

Course Syllabus

Psychology 520t Advanced ANOVA and Longitudinal Designs/Research

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2002 Spring Semester, CSUF
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M 11-1pm, W 5:30-6:30
1-hour E-mail

Course Description/Objectives:

The primary intent of this course is to develop advanced skills with ANOVA and ANOVA-related designs. An intensive study of analysis of variance designs will be undertaken, including Latin squares, repeated measures, MANOVA repeated measures, and mixed designs. Further, newer techniques for longitudinal designs will be addressed, including hierarchical models and individual growth models.

The second intent will focus on issues surrounding the philosophy of research designs. In addition, research creativity, theory generation, and conceptual framing will be addressed.

Grading

The course will be based on the following:

- 15% class participation in discussion
- 40% statistics assignments
- 30% task diary quality, completion
- 15% class presentation

Statistical Homework:

Exercises will be assigned every 3rd week. Grading will be on a 11-point scale. Late homework will be penalized 1-pt per week late. Accompanying the computer output for each exercise should be a brief (5 page) summary, including interpretation of findings written in APA results style (w/annotated output).

Task Diary:

Task diaries will consist of small projects assigned to the student regarding research philosophies, creativity, and conceptual framing. There will be approximately five small projects. In addition, research concept papers will be revised (TD #2) throughout the term. Task diaries will be graded on a 3-pt scale (excellent, good, adequate). Below-adequate tasks will be redone.

Presentation:

Students will be asked to nonverbally present their concepts to the class. Class discussion/ideas will drive the boundaries of this approach. Presentations will be graded on an 11-pt scale.

Required reading:

Course readings will include books, book chapters, and articles. Below is a listing of required and optional readings. Some variations are expected given the flow of the course.

Statistical Texts

Howell, D.C. (2002). *Statistical methods for psychology* (5th ed.). Duxbury.

Tabachnick, B.G., & Fidell, L.S. (2001). *Computer-assisted research design and analysis*. Boston: Allyn & Bacon.

Statistical Excerpts and Articles

Bryk, A.S., & Raudenbush, S.W. (1992). *Hierarchical linear models: Applications and data analysis methods*. Newbury Park, CA: Sage.

Delucchi, K., & Bostrom, A. (1999). Small sample longitudinal clinical trials with missing data: A comparison of analytic methods. *Psychological Methods*, 4(2), 158-172.

Games, P.A., Keselman, H.J., & Rogan, J.C. (1981). Simultaneous pairwise multiple comparison procedures for means when sample sizes are unequal. *Psychological Bulletin*, 90(3), 594-598.

Green, Salkind, & Akey (2000). *Using SPSS for windows: Analyzing and understanding data*. Prentice Hall.

Huck, S. W., McLean, R.A. (1975). Using a repeated measures ANOVA to analyze the data from a pretest-posttest design: A potentially confusing task. *Psychological Bulletin*, 82(4), 511-518.

Hull, C.H. & Nie, N.H. (1981). *SPSS Update 7-9: New procedures and facilities for releases 7-9*. NY: McGraw-Hill.

Jennings, E. (1988). Models for pretest-posttest data: Repeated measures ANOVA revisited. *Journal of Educational Statistics*, 13, 273-280.

Judd, C.M., Kenny, D.A., & McClelland, G.H. (2001). Estimating and testing mediation and moderation in within-subjects designs. *Psychological Methods*, 6(2), 115-134.

Maxwell (1980). Pairwise multiple comparisons in repeated measures designs.

Nagin, D.S. (1999). Analyzing developmental trajectories: A semiparametric, group-based approach. *Psychological Methods*, 4(2), 139-157.

- Nezlek, J.B., & Zyzniewski, L.E. (1998). Using hierarchical linear modeling to analyze grouped data. *Group Dynamics: Theory, research, and practice*, 2(4), 313-319.
- O'Brien, R. G., & Kaiser, M.K. (1985). MANOVA method for analyzing repeated measures designs: An extensive primer. *Psychological Bulletin*, 97(2), 316-333.
- Romaniuk, J. G., Levin, J.R., & Hubert, L.J. (1977). Hypothesis-testing procedures in repeated-measures designs: On the road map not taken. *Child Development*, 48, 1757-1760.
- Sheeber, L. B., Sorensen, E.D., Howe, S.R. (1996). Data analytic techniques for treatment outcome studies with pretest/posttest measurements: An extensive primer. *Journal of Psychiatric Research*, 30(3), 185-199.
- Singer, J.D. (1998). Using SAS Proc Mixed to fit multilevel models, hierarchical models, and individual growth models. *Journal of Educational and behavior Statistics*, 24, 323-355.
- SPSS (1993). Testing simple effects in MANOVA. *Keywords* (No. 51), 10-14.
- Stevens, J. (1996). *Applied multivariate statistics for the social sciences* (3rd ed.). Erlbaum.
- Thompson, B. (1994). Guidelines for authors. *Educational and Psychological Measurement*, 54(4), 837-847.
- Wilkinson, L., & Task Force on Statistical Inference (1999). Statistical methods in psychology journals: Guidelines and explanations. *American Psychologist*, 54(8), 594-604.
- Winer, B.J. (1971). *Statistical principles in experimental design* (2nd ed.). NY: McGraw-Hill.

Research-Creativity Texts

Feynman, R.P. (1999). *The pleasure of finding things out: The best short works of Richard P. Feynman*. Cambridge, M.A.: Perseus.

Petroski, H. (1992). *To engineer is human: The role of failure in successful design*. NY: Vintage.

Pirsig, R.M. (1984). *Zen and the art of motorcycle maintenance: An inquiry into values*. Bantam.

Stokes, D.E. (1997). *Pasteur's quadrant: Basic science and technological innovation*. Washington, D.C.: Brookings Institute.

Research-Creativity/Conceptual Framework Excerpts and Articles

Cohen, J. (1990). Things I have learned (so far). *American Psychologist*, 45, 1304-1312.

Flower, L. (1981). *Problem-solving strategies for writing*. NY: Harcourt Brace Jovanovich.

Forscher, B.K. (1963, letter). Chaos in the brickyard. *Science*.

Hall & Wecker (1995). *Jump start your brain*. Warner books.

Horowitz, L. (1984). *Knowing where to look: The ultimate guide to research*. Cincinnati, OH: Writer's Digest Books.

Nelms, H. (1981). *Thinking with a pencil*. Berkeley, CA: Ten Speed Press.

Platt, J.R. (1964). Strong inference. *Science*, 146, 347-353.

Schotzman, L., & Strauss, A. (1973). *Field research: Strategies for a natural sociology*. Englewood Cliffs, NJ: Prentice Hall.

Smith, N.L. (1981). *Metaphors for evaluation*. Beverly Hills, CA: Sage.

Sommer, R., & Sommer, B.B. (1986). *A practical guide to behavioral research: Tools and techniques* (2nd ed.). NY: Oxford University Press.

Turner, V. (1974). *Dramas, fields, and metaphors*. Ithaca, NY: Cornell University Press.

Weick, K.E. (1979). *The social psychology of organizing*. Reading, MA: Addison-Wesley.

Weiner, B. (1991). Metaphors in motivation and attribution. *American Psychologist*, 46, 921-930.

Wicker, A.W. (1985). Getting out of conceptual ruts: Strategies for expanding conceptual frameworks. *American Psychologist*, 40, 1094-1103.

<u>Week</u>	<u>Stats Topic</u>	<u>Research Topic</u>
1	<p>Overview of Course</p> <p><u>Advanced ANOVA Models</u> Review of basic 1-way and 2-way ANOVA <i>Read - Howell or T/F</i></p>	<p><u>Philos of Research & Research Struggle</u> [TD #1 Applied Research/Stokes] Derive Concept area <i>Read - Pirsig, Stokes</i></p>
2	<p>Latin squares [Stat #1 assigned] <i>Read - T/F</i></p>	<p><i>Read - Petroski</i> <i>Read - Pirsig</i> <i>Read - Platt article</i></p>
3		<p>Reading Discussion [TD#2 - concept def]</p>
4	<p><u>ANOVA & Longitudinal Data</u> Review simple repeated measures 2-way all within Latin squares with repeated data <i>Read - Howell or T/F</i></p>	<p>Pirsig Discussion</p>
5	<p>MANOVA approach to repeated measures Doubly MANOVA [Stat #2 assigned] <i>Read - Howell or T/F</i> <i>Read - Maxwell article</i> <i>Read - Romaniuk et al. article</i> <i>Read - O'Brien & Kaiser article</i> <i>Read - Weinfurt (important)</i></p>	

<u>Week</u>	<u>Stats Topic</u>	<u>Research Topic</u>
6		<u>Creativity/Conceptual Framing</u> Experiential tasks <i>Read - Feynman</i> <i>Read - Wicker article</i> <i>Read - Flower article</i>
7	<u>Mixed Designs</u> Introduction Pre/Post test designs <i>Read - Huck & McLean</i> <i>Read - Weinfurt</i>	[TD #3 - Metaphors] Reading Discussion <i>Read - Weick article</i> <i>Read - Wicker article</i> <i>Read - Smith article</i> <i>Read - Turner article</i> <i>Read - Weiner article</i>
8	<u>Mixed Designs</u> Difference scores Analysis of Covariance <i>Read - Sheeber et al. article</i> <i>Read - Huck & McLean</i> [Stat #3 assigned]	Reading Discussion <i>Read - Nelms article</i>
9		[TD #4 - Observations] Reading Discussion <i>Read - Sommer & Sommer article</i> <i>Read - Schotzman, L., & Strauss article</i>

10	<u>Hierarchical Models and Growth Curves</u> Introduction <i>Read - Singer article</i> <i>Read - Weinfurt</i>	Reading Discussion [TD #5 - Stats] <i>Read - Horowitz article</i>
11	Growth Curves Compared to MANOVA RM	
12	[Stat #4 assigned]	Reading Discussion
13		Reading Discussion Concept Revisions General Feedback [TD #6 - Final Rev Concept]
14	Presentations	
15	Presentations	[Task Diary Due]
16	Presentations	

The above schedule and procedures in this course are subject to change in the event of unforeseen circumstances, or if we decide to spend additional time on a few of the topics.