

HBEH 760: Advanced Research Methods, Fall 2016

Department of Health Behavior

Gillings School of Global Public Health

Tuesday and Thursday, 11-12:15, 1303 McGavran-Greenberg

Course Website: Accessible through Sakai, at <http://sakai.unc.edu/>

Teaching Team

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Office Hours: By Appointment

Course Description

Advanced Research Methods, HBEH 760, is part of the required methods training sequence for first-year doctoral students in the Department of Health Behavior. The course is organized by modules and team-taught by department faculty. Emphasis in the first semester (HBEH 760) is on issues related to the research process, study design, and sampling while emphasis in the later semesters (HBEH 761, 850, 851) is on selected analytic topics, including regression, mediation and moderation, modeling grouped and longitudinal data, and psychometric methods. Modules covered in the first semester are: Conceptualizing Research Questions and Hypotheses, SAS and Analytic Fundamentals, Experimental and Quasi-Experimental Study Designs, Observational Study Designs, and Sampling.

Course Objectives

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

- Conceptualize research problems in terms of research questions, hypotheses, and conceptual models
- Use SAS to perform data management tasks including dataset and variable manipulation
- Use SAS to apply appropriate bivariate analytic methods for testing conceptual hypotheses
- Select and apply appropriate study designs for answering research questions that address topics of significance to public health
- Describe different methods used in survey sampling
- Identify the different considerations that go into determining sample size for hypothesis testing
- Critically analyze research from the literature in terms of the appropriateness of the study design, sample, measures, data analysis, results, and interpretation

Grading and Assignments

The quality of the course depends on your preparation for and participation in discussion and assignments. You are expected to read the assigned readings before class and come to class prepared to contribute to the discussion. Other assignments include graded exercises assigned as homework, a midterm exam, and a final exam. Written assignments will be submitted to instructors using the drop box feature in Sakai and are due prior to the start of class on the day they are due. Grades will be based on: graded homework exercises (30%), mid-term exam (30%), final exam (30%), and contribution to class discussion (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."

Diversity and Inclusion Statement

In support of the University and the Gillings School of Global Public Health's diversity and inclusion goals, the Health Behavior department embraces diversity as an ethical and societal value. We broadly define diversity to include race, gender, national origin, ethnicity, religion, social class, age, sexual orientation, and physical and learning ability. Promoting and valuing diversity in the classroom enriches learning and broadens everyone's perspectives and are key elements for the success of any enterprise.

This class will follow principles of inclusion, respect, tolerance, and acceptance that support the values of diversity.

Some useful links:

- UNC Non-Discrimination Policies: <http://policy.sites.unc.edu/files/2013/04/nondiscrim.pdf>
- Prohibited Discrimination, Harassment, and Related Misconduct at UNC: <https://deanofstudents.unc.edu/incident-reporting/prohibited-harassmentsexual-misconduct>
- Diversity and Inclusion at the Gillings School of Global Public Health: <http://sph.unc.edu/resource-pages/diversity/>

Course Evaluations

Student evaluations are critical to course development and improvement. Students are asked to complete the official on-line departmental/school evaluation at the close of the course. The on-line evaluation system will be open November 28 through December 10; in addition, time will be set aside in the last class for students to complete the evaluation. Informal feedback is welcomed at any time.

Required Readings

Delwiche, L.D., Slaughter, S.J. *The Little SAS Book: A Primer* (Fifth Edition). 2012. Cary, NC: SAS Institute Inc. (Fourth edition is available for free online via the UNC library catalog)

Shadish, W.R., Cook, T.D., and Campbell, D.T. (2002). *Experimental and Quasi-Experimental Designs for Causal Inference*. Boston: Houghton Mifflin Co. (listed below as SCC)

Other readings (see Course Schedule) are available electronically on the Sakai website. Both texts are on reserve at the Health Sciences Library.

Course Schedule

Aug. 23 Introduction and Course Overview

Module 1: Conceptualizing Research Questions and Hypotheses (Luz McNaughton Reyes)

Aug. 25 Units of Analysis, Variables, and Levels of Variables

Singleton, R.A., & Straits, B.C (2010). Chapter 4: Elements of Research Design. In *Approaches to Social Research*, 5th ed. (pp. 79-114). New York: Oxford University Press.

Shah, A. (2010). The relationship between obesity and elderly suicide rates: a cross-national study. *Injury & Violence*, 2(2), 105-9.

Sundquist, K. et Al. (2011). Neighborhood walkability, physical activity, and walking behavior: The Swedish Neighborhood and Physical Activity (SNAP) study. *Social Science and Medicine*, 72, 1266-1273.

Aug. 30 Relationships among Variables: Mediation, Confounding, and Moderation

Ungraded homework exercise handed out (discuss answers 9/6)

MacKinnon, Krull, & Lockwood (2000). Equivalence of the mediation, confounding, and suppression effect. *Prevention Science*, 1(4), 173 – 181.

Frazier, P. A., Tix, A. P., & Barron, K. E. (2004). Testing moderator and mediator effects in counseling psychology research. *Journal of Counseling Psychology*, 51(1), 115-134

Bauman, K (1980). Chapter 3: Causal Inference. In *Research Methods for Community Health and Welfare: An Introduction*. (pp. 16-22). Oxford: Oxford University Press.

Sept. 1 Writing Research Questions and Hypotheses

Kerlinger, F. N. & Lee, H. B. (2000). Problems and hypotheses. In *Foundations of Behavioral Research*, 4th ed. (pp. 23-37). Fort Worth: Harcourt College Publishers.

McGuire, W. J. (1997). Creative hypothesis generating in psychology: Some useful heuristics. *Annual Review of Psychology*, 48: 1-30.

Sept. 6 Role of Theory and Conceptual Models in Research

Discuss answers to the ungraded homework exercise

Glanz, K., Rimer, B. K., & Viswanath, K. (Eds.) (2008). Theory, research and practice in health behavior and health education. In *Health Behavior and Health Education: Theory, Research, and Practice* 4th ed. (pp. 23-40). San Francisco: Jossey-Bass Publishers.

Earp, J. & Ennett, S. (1991). Conceptual models for health education research and practice. *Health Education Research*, 6(2), 163–171.

Sept. 8 In Class Exercise on Developing Theoretically Informed Conceptual Models
Homework 1 handed out (Due on September 15, 2016)

Foshee, V. A., Ennett, S. E., Bauman, K. E., Granger, D. A., Benefield, T., Suchindran, C., ... DuRant, R. H. (2007). A test of biosocial models of adolescent cigarette and alcohol involvement. *Journal of Early Adolescence*, 27 (1), 4-39.

Wilson, H., Sheehan, M., Palk, G., & Watson, A. (2016). Self-Efficacy, Planning, and Drink Driving: Applying the Health Action Process Approach. *Health Psychology*, 5 (7) 695–703.

Module 2: SAS and Analytic Fundamentals (Luz McNaughton Reyes)

Sept. 13 SAS Basics

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

Sept. 15 Using SAS to Manipulate, Examine, and Summarize your Data

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
- 3.11 Simplifying programs with arrays

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
- 9.9 Examining correlations with PROC CORR

Homework 1 Due, Homework 2 handed out (Due on September 29, 2016)

Sept. 20 Bivariate Hypothesis Testing with SAS

Videos on Confidence Intervals 1-4:

- https://www.youtube.com/watch?v=LTkM_s9Xrzw
- <https://www.youtube.com/watch?v=JjoPXqXLwbc>
- <https://www.youtube.com/watch?v=SX0ntoKKJok>
- https://www.youtube.com/watch?v=wdsDz_2cEzw

Streiner, DL. 1996. Maintaining standards: The difference between the standard deviation and standard error, and when to use each. *Canadian Journal of Psychiatry*, 41, 498-502.

<http://www.ats.ucla.edu/stat/sas/whatstat/whatstat.htm>

http://www.ats.ucla.edu/stat/mult_pkg/whatstat/choosestat.html

Sept. 22 In Class SAS Exercise

Module 3: Experimental and Quasi-Experimental Study Designs (Susan Ennett)

Sept. 27 Fundamentals of Experimentation and Validity Typology

SCC, Chapter 1: Experiments and Generalized Causal Inference, pp. 1-17.

SCC, Chapter 2: Statistical Conclusion Validity and Internal Validity, pp. 33-42; 53-63.

Sept. 29 Pre- Experimental Designs

SCC, Chapter 4: Quasi-Experimental Designs that Lack Either a Control Group or Lack Pretest Observations on the Outcome, pp. 103-111; 115-122.

Allen, M. L., Hurtado, G. A., Yon, K. J., Okuyemi, K. S., Davey, C. S., Marczak, M. S., ... & Svetaz, V. M. (2013). Feasibility of a parenting program to prevent substance use among Latino youth: a community-based participatory research study. *Health Promotion*, 27(4), 240-244.

Homework 2 Due

Oct. 4 Randomization and Experimental Designs

SCC, Chapter 8: Randomized Experiments: Rationale, Designs, and Conditions Conducive to Doing Them, pp. 246-263; 266-278.

Williams, M., Bowen, A., Atkinson, J. S., Nilsson-Schönnesson, L., Diamond, P. M., Ross, M. W., &

Pallonen, U. E. (2012). An assessment of brief group interventions to increase condom use by heterosexual crack smokers living with HIV infection. *AIDS care*, 24(2), 220-231.

Oct. 6 Factorial Designs

SCC, Chapter 8: Randomized Experiments: Rationale, Designs, and Conditions Conducive to Doing Them, pp. 263-266.

Singleton, R.A., & Straits, B.C (2010). Chapter 7: Experimental Designs. In *Approaches to Social Research*, 4th ed. (pp. 200-206). Oxford: Oxford University Press.

Brooner, R. K., Kidorf, M. S., King, V. L., Stoller, K. B., Neufeld, K. J., & Kolodner, K. (2007). Comparing adaptive stepped care and monetary-based voucher interventions for opioid dependence. *Drug and alcohol dependence*, 88, S14-S23.

Oct. 11 **UNIVERSITY DAY - NO CLASS**

TAKE-HOME MIDTERM AVAILABLE OCT 9 AT 8 AM, DUE OCTOBER 12 BY 5 PM.

Oct. 13 In-Class Exercise on Factorial Designs

Ungraded exercise handed out – Design Tables Part I (due on Oct 27, 2016)

Oct. 18 Quasi-Experimental Designs

SCC, Chapter 5: Quasi-experimental designs that use both control groups and pretests, pp. 135-161.

Andersen, S., Rod, M. H., Ersbøll, A. K., Stock, C., Johansen, C., Holmberg, T., ... & Tolstrup, J. S. (2016). Effects of a settings-based intervention to promote student wellbeing and reduce smoking in vocational schools: A non-randomized controlled study. *Social Science & Medicine*, 161, 195-203.

Homework 3 handed out (due on Nov 1, 2016)

Oct. 20 **FALL BREAK - NO CLASS**

Oct. 25 Interrupted Time-Series Designs

SCC, Chapter 6: Quasi-Experiments: Time Series Designs. In *Experimental and quasi-experimental designs*, pp. 171-206.

Wagenaar, A.C., Maldonado-Molina, M. & Wagenaar, B.H. (2009). Effects of alcohol tax increases on alcohol-related disease mortality in Alaska: Time-series analyses from 1976-2004, *American Journal of Public Health*, 99, 1464-1470.

Module 4: Observational Study Designs (Susan Ennett & Luz McNaughton Reyes)

Oct. 27 Cross-Sectional and Repeated Cross-sectional Designs

Rutkowski, E.M. & Connelly, C.D. (2011). Self-efficacy and physical activity in adolescent and parent dyads. *Journal for Specialists in Pediatric Nursing, 17*, 51-60.

Wang, Y.C., Gortmaker, S.L., & Tavernas, E.M. (2011). Trends and racial/ethnic disparities in severe obesity among US children and adolescents, 1976-2006. *International Journal of Pediatric Obesity, 6*, 12-20.

Reither, E.N., Hauser, R.M., & Yang, Y. (2009). Do birth cohorts matter? Age-period-cohort analyses of the obesity epidemic in the United States. *Social Science & Medicine, 69*, 1439-1448.

Ungraded exercise handed out – Design Tables Part 2 (due on November 8, 2016)

Design Tables Part 1 Due

Nov. 1 Longitudinal Panel and Cohort Sequential Designs

Huebner, D. M., Neilands, T. B., Rebchook, G. M., & Kegeles, S. M. (2011). Sorting through chickens and eggs: A longitudinal examination of the associations between attitudes, norms, and sexual risk behavior. *Health Psychology, 30*(1), 110-118.

Miyazaki, Y., & Raudenbush, S.W. (2000). Tests for linkage of multiple cohorts in an accelerated longitudinal design. *Psychological Methods, 5*, 44-63.

Muller, A., Mitchell, J. E., Crosby, R. D., Cao, L., Johnson, J., Claes, L., & de Zwaan, M. (2012). Mood states preceding and following compulsive buying episodes: an ecological momentary assessment study. *Psychiatry Research, 200*, 575-580.

Zeiders, K. H., Umaña-Taylor, A. J., & Derlan, C. L. (2013). Trajectories of depressive symptoms and self-esteem in Latino youths: Examining the role of gender and perceived discrimination. *Developmental psychology, 49*(5), 951-963.

Homework 3 Due

Nov. 3 Multilevel Designs

MacIntyre, S., & Ellaway, A. (2000). Ecological approaches: Rediscovering the role of the physical and social environment. In L. Berkman and I. Kawachi (Eds.), *Social Epidemiology*. Oxford, Oxford University Press.

Blakely and Woodward (2000). Ecological effects in multilevel studies. *J. Epidemiol. Community Health, 54*, p. 367-374.

Kim, D. (2008). Blues from the neighborhood? Neighborhood characteristics and depression. *Epidemiologic Reviews, 30*, 101-117.

Homework 4 handed out (due on November 17, 2016)

Nov. 8 In Class Exercise on Selecting Research Designs
Design Tables Part 2 Due

Module 5: Sampling (Marcy Boynton)

Nov. 10 Introduction to Survey Sampling Design and Methodology

TBD

Nov. 15

Nov. 17 Homework 4 Due

Nov. 22

Nov. 24 **THANKSGIVING - NO CLASS**

Nov. 29

Dec. 1

Dec. 6

Dec. 13 **FINAL EXAM DUE BY 5 PM**