HBEH 761
Advanced Research Methods II
Spring 2016

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<tr>
<th>Instructors</th>
<th>Meeting Time &amp; Place</th>
<th>Course Website</th>
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<tbody>
<tr>
<td>Luz McNaughton Reyes</td>
<td>TR 11-12:15</td>
<td>Accessible through Sakai at: sakai.unc.edu</td>
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<td>Mike Bowling</td>
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<td>Marcy Boynton</td>
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<td>TA: May Chen</td>
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Course Description

Advanced Research Methods I and II, HBHE 760 and HBHE 761, are required for first-year doctoral students in the Department of Health Behavior. The courses are organized by modules and team-taught by department faculty. Emphasis in the first semester, HBHE 760, is on issues related to the research process and study design while emphasis in the second semester, HBHE 761, is on data preparation, sampling, and data analysis. Modules covered in the first semester are: Conceptualizing Research Questions and Hypotheses, Measurement, Experimental and Quasi-Experimental Study Designs and Observational Study Designs. Modules covered in the second semester are: SAS and Statistical Fundamentals, Sampling, Introduction to Multilevel and Longitudinal Data Analysis, and Mediation and Moderation. The class is taught through a combination of didactic instruction, engaged discussion, and in-class exercises in the computer lab.

Course Objectives

At the completion of the course students will be able to:

- Use SAS to perform data management and analysis tasks including dataset and variable manipulation and bivariate statistical testing
- Use SAS to apply appropriate bivariate analytic methods for testing conceptual hypotheses
- Formulate mediation and moderation hypotheses
- Apply appropriate analytic methods for testing mediation and moderation hypotheses
- Identify the types of research questions and study designs that require a multilevel analytic approach
- Generate multilevel hypotheses that reflect different types of causal effects
- Estimate and interpret the basic statistical model that underlies a multilevel approach to data analysis
- Describe different methods used in survey sampling
- Identify the different considerations that go into determining sample size for hypothesis testing
- Critically evaluate research in terms of the appropriateness of the study design, research question, sampling and analytic approach, results, and interpretation
Grading & Assignments

The quality of the course depends on students’ preparation for and participation in discussion and assignments. Students are expected to read the assigned readings before class and come to class prepared to contribute to the discussion. Assignments include graded exercises assigned as homework, a midterm exam, and a final exam. Grades will be based on: graded homework exercises (30%), mid-term exam (30%), final exam (30%), and contribution to class dialogue including participation in journal club paper discussions (10%).

Honor Code

Students must observe the Honor Code in all course assignments. You are expected to produce your own work, except where group work is specifically allowed. In all written assignments, you must not plagiarize the work of others. The instrument defining the Honor Code defines plagiarism as "deliberate or reckless representation of another's words, thoughts, or ideas as one's own without attribution in connection with submission of academic work, whether graded or otherwise." If you have questions about your responsibility under the honor code, please bring them to one of the instructors or consult with the office of the Dean of Students or the Instrument of Student Judicial Governance. This document, adopted by the Chancellor, the Faculty Council, and the Student Congress, contains all policies and procedures pertaining to the student honor system.

Please include the following pledge on all written assignments: “On my honor, I have neither given nor received unauthorized aid on this assignment.”

Course Evaluations

Student evaluations are critical to course development and improvement. Time is set aside in the last class for completing the official on-line departmental/school evaluation.

Required Readings


- Other readings (see Course Schedule) are available electronically on the Sakai website or as e-books on the UNC libraries website.
Course Schedule

Module 1: SAS and Analytic Fundamentals (Luz Reyes)

1/12 Session 1: Course Introduction and SAS Basics
- Class notes (posted on Sakai)
- In class exercise (posted on Sakai)
- Little SAS book:
  Chapter 1, Sections 1.1-1.4, 1.6-1.9
  - 1.1 The SAS language
  - 1.2 SAS data sets
  - 1.3 DATA and PROC steps
  - 1.4 The DATA step’s built in loop
  - 1.6 Windows and commands in the SAS windowing environment
  - 1.7 Submitting a program in the SAS windowing environment
  - 1.8 Reading the SAS log
  - 1.9 Viewing your results
  Chapter 2, Sections 2.1, 2.18, 2.19
  - 2.1 Methods for getting your data into SAS
  - 2.18 Temporary vs. permanent data sets
  - 2.19 Using permanent SAS datasets with LIBNAME statements

1/14 Session 2: Using SAS to Manipulate, Examine and Summarize your Data
- Class notes (posted on Sakai)
- In class exercise (posted on Sakai)
- Little SAS book:
  Chapter 3, Sections 3.1, 3.2, 3.4-3.6)
  - 3.1 Creating and redefining variables
  - 3.2 Using SAS functions
  - 3.4 Selected SAS numeric functions
  - 3.5 Using IF-THEN statements
  - 3.6 Grouping observations with IF-THEN/ELSE statements
  Chapter 4, Sections 4.1-4.3, 4.5, 4.10, 4.12
  - 4.1 Using SAS procedures
  - 4.2 Subsetting in procedures with the WHERE statement
  - 4.3 Sorting your data using PROC SORT
  - 4.5 Printing your data using PROC PRINT
  - 4.10 Summarizing your data using PROC MEANS
  - 4.12 Counting your data using PROC FREQ
  Chapter 9, Sections 9.1, 9.3, 9.6
  - 9.1 Examining the distribution of data with PROC UNIVARIATE
  - 9.3 Producing statistics with PROC MEANS
  - 9.6 Testing categorical data with PROC FREQ

1/19 Session 3: Examining Item Correlations and Creating Scales (HW 1 handed out, due 2/2)
- Class notes (posted on Sakai)
- In class exercise (posted on Sakai)
- Little SAS book:
  Chapter 3, Section 3.11 Simplifying programs with arrays
  Chapter 9, Section 9.9 Examining correlations with PROC CORR
1/21  Session 4: Confidence Intervals, T-Tests
  • Class notes (posted on Sakai)
  • Videos on Confidence Intervals 1-4:
    o https://www.youtube.com/watch?v=LTkM_s9Xrzw
    o https://www.youtube.com/watch?v=Jj0PXqXLwbc
    o https://www.youtube.com/watch?v=SX0ntoKKJok
    o https://www.youtube.com/watch?v=wdsDz_2cEzw
  • In class exercise (posted on Sakai)

1/26  Session 5: Chi-square, Odds, and Risk Ratios
  • Class notes (posted on Sakai)
  • In class exercise (posted on Sakai)

1/28  Session 6: Chi-square, Odds, and Risk Ratios
  • In class exercise (posted on Sakai)

2/2  Session 7: Analysis of Variance (*HW 1 due, HW 2 handed out, due 2/11*)
  • Class notes (posted on Sakai)
  • Little SAS Book, Chapter 9
    o Section 9.12 Using PROC ANOVA for one-way analysis of variance
    o Section 9.13 Reading the output of PROC ANOVA

Module 2:  Mediation and Moderation (Luz Reyes)

2/4  Mediation
  • Class notes (posted on Sakai)
    o Chapter 4: The Simple Mediation Model

2/9  Testing Mediation
  • In class exercise (posted on Sakai)

2/11 Testing Mediation  (*HW 2 due: HW 3 handed out due 2/18*)
  • In class exercise (posted on Sakai)
    o Chapter 5: Multiple Mediator Models.
    o Chapter 6. Miscellaneous Topics in Mediation Analysis (skip section 6.3 on effect size)

2/16  Moderation
    o Chapter 7: Fundamentals of Moderation Analysis.

2/18 Testing Moderation  (*HW 3 due*)
  • In class exercise (posted on Sakai)
2/23 Testing Moderation *(HW 4 handed out, due 3/1)*
- In class exercise (posted on Sakai)

2/25 Conditional process models
- Class notes (posted on Sakai)
  - Chapter 10: Conditional Process Analysis

3/1 Conditional process models/Special Topics *(HW 4 due)*
- In class exercise (posted on Sakai)

3/3 Journal Club
- Article reading guide (posted on Sakai)

3/8 Midterm Review Session

3/10 Midterm

| Spring Break! (3/12/15 - 3/20/15) |

Module 3: Introduction to Multilevel & Longitudinal Data Analysis (Luz Reyes)

3/22 Multilevel Models
- Class notes (posted on Sakai)

3/24 Multilevel Models
- Class notes (posted on Sakai)

3/29 Multilevel Models
- Class notes (posted on Sakai)

3/31 Multilevel Models *(HW 5 handed out, due 4/14)*
- In-class exercise (posted on Sakai)
4/5 Journal Club
- Article reading guide (posted on Sakai)

Module 4: Sampling (Mike Bowling & Marcy Boynton)

4/7 Introduction to Survey Sampling Design and Methodology
- Class notes (posted on Sakai)

4/12 Sample Size: Complex Survey Designs (HW 5 due)
- Class notes (posted on Sakai)

4/14 Survey Sampling
- Class notes (posted on Sakai)

4/19 Introduction to Survey Sampling Design and Methodology
- Class notes (posted on Sakai)
- *Homework 6 handed out, due 4/26 (**One week turn around)**

4/21 Analysis of Survey Data
- Class notes (posted on Sakai)

4/26 In Class Exercise and course evaluation (HW6 due)
- Class notes (posted on Sakai)

4/29 Final Exam (12 PM). *This is the official date/time for the exam assigned by the university. We will discuss alternative dates/times.