

Psyc 225 – Spring 2007 WW154 Tuesdays 9:00 – 11:30AM

Graduate Psychological Measurement and Statistics 2

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Course Description

We will examine the logic and application of multiple regression, test development theory, and multivariate statistics that are prominent in psychological research, including the research that students will inevitably do for their theses and dissertations. These include analytic strategies that involve multiple independent and dependent variables. The list of topics and techniques appears in the schedule.

Upon completion of this course, you should be able to: (1) use a broad repertoire of statistical techniques to analyze a wide range of psychological data; (2) formulate problems and design studies that maximize the features of the various statistical techniques; (3) evaluate the propriety of statistical techniques, their possible limitations, as you encounter them in the psychological literature or your own work; (4) correctly interpret results of statistical analyses; (4) use SPSS for the statistical analysis and make good use of its features; (5) develop a working knowledge of psychometric concepts for building psychological measurements.

Readings

The primary text for this course is:
Tabachnick, B. G., & Fidell, L. S. (2007). Using multivariate statistics (5th ed.). Boston: Allyn and Bacon.

There will be a set of journal articles that exemplify the various statistics that we'll cover in class. The articles will be on reserve in Raynor Library. The list of articles will follow separately. Chapters in the text that are assigned for particular weeks of class are designated as TF#. Readings are designated as R#.

Exams

There will be two in-class exams. Exams may consist of computations, data analysis, and interpretation of statistical results. They could involve short answer or essay questions. Material covered in the lecture and the readings will be included on the exam. The midterm and the final are each worth 25% of your grade.

Other assignments

There are four other graded assignments for this course. They first are each worth different percentages of your grade. A brief description of the assignments follow. There may be additional instructions or suggestions forthcoming at a later time.

1. Find a data set. (5%). For this assignment and the two that follow, you should analyze a new data set, i.e., one that you are not already using for a masters thesis, dissertation, or RA assignment. This can be data that you collect on your own, or data that you retrieve from a public archive. You will be using this data set for Assignments 2 and 3. The university has access to some good sites, but you will need to be logging in from an MU computer in order to gain access. Everyone will be expected to give a brief presentation in class on the site that they found and what they retrieved.

Other suggestions for this assignment: Read the study description before downloading the data. Pay close attention to the level of measurement of the variables that you are interested in using. Do not use any online data analysis systems; you will want this data file in SPSS. Start on this task immediately.

An Internal Review Board approval is not necessary for the completion of the class projects with this data. However, if you find any results that you would like to publish or present at a conference, you would need to get an IRB approval.

2. Multiple regression assignment. (10%). Compose a hypothesis that you can test with multiple regression analysis. Turn in a brief write-up of your hypothesis, the description of the variables, type of diagnostics that you used on the data, type of regression analysis that you used, results of course, and your interpretation of those results.

3. Moderator regression assignment. (10%). Compose a hypothesis that you can test using moderator regression. Again turn in a brief write-up of your hypothesis, the description of the variables, type of diagnostics that you used on the data, results, and your interpretation of those results.

4. Data analysis project. (25%). Everyone will be assigned a data analysis project. Projects will cover a broad range of the analyses that are covered in class. A

schedule will be set up where students are assigned a type of analysis to use. The same type of write-up is expected, although each aspect of the write-up would be more extensive. There will also be a class presentation, and the schedule of presentations appears on the timetable.

There should be sufficient review of the topic in the introduction section of the paper to justify your hypotheses and statistical analysis. The methods section should describe the data set that you are analyzing, including participants, measurements (on the ones that you are using), and the experimental or data collection procedures. The results should be thorough, including statistics conducted. Use tables and figures as necessary. The discussion should demonstrate your ability to interpret the results and integrate them in terms of your initial hypotheses and their implications for the study topic. Use the *APA Publication Manual 5th Edition* for all points of style in preparing your write-up.

Week	Topic & Readings
1/16	Review of bivariate regression and its alternative forms. TF 1-3.
1/23	Cleaning data: distributions, transformations, outliers. TF 4.
1/30	Multiple regression. Assignment 1, data sets and class presentation due. Set up selections and schedule for final presentations. TF 5; R1.
2/6	Partial and semipartial correlations, cross-validation.
2/13	Categorical variables, moderators, suppressors, and mediators. R2.
2/20	ANOVA by regression; TF6 R3.
2/27	Analysis of covariance. R4
3/6	MIDTERM EXAM
3/20	Discriminant analysis and canonical correlation. TF 9, 12. R5-6.
3/27	MANOVA TF7-8. Presentations due for discriminant analysis and canonical correlation.
4/3	Factor analysis TF 13, R9-10. Presentations due for MANOVA.
4/10	Psychometric Theory R11. Presentations due for MANOVA.
4/17	Non-normal distributions, events that change over time, nonlinearities, polynomial regression. R12-13. Presentations due for logistic regression, survival analysis, and any technique not already mentioned.
4/24	Nonlinearities and change continued; nonlinear regression. R14.
5/1	Final exam

Grades

Grades are based on the total of points earned on graded assignments: A = 85%; AB = 80%; B = 70%; BC = 65%; C = 60%; F < 60%.

With the exception of scheduled class presentations, assignments will be accepted late with a 5% deduction for each day the assignment is late. Class presentations, however, are meant to be delivered on the scheduled day. If a schedule problem is foreseen in advance, we need to work something out in advance. Emergency considerations will be taken into account on a case-by-case basis.

Psyc 225
Graduate Statistics 2 – Spring 2005
Readings on Reserve:

1. Regression

Hellman, C. M., Hoppes, S., & Ellison, G. C. (2006). Factors associated with college student intent to engage in community service. *The Journal of Psychology, 140*, 29-39.

2. Moderator regression

O'Leary, U.M., Rusch, K. M., & Guastello, S. J. (1991). Estimated age-stratified WAIS-R IQs from scores on the Raven's Standard Progressive Matrices. *Journal of Clinical Psychology, 47*, 277-284.

3. Anova by regression

Baer, M., & Oldham, G.R. (2006). The curvilinear relation between experienced and creative time pressure and creativity: Moderating effects of Openness to Experience and Support for Creativity. *Journal of Applied Psychology, 91*, 963-970.

4. Ancova

Czyzewska, M. & Ginsburg, H. J. (2007). Explicit and implicit effects of anti-marijuana and anti-tobacco TV advertisements. *Addictive Behaviors, 32*, 114-127.

5. Discriminant Analysis

Gupta, R., Derevensky, J., & Ellenbogen, S. (2006). Personality characteristics and risk-taking tendencies among adolescent gamblers. *Canadian Journal of Behavioral Science, 38*, 201-213.

6. Canonical Correlation

Masters, K.S., & Wallston, K.A. (2005). Canonical correlation reveals important relations between health locus of control, coping, affect, and values. *Journal of Health Psychology, 10*, 719-731.

7. MANOVA (used in a repeated measures design)

Guastello, S. J., & Bond, R. W. Jr. (2004). Coordination learning in stag hunt games with application to emergency management. *Nonlinear Dynamics, Psychology, and Life Sciences, 8*, 303-444.

8. MANOVA (actually a MANCOVA)

Guastello, S. J., Guastello, D. D., & Hanson, C. A. (2004). Creativity, mood disorders, and emotional intelligence. *Journal of Creative Behavior, 38*, 260-281.

9. Factor analysis, varimax

Singh, G., Sharan, P., & Kulhara, P. (2003). Phenomenology of hallucinations: A factor analytic approach. *Psychiatry and Clinical Neurosciences, 57*, 333-336

10. Factor analysis, oblique

Guastello, S. J., & Shissler, J. E. (1994). A Two-factor taxonomy of creative behavior. *Journal of Creative Behavior, 28*, 211-221.

11. Psychometric Theory

Guion, R. M. (1998). Assessment, measurement, and prediction for personnel decisions. Mahwah NJ: Lawrence Erlbaum Associates.

12. Non-normal distributions

Guastello, S. J. (2005). Statistical distributions and self-organizing phenomena: What conclusions should be drawn. *Nonlinear Dynamics, Psychology, and Life Sciences, 9*, 463-478.

13. Nonlinear change: Polynomial Regression

Guastello, S. J. (1991). Psychosocial variables related to transit safety. *Work and Stress, 5*, 17-28.

14. Nonlinear change: Nonlinear regression

Guastello, S. J., Pincus, D., & Gunderson, P. R. (2006). Electrodermal arousal between participants in a conversation: Nonlinear dynamics and linkage effects. *Nonlinear Dynamics, Psychology, and Life Sciences, 10*, 365-399.