PSY-6110: Quantitative Methods in Psychology - II
University of Toledo, Department of Psychology
Spring 2013; TR 11:00-12:15, UH 5150F
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Office Hours: TR 1:00-2:00; or by appt.   MF 10-12; or by appt.

Course Goals: This course builds on PSY 6100, Quantitative Methods in Psychology-I, and is designed to solidify knowledge of exploratory data analysis, *t*-tests, effect sizes, power, and ANOVA as well as provide an understanding of correlation, regression, and multiple regression. In addition, practical skills in computerized statistical analysis using SPSS will be emphasized, including using syntax for data management, data transformation, data analysis, and data modeling.

The University of Toledo abides by the Americans with Disabilities Act (equal and timely access) and Section 504 of the Rehabilitation Act of 1973 (non-discrimination on the basis of disability). If you have a disability and are in need of academic accommodations but have not yet registered with the Office of Accessibility (OA) (Rocket Hall 1820; 419-530-4981; officeofaccessibility@utoledo.edu) please contact the office as soon as possible for more information and/or to initiate the process for accessing academic accommodations. I also encourage students with disabilities receiving accommodations through OA to discuss these with me, after class or during my office hours, so that I may be better informed on how to assist you during the semester.

Prerequisites: PSY 6100/7100 or an equivalent course

Texts and Readings:
Primary
Field, A. (2009). *Discovering statistics using SPSS* (3rd Ed.). Thousand Oaks, CA: Sage. (ISBN-10: 1412977525); http://www.statisticshell.com/   http://www.sagepub.com/field3e/MCQ.htm
Howell, D. C. (2011). *Statistical Methods for Psychology* (8th Ed.). Pacific Grove, CA: Duxbury (ISBN-10: 1111835489).; http://www.uvm.edu/~dhowell/methods8/index.html
Secondary
Boslaugh, S. (2004). *An Intermediate Guide to SPSS Programming: Using Syntax for Data Management*. Thousand Oaks, CA: Sage. (ISBN-10: 0761931856)
Green, S. B., & Salkind, N. J. (2010). *Using SPSS for Windows and Macintosh: Analyzing and understanding data* (6th Ed.). Upper Saddle River, NJ: Prentice Hall. (ISBN-10: 0205020402)
Other Helpful Supplies: Calculator, SPSS Graduate Pack (12 month renewable license; $79.99 for standard [Base, Advanced, Regression], $90.99 for Premium [everything but Amos])

Course Requirements:
1.   Attend and participate in class.
2.   Read the texts and other material when they are assigned.
3.   Complete all homework assignments and have them ready to turn in at the start of class.
4.   Successfully complete the exams.
5.   Use the computers during class just for stats; no email, shopping, Facebook, etc.

Grading: Relatively equal emphasis is placed on conceptual knowledge, as demonstrated on exams, and practical knowledge, as demonstrated on homework assignments. Class attendance is expected though no points

are assigned. Lowest values for grades: A = 93% (525), A- = 90% (508), B+ = 87% (491), B = 83% (468), B- = 80% (452), C = 70% (396), D = 60% (339). I will assign grades based on how well you master the material but if the whole class does poorly on an exam or assignment, I will make adjustments. Late assignments lose 10% per day.   Midterm = 30%   Final = 30%   Homework = 40%

Collaboration: It is often very helpful to discuss class or homework topics with classmates. However, you must prepare all the material submitted for a grade on your own. It is not permissible to submit any material prepared by another student. You also may not collaborate during the midterm or final exam.

Schedule: A tentative schedule is below, though it may be adjusted depending on our pace. I anticipate 14 homework assignments, with one due every week. The schedule for the midterm and final will be fixed.

Wk	Date	Topic	Reading	HW Due
1	1/08 - 1/10	Introduction, Orientation, Review and Intro to SPSS History and systems in data analysis	Howell: Ch 1 Field: Ch 1	
2	1/15 1/17	Overview of SPSS: Windows, preferences, keyboard commands, syntax Data Transformations (Compute and recode), Data Functions (Split files, select and weight cases), Data Management (File import and export), Data Restructure (Add cases, add variables, or update, aggregate, cases to variables, variables to cases)	Howell: Ch 2 & 3 Field: Ch 3 Behrens (1997) *EDA*	#1 SPSS Tutorial
3	1/22 1/24	Output Management System (OMS; capturing and reprocessing output) Review - Sampling Error and Confidence Intervals	Howell: Ch 4 Field: Ch 2 & 9	#2 Data Management, Transformations, and Functions
4	1/29 1/31	Effect Sizes Power	McGrath & Meyer (2006), MacCallum et al. (2002), Howell: Ch 8 Cohen (1992)	#3 Sampling Distribution and the CLT
5	2/05 2/07	Oneway ANOVA	Howell: Ch 11 Field: Ch 10	#4 Effect Sizes and Power
6	2/12 2/14	ANOVA Omnibus Statistics vs. Focused Contrasts (linear vs. nonlinear, weights)		#5 Oneway ANOVA
7	2/19 2/21	ANOVA - Multiple Comparisons and Type I Error Control via Bonferroni and Holm's correction; Other Post Hoc Procedures (Larzelere & Mulaik, REGW-Q, Dunett, Games-Howell)	Howell: Ch 12	#6 Focused Contrasts and Multiple Mean Comparisons
8	2/26 2/28	Multifactor ANOVA	Howell: Ch 13 Field: Ch 12	#7 Multifactor ANOVA
9	3/05 3/07	**No Class - Spring Break**		
10	3/12 3/14	Multifactor ANOVA Repeated Measures ANOVA	Howell: Ch 14 Field: Ch 13	Midterm Exam
11	3/19 3/21	Revisiting Interactions: Cell Means vs. Cell Residuals Simple Effects Analysis Correlation [**Meyer gone 3/21**]	Field: Ch 6	#8 Repeated Measures ANOVA
12	3/26 3/28	Influences on Effect Sizes: Range Restriction and Enhancement Differences between dependent and independent correlations	Howell: Ch 9 Howell: Ch 10	
13	4/02 4/04	Regression Multiple Regression	Howell: Ch 15 Field: Ch 7	#9 Correlation
14	4/09 4/11	Multiple Regression		#10 Bivariate and Multiple Reg.
15	4/16 4/18	Multiple Regression: Understanding Interactions (Moderation) Multiple Regression: Moderation; Centered vs. Uncentered Results		#11 Multiple Regression
16	4/23 4/25	Multiple Regression: Understanding Statistical Mediation Factor Analysis	Preacher & Hayes (2008) Field: Ch 17	#12 Moderator Analyses
	Thur 5/02?	Final Exam; (10:15-12:15) UH 5150F	All	Final Exam

Old topics

Wk	Date	Topic	Reading	HW Due
1	1/12 - 1/14	Introduction, Orientation, Review and Intro to SPSS (set preferences, common keyboard commands, 3 types of SPSS windows, introduction to syntax); history and systems in data analysis (traditions in experimental vs. individual differences research); Data management: File import, export, and restructure.	Howell: Ch 1 Field: Ch 1	
2	1/19 - 1/21	Data management: File restructure, data transformations, data functions (split files, select and weight cases)	Behrens (1997) Howell: Ch 2 & 3 Field: Ch 2	#1 SPSS Tutorial
3	1/26 - 1/28	t-test Review (z scores, normal dist, logic of hyp testing, relation of stats in sample to stats in a sampl**ing** dist, central limit theorem, computing $\sigma_{\overline{X}}$ and $\sigma_{\overline{X}_1-\overline{X}_2}$)	Howell: Ch 4 Field: Ch 2 & 7	#2 EDA
4	2/02 - 2/04	t-test Review (difference between z and t, illustrated by SPSS distributions; 1-sample t-test with examples of sampling error in SPSS; independent samples t; confidence intervals; variance sums law; homogeneity of variance, Levine test, paired vs. independent samples t)	Howell: Ch 7	#3 EDA
5	2/09 - 2/11	Effect Sizes (history of ES vs. sig. testing; r and d families; omnibus vs. focused contrast; d vs. g; computing d and g from M and SD for independent samples or from t for paired and independent samples; phi, r_{pb}, r and the "cost of dichotomization;" computing one ES from another; Cohen's benchmarks of small, medium, and large effects for d, r_{pb}, and r)	McGrath & Meyer (2006), MacCallum et al. (2002), Streiner (2002) Howell: Ch 8	#4 t-test
6	2/16 - 2/18	Effect Sizes (cont.); ANOVA (how CLT justifies examining variance to test for mean differences, basic model and notation; assumptions, terms, logic of the null and alt. model)	Howell: Ch 11	#5 ESs
7	2/23 - 2/25	ANOVA (computations by hand and SPSS; assumptions and data transformations; alternatives to t and F with unequal variance; fixed vs. random effects); Power	Howell: Ch 8 Cohen (1992)	#6 Oneway ANOVA
8	3/02 - 3/04	Omnibus Statistics vs. Focused Contrasts (linear vs nonlinear, weights); Focused Contrasts (via polynomials or specifying coefficients, computing r_{ES} from a focused contrast or raw data, r_{ES} vs. $r_{Contrast}$)		#7 ANOVA and Power
9	3/09 - 3/11	**No Class - Spring Break**		
10	3/16 - 3/18	ANOVA - Multiple Comparisons and Type I Error Control via Bonferroni and Holm's correction; Other Post Hoc Procedures (Larzelere & Mulaik, REGW-Q, Dunett, Games-Howell)	Howell: Ch 12	Midterm Exam #8 Power & Contrasts
11	3/23 - 3/25	Multiway ANOVA (2 x 2 example, plotting Ms to identify an interaction; computing SS, df, MS, F, and p for total, factors A and B, cells, interaction, and within groups); Interpreting Interactions (cell means vs. cell residuals); Obtaining and Interpreting Multiway ANOVA in SPSS	Howell: Ch 13	#9 Post Hoc Analyses
12	3/30 - 4/01	Repeated Measures ANOVA (power vs. nonindependence; standard F and sphericity vs. epsilon adj. dfs for F or MANOVA); Repeated Measures ANOVA in SPSS with post hoc paired comparisons	Field: Ch 10	#10 2 x 3 ANOVA w/ interaction

Wk	Date	Topic	Reading	HW Due
13	4/06 - 4/08	Correlation and Regression (definitions, example scatterplots for diff. rs and impact of sampling error on r; marginal and conditional distributions, homoscedasticity, components of regression line, prediction)	Howell: Ch 14 Field: Ch 11	#11 RM ANOVA
14	4/13 - 4/15	Correlation and Regression ($SS_{residual}$ and $SE_{Estimate}$; formulas to test sig. of r, compute CIs and Zr, compare 2 independent rs and diff types of dependent rs; plots of range restriction and enhancement; point-biserial, phi, Spearman's rho; biserial and tetrachoric)	Howell: Ch 9 Field: Ch 4	#12 Correlation
15	4/20 - 4/22	Multiple Regression (logic of multivariable prediction; defining b, β, Y-hat, r, R, r^2, R^2, $SS_{Regression}$, SS_{Total}; running an example, tolerance, partial and semipartial r, 3 main types of regression)	Howell: Ch 10 Field: Ch 5	#13 Bivariate Regression
16	4/27 - 4/29	Multiple Regression (regression diagnostics; moderators and mediators; testing and visualizing interactions; testing for full and partial mediation)	Howell: Ch 15 Field: Ch 5	#14 Multiple Regression
	5/07	Final Exam; 10:15-12:15 UH5600	All	#15 Moderators & Mediators in Regression

Potential Topics
Stats: ANCOVA, Logistic Regression, Factor Analysis, Discriminant Function, Meta-Analysis
SPSS: Merge Files, Restructure Files, Aggregate, OMS, OLAP Cubes, Read Data Files