

SYLLABUS

Course: PSY675 (section 29886); Seminar in Psychological Measurement

Course Description General principles, theory and methods underlying measurement in studies of group and individual differences in controlled experiments..

Prerequisites: Psychology 370 and consent of master's program advisor.

Credit: 3 units

Semester: Spring, 2008

Time: Tuesday & Thursday 1230-1345 (12:30 to 1:45 pm)

Location: SH-143

Instructor: Dale N. Glaser, Ph.D.

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Course Objectives

A background in psychometric theory and measurement methods is imperative in order to conduct, interpret, and apply psychological research. Interestingly, many major advances made in relation to the measurement process have been employed extensively in other sciences (e.g., econometrics, biometrics, sociometrics, chemometrics, and a new one I recently heard about: envirometrics!!), a great deal of the progress in measurement was generated by the psychological sciences (e.g., reliability, validity, etc.), presumably due to the variable (and latent) nature of our units of analysis (i.e., people!) and the types of variables we examine (e.g., depression, anxiety, organizational commitment, etc.). This course is designed for the beginning graduate student, particularly those anticipating further work in domains of psychology that entail some application or interpretation of the measurement process (e.g., I/O Psychology, Clinical Psychology, Experimental Psychology, etc.) or in the development of psychometric instruments (i.e., test developer, quantitative methodologist, statistician, survey research, etc.). The course is intended to provide the student with an understanding of psychometric theory in general, familiarity with the various publications in psychometrics, current issues and methods in psychological measurement, and the application of measurement principles and methods in the psychological sciences. The primary objectives for this course are to demonstrate understanding of:

- 1) classical psychometric theory
- 2) modern measurement models, controversies, and developments
- 3) methods for measuring individual differences in ability, achievement, interests, personality, knowledge, skills, performance, and other psychological traits
- 4) standards of measurement in applied settings

Course Requirements

- 1) Given the comprehensive (and cumulative) nature of the curriculum, **attendance** is strongly encouraged and should be adhered to per school policy; also, given the frequent reference to quantitative methods, it would be advantageous to have a basic hand calculator available during classtime (and during the tests).
- 2) **Short Papers.** A series of papers will be assigned that will correspond to the chapters in the primary text. For some of the assignments analysis in SPSS and interpretations of the results will be required. It will be permitted that you work in dyads (and if for compelling reasons, triads!!!!), though keep in mind that all participants are expected to expend equal efforts (i.e., watch for social loafing effect!). All assignments are expected to be typed/double-spaced and conform to APA style (total 120 points)

- 3) **Midterm and Final Exam.** Will consist of short essay, multiple choice, and true/false items. (100 points each exam)
- 4) **Presentation/Paper.** The Joint Committee on the Standards for Educational and Psychological Testing have recently published the revised standards (the most recent prior to the 1999 version being 1985, though I believe they are in the process of updating the 1999 version); this is a collaborative work by the American Educational Research Association, American Psychological Association, and the National Council on Measurement in Education. Students will be expected to give a professional presentation on the assigned chapter and discuss its relevance to application, especially in the sphere of organizational/clinical psychology. They will be expected to *engage* the class in a discussion about the proposed standards and not just READ the standards aloud. A brief paper will entail discussion of the standards and implications for practice (80 points).

Grading

25% each will be accorded to the midterm and the final, 30% for the papers, and 20% for the presentation/paper, thus anticipated total points of 400. Grading will be commensurate with school policy. Make-up of assignments will be granted only when notification is provided **prior** to assignment. Extra credit will not be provided!

Required Texts

Nunnally, J. C. & Bernstein, I. H. (1994). Psychometric Theory. (3rd Ed.). NY, NY: McGraw-Hill. (N/B)

AERA, APA, NCME (1999). Standards for Educational and Psychological Testing. DC: AERA. (Standards)

Recommended Readings

All *journal articles* listed below are recommended reading; if possible, throughout the semester I will append some of the articles on Blackboard.

And if you are particularly interested, this relatively recent release may captivate you:

Maydeu-Olivares, A. & McArdle, J. J. (2005). *Contemporary psychometrics*. (Ed.). Mahwah, NJ: Lawrence Erlbaum.

....as well as:

Embretson, S. E., & Hershberger, S. L. (1999). *The new rules of measurement*. (Ed.). Mahwah, NJ: Lawrence Erlbaum.

..and a text dedicated to measurement in industry:

Whetzel, D. L. & Wheaton, G. R. (1997). Applied Measurement Methods in Industrial Psychology. Palo Alto, CA: Davies-Black Publishing.

Feb. 19- 21

Linear combinations and regression

Required Readings: Chap. 5 (N/B)
Chap. 6 (Standards)

LeBreton, J. M., Hargis, M. B., Griepentrog, B., Oswald, F. L., & Ployhart, R. E. (2007). A multidimensional approach for evaluating variables in organizational research and practice. Personnel Psychology, 60, 475-498.

Feb. 26- 28

Measurement error

Required Readings: Chap. 6 (N/B)
Chap. 7 (Standards)

Schmidt, F. L., & Hunter, J. E. (1996). Measurement error in psychological research: Lessons from 26 research scenarios. Psychological Methods, 1(2), 199-223.

Dudek, F. J. (1979). The continuing misinterpretation of the standard error of measurement. Psychological Bulletin, 86(2), 335-337.

+ a great text solely devoted to measurement error!!:

Viswanathan, M. (2005). *Measurement error and research design*. Thousand Oaks, CA: Sage.

Mar. 4-6

Reliability

Required Readings: Chap. 7 (N/B)
Chap. 2 (standards)

Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. Journal of Applied Psychology, 78(1), 98-104.

Shavelson, R. J., Webb, N. W., & Rowley, G. L. (1989). Generalizability theory. American Psychologist, 44(6), 92-932.

Feldt, L. S. (1997). Can validity rise when reliability declines? Applied Measurement in Education, 10(4), 377-387.

Relatively recent text:

Thompson, B. (2003). *Score reliability*. (Ed). Thousand Oaks, CA; Sage.

Mar. 11-13

MIDTERM

Test construction

Required Readings: Chap. 8 (N/B)

Gardner, D. G., Cummings, L. L., Dunham, R. B., & Pierce, J. L. (1998). Single-item versus multiple-item measurement scales: An empirical comparison. Educational and Psychological Measurement, 58(6), 898-915.

Texts on scale and test development/procedures:

DeVellis, R. F. (2003). Scale development. (2nd Ed.). Thousand Oaks, CA: Sage.

Netmeyer, R. G., Bearden, W. O., & Sharma, S. (2003). Scaling Procedures. Thousand Oaks, CA: Sage.

Mar 18-20

Classical Test Theory

Required Readings: Chap. 8 (con't); Chap. 9 (N/B)
Chap. 3 (Standards)

Hunter, J. E., & Schmidt, F. L. (1976). Critical analysis of the statistical and ethical implications of various definitions of *test bias*. Psychological Bulletin, 83(6), 1053-1071.

Cooper, W. H. (1981). Ubiquitous halo. Psychological Bulletin, 90(2), 218-244.

Mar. 25-27

Recent developments in test theory

Required Readings: Chap. 10 (N/B)
Chap. 8 and Chap. 11 (Standards)

Thissen, D., & Steinberg, L. (1988). Data analysis using item response theory. Psychological Bulletin, 104(3), 385-395.

Lord, F. M. (1953). The relation of test score to the trait underlying the test. Educational and Psychological Measurement, 13, 517-549.

Feld, L. S. (1993). The relationship between the distribution of item difficulties and test reliability. Applied Measurement in Education, 6(1), 37-48.

And possible text of interest:

Baker, F. B., & Kim, S.H. (2004). Item response theory: Parameter estimation techniques. (2nd. Ed). NY: Marcel Dekker.

Apr 1 & 3

Spring Recess: No Class!!!!

Apr. 8

Factor analysis: topics and issues + "guess that factor" **Discuss cancelled 4/10 (SIOP)**

Required Readings: Chap. 11 and 12 (N/B)
Chap. 9 (Standards)

Gorsuch, G. L. (1990). Common factor analysis versus component analysis: Some well and little known facts. Multivariate Behavioral Research, 25(1), 33-39.

Velicer, W. F., & Jackson, D. N. (1990). Component analysis versus common factor analysis: Some issues in selecting an appropriate procedure. Multivariate Behavioral Research, 25(1), 1-28.

Ford, J. K., MacCallum R. C., & Tait, M. (1986). The application of exploratory factor analysis in applied psychology: A critical review and analysis. Personnel Psychology, 39, 291-314.

Fabrigar, L. R., Wegener, D. T., MacCallum, R. C., & Strahan, E. J. (1999). Evaluating the use of exploratory factor analysis in psychological research. Psychological Methods, 4, 272-299.

Hensen, R. K., & Roberts, J. K. (2006). Use of exploratory factor analysis in published research. Educational and Psychological Measurement, 66, 393-416.

Apr. 15-17

EFA (con't); Confirmatory factor analysis

Required Readings: Chap 12 (con't); Chap. 13 (N/B)
Chap. 10 (Standards)

Medsker, G. J., Williams, L. J., & Holahan, P. J. (1994). A review of current practices for evaluating causal models in organizational behavior and human resources management research. Journal of Management, 20(2), 439-464.

Brannick, M. T. (1995). Critical comments on applying covariance structure modeling. Journal of Organizational Behavior, 16, 201-213.

Williams, L. J. (1995). Covariance structure modeling in organizational research: problems with the method versus applications of the method. Journal of Organizational Behavior, 16, 225-233.

Hurley, A. E., Scandura, T. A., Schriesheim, C. A., Brannick, M. T., Seers, A., Vandenberg, R. J., & Williams, L. J. (1997). Exploratory and confirmatory factory analysis: Guidelines, issues, and alternatives. Journal of Organizational Behavior, 18, 665-683.

User friendly text re: EFA and CFA:

Thompson, B. (2004). *Exploratory and confirmatory factor analysis*. DC: American Psychological Association.

Apr. 22-24

CFA (con't); Other statistical models

Required Readings: Chap 12 (con't); Chap. 14 (N/B)-[select parts—especially discriminant analysis]
Chap. 12 and Chap. 13 (Standards)

Apr. 29-May 1

Other statistical models (con't); Categorical data and related procedures

Required Readings: Chap. 15 (N/B)
Chap. 14 and Chap. 15 (Standards)

White, M., Tansey, R, Smith, M., & Barnett, T. (1993). Log-linear modeling in personnel research. Personnel Psychology, 46, 667--686.

May 6-8

Categorical data and related procedures (con't)--and catch-up!!

Required Readings: Chap. 15 (N/B)
Chap. 14 and Chap. 15 (Standards)

Cortina, J. M. (2002). Big things have small beginnings: An assortment of "minor" methodological misunderstandings. Journal of Management, 28, 339-362.

May 13

Final Exam: 1300-1500 (1:00 to 3:00 pm) (per catalogue)

Relevant Articles from Journal of Personality Assessment

- Streiner, D. L. (2003). Starting at the beginning: An introduction to coefficient alpha and internal consistency. *Journal of Personality Assessment*, 80, 99-103.
- Streiner, D. L. (2003). Being inconsistent about consistency: When coefficient alpha does and doesn't matter. *Journal of Personality Assessment*, 80, 217-222.
- Reise, S. P., & Henson, J. M. (2003). A discussion of modern versus traditional psychometrics as applied to personality assessment scales. *Journal of Personality Assessment*, 81, 93-103.
- Streiner, D. L. (2003). Diagnosing tests: Using and misusing diagnostic and screening tests. *Journal of Personality Assessment*, 81, 209-219.
- Wise, E. A. (2004). Methods for analyzing psychotherapy outcomes: A review of clinical significance, reliable change, and recommendations for future directions. *Journal of Personality Assessment*, 82, 50-59.
- Bauer, S., Lambert, M. J., & Nielsen, S. L. (2004). Clinical significance methods: A comparison of statistical techniques. *Journal of Personality Assessment*, 82, 60-70.
- Hofstee, W. K. B., & Ten Berge, J. M. F. (2004). Personality in proportion: A bipolar proportional scale for personality assessments and its consequences for trait structure. *Journal of Personality Assessment*, 83, 120-127.
- Sherry, A., & Henson, R. K. (2005). Conducting and Interpreting Canonical Correlation Analysis in Personality Research: A User-Friendly Primer. *Journal of Personality Assessment*, 84, 37-48.
- Reise, S. P., & Haviland, M. G. (2005). Item Response Theory and the Measurement of Clinical Change. *Journal of Personality Assessment*, 84, 228-238.
- McGrath, R. E. (2005). Conceptual Complexity and Construct Validity. *Journal of Personality Assessment*, 85, 112-124.
- Byrne, B. M. (2005). Factor Analytic Models: Viewing the Structure of an Assessment Instrument From Three Perspectives. *Journal of Personality Assessment*, 85, 17-32.
- Steger, M. F. (2006). An Illustration of Issues in Factor Extraction and Identification of Dimensionality in Psychological Assessment Data. *Journal of Personality Assessment*, 86, 263-272.
- Reise, S. P., Ventura, J., Nuechterlein, K. H., & Kim, K. H. (2005). An Illustration of Multilevel Factor Analysis. *Journal of Personality Assessment*, 84, 126-136.
- Ullman, J. B. (2006). Structural Equation Modeling: Reviewing the Basics and Moving Forward. *Journal of Personality Assessment*, 87, 35-50.
- Stein, J. A., Lee, J. W., & Jones, P. S. (2006). Assessing Cross-Cultural Differences Through Use of Multiple-Group Invariance Analyses. *Journal of Personality Assessment*, 87, 249-258.
- Rouse, S. V. (2007). Using reliability generalization methods to explore measurement error: An illustration using the MMPI-2 PSY-5 Scales. *Journal of Personality Assessment*, 88, 264-275.