personal research goals whenever possible, and we will help students identify substantive and methodological resources that will help you pursue those interests. We will meet with students individually or in groups upon request and we will be available in person, by telephone, and by e-mail to answer your questions and assist you in making this an engaging class and an opportunity to engage in meaningful, high-quality research.

General Instructional Policies

All students are expected to abide by the code of academic integrity throughout this course and all other courses offered at the University of Maryland. Academic dishonesty, including cheating, fabrication, and plagiarism will not be tolerated and will be reported to the Student Honor Council. The full text of the University's honor code is available at <http://www.studenthonorcouncil.umd.edu/code.html>. Students, who have questions about the code, or their obligations under the code, should contact the student honor council chair at HonorCouncil@umd.edu.

A student with a documented disability or any other special need who wishes to discuss academic accommodations should contact the instructors as soon as possible. The University is obligated, whenever possible, to provide appropriate accommodations for students with disabilities. Students who have questions about their rights or accommodations may contact Disability Support Services (4-7682).

It is the University policy (and our own) that students should not be penalized because of their religious beliefs and observances. Whenever possible, students will be given reasonable time to make up any academic assignment that is missed due to participation in a religious observance. Students should inform the instructor of any conflicts between the course schedule and religious observances as soon as possible so that appropriate arrangements may be made.

Materials

Required Books

There are three required books for the course. All books can be purchased from an on-line or local bookstore.

Green, S.B. & Salkind, N.J. (2005). *Using SPSS for Windows and Macintosh: Analyzing and understanding data* (4th edition). Upper Saddle River, NJ: Prentice Hall. Approximate cost, \$70. If you have the 3rd edition, there is not much of a difference between the 3rd and 4th editions.

Schroeder, L.D., Stephan, P.E., & Sjoquist, D.L. (1986). *Understanding regression analysis*. Sage: Newbury Park, CA. Approximate cost, \$17

Thompson, B. (2006). *Foundations of behavioral statistics: An insight-based approach*. New York, NY: Guilford Press. Approximate cost, \$65.

Required Readings

There are also readings assigned outside of these books as part of the course. All of these readings will be provided either on line or in hard copy for you to reproduce. Other readings may be added to this list as the course progresses.

Blaikie, N. (2003). Social research and data analysis: Demystifying basic concepts. In *Analyzing quantitative data* (Chapter 1, pp. 10-36). Thousand Oaks, CA: Sage. (Hard copy)

Blaikie, N. (2003). Descriptive analysis – bivariate: Looking for patterns. In *Analyzing quantitative data* (Chapter 4, pp. 89-114). Thousand Oaks, CA: Sage. (Hard copy)

Blaikie, N. (2003). Data reduction: Preparing to answer research questions. In *Analyzing quantitative data* (Chapter 7, pp. 214-248). Thousand Oaks, CA: Sage. (Hard Copy)

Cabrera, A. F. (1994). Logistic regression analysis in higher education: An applied perspective. In J.C. Smart (Ed.), Higher Education: Handbook of Theory and Research (Vol. X., pp. 225-256). New York: Agathon Press. (Hard copy)

Cabrera, A., Deil-Amen, R., Prabhu, R., Terenzini, P.T., Lee, C., & Franklin Jr., R.E. (2006). Increasing the college preparedness of at-risk students. *Journal of Latinos and Education*, 5(2), 79-97. (Hard copy)

Croninger, R.G., Douglas, K.M. (2005). Missing data and institutional research. *New directions for institutional research*, 127 (Fall) 33-50). (On course website. Do not use the article in the electronic journal; table 4 is flawed)

Croninger, R.G., Rice, J.K., & Rathbun, A. (March 2003). Teacher qualifications and early learning: Effects of certification status, degree, and experience on first-grade achievement. Paper prepared for the 2003 annual meeting of the American Education Finance Association, Orlando, FL. (On the course website)

Croninger, R.G., Titus, M., & Barber C. (draft). An Introduction to multilevel modeling: Its logic and use in social science research. Chapter to appear in Jason Osborne's (Ed.), *The new stats: Attitudes for the 20th century*. Newbury: Sage. (On the course website)

- Kennedy, J.M. (2005). Institutional review boards and institutional researchers. *New Directions for Institutional Research. Special Issue: Survey Research: Emerging Issues*. 127 (Fall) 17-31. <http://www3.interscience.wiley.com/cgi-bin/jissue/112097274>
- Greene, J., & Homana, G. (2003, November). Adolescent participation in student government and voluntary organizations: A comparative study in Australia and the United States. An earlier version of this paper was presented at the International Conference for Civic Education Research in New Orleans, LA. (On the course website)
- Husfelt, V. (2006). Extreme negative attitudes toward immigrants. An analysis of factors in five countries. Unpublished manuscript. (On the course website)
- Lee, V. E., Croninger, R. G., Linn, E., & Chen, X. (1996). The culture of sexual harassment in secondary schools. *American Educational Research Journal*, 33(2), 383-417. <http://www.jstor.org/journals/00028312.html>
- Milem, J. (1998). Attitude change in college students: Examining the effect of college peer groups and faculty normative groups. *Journal of Higher Education*, 69(2), 117-140. <http://www.jstor.org/journals/00221546.html>
- Perna, L.W. (2000). Differences in the decision to enroll in college among African Americans, Hispanics, and Whites. *Journal of Higher Education*, 71(2), 117-141. <http://www.jstor.org/journals/00221546.html>
- Perna, L.W. (2003). The private benefits of higher education: An examination of the earnings premium. *Research in Higher Education*, 44, 451-472. <http://plinks.ebscohost.com/ehost/detail?vid=5&hid=1&sid=569831a8-6b3a-43f5-adc7-f8cdaa3c6ec2%40sessionmgr4>
- Thomas, S., Heck, R.H., Bruner, K.W. (2005). Weighting and adjusting for design effects in secondary data analyses. *New Directions for Institutional Research. Special Issue: Survey Research: Emerging Issues*. 127 (Fall) 51-72. <http://www3.interscience.wiley.com/cgi-bin/jissue/112097274>
- Torney-Purta, J., & Barber, C. (2005). Democratic school engagement and civic participation among European adolescents: Analysis of data from the IEA Civic Education. *Journal of Social Science Education*. [online journal] http://www.jsse.org/2005-se/torney_purta_barber_iea_analysis.htm

Additional Resources

We've identified two types of additional resources that you may find helpful. The first type includes the research and statistics books listed below. You may already have one

or more of these books in your personal library; if so they may serve as useful references to you during the course. The list is not meant to be comprehensive; rather, it identifies resources that we've personally found useful or that colleagues have found useful. You need not purchase any of these books; we've provided the list in case you want to pursue some of the topics covered in the course in greater depth.

A second set of resources are recommended websites that discuss quantitative applications and statistical software. We've found the site at the University of California-Los Angeles (UCLA), <http://www.ats.ucla.edu/stat/>, especially helpful. The site is very comprehensive and provides links to a wide range of quantitative techniques and applications. We'll highlight those that deal with the use of SPSS syntax (rather than the pull-down menus) as part of the course.

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage. The best book we've run across about how to structure, test, and interpret higher-order interactions using regression.

Allison, P. D. (1999). *Multiple regression: A primer*. Thousand Oaks, CA: Pine Forge Press. A simple and straightforward explanation of regression; Paul Umbach uses this text for a similar course at the University of Iowa.

American Psychological Association. (2001). *Publication manual of the American Psychological Association*. (5TH edition). Washington DC: American Psychological Association. One aspect of the course is presenting your findings to colleagues in written form; the APA manual provides guidance on how to do so.

Cohen, J, Cohen, P., West, S.G., & Aiken, L.S (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd edition). Lawrence Erlbaum & Associates. Classic though somewhat complex text on regression. Includes chapters on a range of analysis issues, including the treatment of missing data.

Harrell, F.E. (2001). *Regression modeling strategies*. New York: Springer. Written from the perspective of biostatistics but a very interesting book about modeling decisions with different forms of regression.

Huff, D. (1954). *How to lie with statistics*. New York: W. W. Norton. Classic book on fallacies in statistical thinking and argument. Inexpensive. Still available at many bookstores.

Jaeger, R. M. (1993). *Statistics. A spectator sport* (2nd edition). Newbury Park, CA: Sage. Inexpensive, non-technical explanation of statistical procedures and research strategies.

- Light, R. J., Singer, J. D., & Willett, J. B. (1990). *By design: Planning research on higher education*. Cambridge, MA: Harvard University Press. An excellent book that focuses on the process of conducting quantitative research. Although described as a book about planning research in higher education, materials are relevant to a broad range of research studies.
- National Research Council. (2002). *Scientific research in education*. Washington, DC: National Academy Press. An interesting discussion of the nature of scientific research in education and other fields.
- Norušis, M.J. (2005). *SPSS 14.0: Guide to data analysis*. Upper Saddle River, NJ: Prentice Hall. There is probably the most recent version of this book; SPSS updates and releases it with new versions of SPSS, but with few changes.
- Pampel, F. (2000). *Logistic regression: A primer*. Thousand Oaks: CA. Sage Publications. Easy to understand introduction to logistic regression.
- Phillips, Jr., J. L. (2000). *How to think about statistics* (6th edition). New York: W. H. Freeman & Co. Very basic but good explanation of statistical reasoning. Inexpensive.
- Tuft, E.R., (1970). *The quantitative analysis of social problems*. Reading, MA: Addison-Wesley. This is one of the first textbooks to discuss the use of quantitative techniques to examine social problems and policies.
- Vogt, W. P. (1998). *Dictionary of statistics and methodology: A non-technical guide for social sciences* (2nd edition). Newbury Park, CA: Sage. Relatively inexpensive and straightforward explanation of various statistics used in the social sciences.
- Williams, F. & Monge, P. (2001). *Reasoning with statistics: How to read quantitative research* (5th edition). Orlando, FL: Harcourt College Publishers. We used this before in the class; it focuses on the underlying logic of different statistical procedures.

Statistical Software

Class lectures and assignments will feature the use of SPSS, a software package that conducts a range of data management and statistical analyses. SPSS is available at many University of Maryland locations on multiple platforms, including MAC and Windows. Students may find it helpful to purchase their own copy of SPSS since doing so will make it possible to work with data off campus. SPSS is sold in modules and for this class we will use the basic, advanced, and professional versions of SPSS 14. (Earlier versions of SPSS may also be suitable if they include all three modules.) A graduate student version of the SPSS modules may be purchased from Journey Ed for \$199.98 (plus shipping). The student version, though cheaper, is not recommended.

Please refer to the Journey Ed website for your purchase:
<http://www.journeyed.com/itemDetail.asp?T1=62391573+R>. We will discuss how to gain access to the software and datasets from on and off campus during the first class.

Schedule

The schedule is organized around some of the basic steps involved in conducting a quantitative study. We proceed generally, considering issues of exploratory analysis, selection of an analytic sample, and the development of quantitative measures of policy-relevant phenomena. Then, we begin to examine in detail the logic of quantitative applications to policy analysis; we will cover ANOVA, OLS regression and logistic regression techniques and their application to policy analyses. Note that we will be meeting in two different rooms or locations, depending on the date and the primary purpose of the class. On dates marked lecture, we will meet in room 2101 of the Benjamin Building; on dates marked lab, we will meet in the PC lab, in room 304 of the Benjamin Building. Readings are posted for the week that they are due.

The pace of the course requires that we assume students have a basic knowledge of statistical concepts (e.g., theories of measurement, measures of central tendencies, measures of variance, and hypothesis testing) and statistical software (e.g., SPSS). If you are feeling a bit “rusty” in these areas, you may want to review some of the more basic material included in the readings. Although not assigned as part of the class, the following chapters or units in Thompson’s *Foundations of behavioral statistics* and Green and Salkind’s *Using SPSS for Windows and Macintosh* may be useful:

Foundations of behavioral statistics. These are basic chapters on measurement concepts, measures of central tendency, and distribution.

- Chapter 1: Introductory Terms & Concepts (pp. 1-30)
- Chapter 2: Location (pp. 30-52)
- Chapter 3: Dispersion (pp. 53-73)
- Chapter 4: Shape (pp. 75-96)

Using SPSS for Windows and Macintosh (4th edition). These lessons introduce you to the main menus and toolbars in SPSS and basic operations.

- Unit 1 (Lessons 1-4): Getting Started with SPSS (pp. 1-18)

Week 1, September 11th (Lecture, room 2101)

Overview of course and quantitative applications to policy studies. We’ll begin with a brief overview of the course and syllabus. Then we’ll discuss epistemological principles underlying quantitative methods and research designs (especially, quasi-experimental designs), present a construct map that highlights key steps in quantitative analyses (a roadmap for the course), and discuss a

case study of a quantitative application to a policy issue (see Lee, Croninger, Linn, & Chen, 1996). We'll also review the University of Maryland's Institutional Review Board (IRB) requirements for conducting research that involves human subjects.

Readings due this week. (We recognize that many students will not have had a chance to read these materials before the first class. Nonetheless, the pace of the course requires that we include readings each week. Students are strongly encouraged to keep up with these readings and complete them, whenever possible, before each class.)

Blaikie, N. (2003) Social research and data analysis: Demystifying the basic concepts. (Hard copy).

Lee, V.E., Croninger, R.G., Linn, E., & Chen, X. (1996). The culture of sexual harassment in secondary schools. (Available online: see above.)

Kennedy, J.M. (2005). Institutional review boards and institutional researchers. (Available online: see above.)

<http://www.umresearch.umd.edu/IRB/index.htm> University of Maryland IRB website. Review guidelines online.

Week 2, September 18th (Lab, room 304)

Exploring data and relationships. We'll discuss one of the first steps in quantitative applications, exploratory analyses, as well as introduce you to the University's computer network, the course datasets, and the statistical software that we will use for the course (SPSS). We'll discuss both technical and conceptual issues that researchers often face in assessing the suitability of a dataset for analyzing policies or proposed research questions. At the end of class, we'll hand out the directions for the 1st analytic exercise (the directions will also be available online at the course website). The directions will include a scenario to choose from for each dataset. This exercise focuses on conducting an exploratory analysis and communicating the results to colleagues. *The exercise is due at the beginning of the class.*

Readings due this week.

Thompson, B. (2006). Bivariate relationships (Chapter 5, pp. 97-132)

Blaikie, N. (2003). Descriptive analysis – bivariate: Looking for patterns. (Hard copy.)

Green, S.B. & Salkind, N.J. (2005). Unit 2 (Lessons 5-10): Creating and working with data files (pp. 23-52); Unit 3 (Lessons 11-14): Working with data (pp. 53-72); and Unit 5 (Lessons 18-20): Creating variables and computing descriptive statistics (pp. 114-153)

Optional readings on creating and using SPSS syntax:

These links take you to a four-part seminar on how to use syntax to run SPSS. Each part of the seminar was recorded as a movie and can be run online. There are many advantages to using syntax rather than the conventional “point-and-click” technique to run SPSS, so we’ll be encouraging you to use syntax as part of the course. The second and third links provide examples of SPSS output and syntax for generating descriptive statistics and correlations.

Statistical Computing Seminars: Beyond Point and Click: SPSS Syntax.

Available on the Web at:

http://www.ats.ucla.edu/stat/spss/seminars/spss_syntax/default.htm

Annotated SPSS Output- Descriptive Statistics. Available on the Web at:

<http://www.ats.ucla.edu/stat/spss/output/descriptives.htm>

Annotated SPSS Output - Correlation. Available on the Web at:

<http://www.ats.ucla.edu/stat/spss/output/corr.htm>

Week 3, September 25th (Lab, room 304)

Missing data analysis. (1st analytic exercise due at the beginning of class.) All of the datasets that we use for the class are large-scale, complex surveys. These datasets often pose both technical and conceptual issues associated with sample design, non-response, and external validity. We’ll discuss complex sample designs, the use of weights in your analysis, strategies for addressing missing data, and the importance of knowing “who your are studying.” We’ll hand out directions for the 2nd analytic exercise at the end of the class; the exercise is an extension of the 1st exercise and focuses on missing data analysis.

Readings due this week.

Croninger, R.G., Douglas, K.M. (2005). Missing data and institutional research. (Available online: see above.)

Thomas, S., Heck, R.H., Bruner, K.W. (2005). Weighting and adjusting for design effects in secondary data analyses. (Available online: see above.)

Optional readings on creating & using SPSS syntax

The following link discusses different forms of missing data, how missing data are handled in SPSS, and provides examples of syntax used to address missing data.

SPSS Learning Module – Missing Data. Available on the Web at:
<http://www.ats.ucla.edu/stat/spss/modules/missing.htm>

Week 4, October 2nd (Lab, room 304)

Improving measures. Data reduction. (2nd analytic exercise due at the beginning of class.) Most of the work in conducting a policy study focuses on the construction and selection of measures that tap, as best as possible, key constructs. The actual analysis of data occurs only after securing an appropriate sample and set of measures. This week we will talk about ways to improve measures using data-reduction techniques to create composites. We will discuss strategies for combining measures, assessing their reliability, and addressing non-normal distributions. At the end of class we'll provide directions for the 3rd analytic exercise. This exercise focuses on data reduction techniques to develop more robust measures. It will be due at the beginning of class next week.

Readings due this week.

Blaikie, N. (2003). Data reduction: Preparing to answer research questions. (Hard copy)

Milem, J. (1998). Attitude change in college students: Examining the effect of college peer groups and faculty normative groups. (Available online: see above)

Green, S.B. & Salkind, N.J. (2005). Unit 9 (Lessons 35-37) Scaling procedures Scaling procedures (pp. 311-348).

Week 5, October 9th (Lab, room 304)

Analysis of variance (ANOVA). (3rd analytic exercise due at the beginning of class.) How do you compare the average levels of achievement for more than two study populations, such as four racial and ethnic groups of students? What if you want to know if average levels of achievement vary not only across racial/ethnic groups but also between women and men? This week we will examine the use of one-way analysis of variance (ONEWAY) and two-way analysis of variance (ANOVA) to compare means for multiple study populations and combinations of study populations. We will consider the kinds of hypotheses

that are examined with these techniques, underlying assumptions, and interpretation of specified interactions. We'll provide directions for the 4th analytic exercise at the end of the class. The exercise focuses on using ANOVA to examine mean differences between various student populations; it is due at the beginning of next week's class.

Readings due this week.

Thompson, B. (2006). Chapter 10: One-way Analysis of Variance

Greene, J., & Homana, G. (2003). Adolescent participant in student government and voluntary organizations: A comparison of Australia and the United States. (Available online: see above.)

Green, S.B. & Salkind, N.J. (2005). Unit 7 (Lessons 24 - 25) Univariate and multivariate analysis of variance techniques (pp. 175-206)

Week 6, October 16th (Lecture, room 2101)

Logic of bivariate regression. (4th analytic exercise due at the beginning of class.) What is regression analysis? This week we will examine the logic of regression analysis and the general linear model for policy studies. We will discuss the basic assumptions of regression analysis, estimation theory, and how to interpret a simple bivariate regression model. At the end of class, we'll hand out the 5th analytic exercise; it will be due at the beginning of the next week's class; we'll set aside some time in class to review for the midterm.

Readings due this week.

Thompson, B. (2006). Chapter 8: Multiple regression analysis (pp. 215-246)

Schroeder, L.D., Stephan, P.E., & Sjoquist, D.L. (1986). Read pages 11-29.

Green, S.B. & Salkind, N.J. (2005). Unit 8 (Lessons 30-32) Correlation, regression & discriminant analysis procedures (pp. 311-348)

Week 7, October 23rd (Lab, room 304)

Logic of multivariate regression. (5th analytic exercise due at the beginning of class.) An investigation of education policy usually involves the construction of a multivariate regression model. In this class we will discuss model building strategies (e.g., blocked entry v. stepwise regression), as well as coding schemes for categorical data (e.g., dummy coding). We'll also discuss some of

the basics of how to assess the appropriateness of regression models and whether specific assumptions about regression have been met (e.g., residual analyses); we'll set aside some time in class to review for the midterm. We'll hand out the at the end of the class; it will be due at the beginning of class on November 11th, 2 weeks from today.

Readings due this week.

Green, S.B. & Salkind, N.J. (2005). Unit 8 (Lessons 33) Correlation, regression & discriminant analysis procedures (pp. 283-297)

Schroeder, L.D., Stephan, P.E., & Sjoquist, D.L. (1986). Read pages 29-53.

Torney-Purta, J., & Barber, C. (2005). Democratic school engagement and civic participation among European adolescents: Analysis of data from the IEA Civic Education. (Available online: see above.)

Week 8, October 30th (Lecture, room 2101)

Logic of Multivariate Regression (continued). We'll examine in greater detail the interpretation of dummy-coded variables, unstandardized coefficients, and standardized coefficients. We will discuss how to present regression results in both tabular and graphic formats.

Readings due this week.

Schroeder, L.D., Stephan, P.E., & Sjoquist, D.L. (1986). Read pages 53-80.

Thompson, B. (2006). Chapter 6: Statistical significance (pp. 133-183); Chapter 7: Practical significance (pp. 185-213).

Reread or review Torney-Purta, J., & Barber, C. (2005). Democratic school engagement and civic participation among European adolescents: Analysis of data from the IEA Civic Education. (Available online: see above.)

Re-read or review Milem, J. (1998). Attitude change in college students (Available online: see above.)

Review the following website. Standards for reporting on empirical research in AERA journals. <http://www.aera.net/?id=1480>

Week 9, November 6th (Lecture, room 2101).

When Effects Vary by Other Variables. Interactions. (Midterm due at the beginning of class.) The effects of a particular variable in a model may vary by sub-population (e.g., gender) or by some other values (e.g., Socioeconomic status). We'll examine more closely the notion of interactions and how to test for them in a regression analysis. Interactions are often some of the more interesting findings in a study, especially from a policy perspective. We'll hand out the directions for the final (6th) analytic exercise at the end of the class.

Croninger, R.G., Rice, J.K., & Rathbun, A. (2003). Teacher qualifications and early learning: Effects of certification status, degree, and experience on first-grade achievement (Available online: see above.)

Perna, L.W. (2003). The private benefits of higher education: An examination of the earnings premium (Available online: see above).

Week 10, November 13th (Lecture, room 2101).

Logic of logistic regression. (6th Analytic exercise due at the beginning of class). So far we have only considered regression models where the dependent variable is continuous and more-or-less normally distributed. This week we will consider regression models where the dependent variable is binary (e.g., dropped out of school or graduated; was sexually harassed or was not). Binary outcome violates many of the assumptions of OLS regression, so researchers use an alternative technique called, logistic regression. We'll discuss the use of this technique and its underlying assumptions.

Readings due this week.

Thompson, B. (2006). Chapter 13: Some logistic models (pp. 393-426).

Reread or review Lee, Croninger, Linn, & Chen, The culture of sexual harassment in secondary schools, especially the sections that use logistic regression. (Available online: see above.)

Cabrera, A. F. (1994). Logistic regression analysis in higher education: An applied perspective. (Hard copy)

Week 11, November 20th (Lab, room 304)

Logic of logistic regression (continued). We will continue will our discussion of logistic regression, focusing on hypothesis testing, model fit, and the interpretation of coefficients. We'll also hand back the midterm and set aside time to review it.

Husfelt, V. (2006). Extreme negative attitudes toward immigrants. An analysis of factors in five countries. (Available online: see above.)

Perna, L.W. (2000). Differences in the decision to enroll in college among African Americans, Hispanics, and Whites. *Journal of Higher Education*, 71(2), 117-141. (Available online: see above.)

Week 12, November 27th (Lecture, room 2101)

Advanced applications – Multilevel models. Recent developments in statistical software and computation power permit the use more advanced quantitative applications to the study of policies and practices. We'll introduce one such application in this class – multilevel modeling. Multilevel modeling permits the specification models at multiple levels of a phenomenon (e.g., students within schools or worker productivity within industries). We'll discuss this technique, and its use in social science research. We'll also discuss other datasets available through NCES, and we will schedule presentations for the next two classes.

Croninger, R.G., Titus, M., & Barber C. (draft). An Introduction to multilevel modeling: Its logic and use in social science research. (Will be made available online.)

Cabrera, A., Deil-Amen, R., Prabhu, R., Terenzini, P.T., Lee, C., & Franklin Jr., R.E. (2006). Increasing the college preparedness of at-risk students. (Available online: See above.)

Review the description of the available datasets at NCES' website.
<http://nces.ed.gov/surveys/>

Week 13, December 4th (Lecture, room 2101)

Presentation of final projects. Students will present their final projects to classmates. Note: All papers are due at the beginning of class on May 10th.

Week 14, December 11th (Lecture, room 2101)

Presentation of final projects (continued). During this class, we will complete course evaluations, discuss additional opportunities to acquire expertise in applying quantitative methods to the study of education policies and practices, and discuss the possibilities and limitations of using quantitative research to shape and influence policy.