

Behavioral Research Methods and Statistics

MAS class, Spring 2010
MAS 964

Class time:

12:00-3:00, Thursdays
6 week class beginning Feb 4th ending Apr 1st

Location:

E14-525

Credits:

3-0-3, G-level

Instructors:

Matthew Goodwin, Ph.D.
Office Hours: TBD
mgoodwin@media.mit.edu

Elliott Hedman
Office hours: TBD
hedman@mit.edu

Coco Krumme
Office hours: TBD
kak@mit.edu

Professor Rosalind Picard –Faculty Adviser
picard@media.mit.edu

Course Objectives:

In order to design effective experiments and be critical consumers of research, investigators need to be able to generate relevant hypotheses, select appropriate research designs, compute proper statistics, and effectively communicate findings. By the end of the course, students will:

1. Have a thorough understanding of a variety of common research principles, designs, and statistical approaches employed in behavioral research;
2. Be able to address assumptions and limitations of various research designs and statistical approaches;
3. Understand how to formulate and apply hypothesis testing;
4. Get exposure to both qualitative and quantitative analyses. Methods will include ethnography, interviews, surveys, power analysis, effect size estimates, correlation, regression, analysis of variance, repeated measures, and times series analysis; and
5. Communicate statistical results, both written and orally.

Motivation:

For a creative concept to gain traction it must be validated. We intend to introduce students with little or no prior training in behavioral research methods and statistics to evaluate whether a technology, idea, or experimental outcome differs from what would be observed randomly. We also strive to provide tools to better understand the assumptions and limitations of current research. Finally, we hope to promote a learning approach to research design and statistics in line with the Media Lab way of thinking: by drawing examples from real data and providing students with opportunities to learn concepts using their own technology and data.

Guiding Structure:

Following the National Science Foundation's (NSF) *Guidelines for Assessment and Instruction in Statistics Education College Report 2005*, we hope to:

1. Emphasize statistical literacy and develop statistical thinking;
2. Use real data; and
3. Foster active learning in the classroom.

Class Structure: Each class will consist of 3 components (approximately 1 hour each):

Guest Speaker

When applicable, we will invite guest speakers who have expertise in each week's topic area to provide insight on relevant research designs, statistical methods, and common errors in their everyday work.

Discussion

Each class will involve a discussion of the readings and homework assignments, including addressing any questions students have. We will also highlight how the week's concepts have been applied to real data, and review common mistakes and/or biases when applying these methods.

Application

We will take student's research projects from class and discuss their work in the context of current readings and guest lectures.

Required Texts (additional weekly readings are noted in the schedule):

Cohen & Lea (2004). *Essentials of Statistics for the Social and Behavioral Sciences*. New Jersey: Wiley.

Kline (2009). *Becoming a Behavioral Science Researcher: A Guide to Producing Research That Matters*. New York: Guilford Press.

Recommended Texts:

Shadish, Cook, & Campbell (2002). *Experimental and Quasi-Experimental Designs for Generalized Causal Inference*. New York: Houghton Mifflin.

Online Resources:

Lane, D., Lu, J., Peres, C & Zitek, E (2008). *Online Statistics: An Interactive Multimedia Course of Study*. <http://onlinestatbook.com/>

Weekly Assignments:

In order to participate in class discussions, you are responsible for completing readings prior to each class meeting. To ensure productive discussion, we also ask that you critically apply reading topics to your areas of research interest, and complete assigned homework. All homework assignments, unless otherwise noted, are due by 12:00pm (noon) the Wednesday before class.

Grades:

<i>Weekly reading assignments</i>	<i>25%</i>
<i>Weekly application assignments</i>	<i>25%</i>
<i>Class participation</i>	<i>50%</i>
<i>Total</i>	<i>100%</i>

Academic Honesty:

We expect the highest standards of academic integrity, in keeping with MIT's policy: "Fundamental to the principle of independent learning and professional growth is the requirement of honesty and integrity in conduct of one's academic and nonacademic life....Cheating, plagiarism, unauthorized collaboration, and other forms of academic dishonesty are considered serious offenses for which disciplinary penalties can be imposed." All referenced work should be appropriately cited using American Psychological Association (APA) format. Students should feel free to contact course instructors with any questions or concerns regarding these policies.

Schedule:

February 4

Introduction, Course Overview, Getting to Know Each Other

February 11

No Class. Please read and prepare for next class meeting.

February 18

Basic Research Design Principles and Statistics Overview

Readings:

- Kline (2009), chapters 3, 4, & 5

February 25

Qualitative Methods

Readings:

- Chapter 1 from Silverman, D. (2000). *Doing qualitative research: A practical handbook*. Thousand Oaks, CA: Sage.
- Chapter 3 from Creswell, J.W. (2007). *Qualitative inquiry and research design: Choosing among five approaches* (2nd ed.). Thousand Oaks, CA: Sage.
- Poggenpoel, M., Myburgh, C.P.H., & van der Linde, C.H. (2001). Qualitative research strategies as prerequisite for quantitative strategies. *Education*, 122(2), 408-413.

Guest Speaker: Karen Brennan, MIT Media Lab

March 4

Power Analysis and Effect Size Estimation

Readings:

- TBD

Guest Speaker: Dr. Joe Rossi, University of Rhode Island

March 11

Correlation and Multiple Regression

Readings:

- Cohen & Lea (2004), chapter 4

Guest Speaker: TBD

March 18

Analysis of Variance

Readings:

- Cohen & Lea (2004), chapter 5

Guest Speaker: Dr. Kristopher Thornburg

April 1

Repeated Measures and Time Series Analysis

Readings:

- Cohen & Lea (2004), chapter 8
- Velicer & Fava (2003). Time series analysis. In J. A. Schinka & W. F. Velicer (Eds.). *Handbook of Psychology, Volume 2, Research Methods in Psychology*.
- Molenaar (2004). A manifesto on psychology as idiographic science: Bringing the person back into scientific psychology, this time forever. *Measurement, 2*, 201-218.

Guest Speaker: Dr. Wayne Velicer, University of Rhode Island

April 8

Writing Up Findings & Presenting Results

Readings:

- Kline (2009), chapter 9