

PSYCHOMETRIC METHODS  
(Fall 2005, PSY 317)

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Office Hours: M: 3:00 - 5:00, and by appointment  
Lectures: W: 4:10 - 7:00, Hobbs 100A

I. Course Objectives: The basic objectives of this course are for you to learn the fundamental concepts, methods, and principles of educational and psychological measurement. Particular attention will be devoted to reliability and validity issues underlying psychometric theory, and how psychometric theory relates to the assessment of individual differences or human variation more generally.

II. Grading: Course grades will be based on “points” accumulated from 3 sources.

(1) Midterm Exam (35%)

(2) Two Quizzes (20%) – 10% each

(3) Final Exam (45%)

The midterm and final exams will consist of closed-book essay questions. The two quizzes will be open-book, and consist mostly of computational problems. (Hence, you will not be required to memorize any formulas for this class. You will, however, be required to use them and perform computations.)

Text: Crocker, L., & Algina, J. (1986). *Introduction to Classical & Modern Test Theory*.  
Wadsworth: Thompson Learning.

COURSE SYLLABUS

DATE	DAY	TOPIC	READINGS
Aug. 24	W	Introduction/ History	C&A, Ch 1 Lubinski (1996)
Aug. 31	W	Statistics Review	C&A, Ch 2 & 3 Sackett & Yang (2000)
Sept. 7	W	Validity Construct Validity Construct Representation/ Nomothetic Span	Cronbach & Meehl (1955) C&A, Ch 10 Embretson (1983)
Sept. 14	W	Multitrait Multimethod Matrix Convergent/Discriminant Validity	Campbell & Fiske (1959, pp. 81-85, 100-104)
Sept. 21	W	Extrinsic Convergent Validity Validity: Taylor-Russell Tables	C&A, Ch 11 Handout
Sept. 28	W	Multiple Regression Incremental Validity	Handout Sanders et al (1995) Judge et al. (2002)
Oct. 5	W	[Quiz #1, & Midterm Exam]	
Oct. 12	W	Moderator & Suppressor Variables	Dawes et al (1989)
Oct. 19	W	Replication/Cross-validation	Grove & Meehl (1996)
Oct. 26	W	Classical Reliability Theory Classical Reliability Theory	C&A, Ch 6 & 7 Green (1978); Schmidt & Hunter (1997)
Nov. 2	W	Test Bias, ATIs, Scale Development	Cronbach (1957) Dawis (2000); Tellegen (1985)
Nov. 9	W	Factor Analysis	C&A, Ch 13 Handout
Nov. 16	W	Item Response Theory	Weiss (1995); C&A, Ch 13 Reise et al. (2005)
Nov. 23	W	[Thanksgiving, No Class]	
Nov. 30	W	[Quiz #2]	
Dec. 7	W	Theory/Review	
<b>Dec 14</b>		<b>Final Exam, Wednesday (5:00-7:00 PM)</b>	

## REQUIRED READINGS

- Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin*, *56*, 81-105.
- Cronbach, L. J. (1957). The two disciplines of scientific psychology. *American Psychologist*, *12*, 671-684.
- Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. *Psychological Bulletin*, *52*, 281-302.
- Dawes, R. M., Faust, D., & Meehl, P. E. (1989). Clinical versus actuarial judgment. *Science*, *243*, 1669-1674.
- Dawis, R. V. (2000). Scale construction and psychometric considerations. In H. E. A. Tinsley and S. Brown (Eds.) *Handbook of applied multivariate methods statistics and mathematical modeling* (pp. 65-94). San Diego: Academic Press.
- †Embretson, S. E. (1983). Construct validity: Construct representation versus nomothetic span. *Psychological Bulletin*, *93*, 179-197.
- Green, B. F. (1978). In defense of measurement. *American Psychologist*, *33*, 664-670.
- Grove, W. M., & Meehl, P. E. (1996). Comparative efficiency of formal (mechanical, algorithmic) and informal (subjective, impressionistic) prediction procedures: The clinical/statistical controversy. *Psychology, Public Policy, and Law*, *2*, 293-323.
- †Gustafsson, J. E. (2002). Measurement from a hierarchical point of view. In H. L. Braun, D. G. Jackson, & D. E. Wiley (Eds.) (2002). *The role of constructs in psychological and educational measurement* (pp. 73-95). Mahwah, NJ: Erlbaum.
- Judge, T. A., Erez, A., Bono, J. E., & Thoresen, C. J. (2002). Are measures of self-esteem, neuroticism, locus of control, and generalized self-efficacy indicators of a common core construct? *Journal of Personality and Social Psychology*, *83*, 693-710.
- †Loevinger, J. (1957). Objective tests as instruments of psychological theory. *Psychological Reports*, *3*, 635-694.
- Lubinski, D. (1996). Applied individual differences research and its quantitative methods. *Psychology, Public Policy, and Law*, *2*, 187-203.
- †Lubinski, D., & Dawis, R. V. (1992). Aptitudes, skills, and proficiencies. In M. D.

- Dunnette & L. Hough (Eds.) *Handbook of Industrial and Organizational Psychology* (2nd ed., vol. 3, pp. 1-59). Palo Alto: Consulting Psychologists Press.
- Reise, S. P., Ainsworth, A. T., & Haviland, M. G. (2005). Item response theory: Fundamentals, applications, and promise in psychological research. *Current Directions in Psychological Science*, *14*, 95-101.
- †Rodgers, J. L., & Nicewander, W. A. (1988). Thirteen ways to look at a correlation coefficient. *The American Statistician*, *42*, 59-66.
- Sackett, P. R., & Yang, H. (2000). Correction for range restriction: An expanded typology. *Journal of Applied Psychology*, *85*, 112-118.
- Sanders, C. E., Lubinski, D., & Benbow, C. P. (1995). Does the Defining Issues Tests measure psychological phenomena distinct from verbal ability: An examination of Lykken's query. *Journal of Personality and Social Psychology*, *69*, 498-504.
- Schmidt, F. L., & Hunter, J. E. (1997). Measurement error in psychological research: Lessons from 26 research scenarios. *Psychological Methods*, *1*, 199-223.
- Tellegen, A. (1985). Structures of mood and personality and their relevance to assessing anxiety, with an emphasis on self-report. In A. H. Tuma & J. D. Maser (Eds.) *Anxiety and the anxiety disorders* (pp. 681-706). Hillsdale, NJ: Erlbaum.
- Weiss, D. J. (1995). Improving individual differences measurement with item response theory and computerized adaptive testing. In D. Lubinski and R. V. Dawis (Eds.) *Assessing individual differences in human behavior: New concepts, methods, and findings* (pp. 49-79). Palo Alto, CA: Davies-Black.

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Supplementary readings/Reference Texts

- American Educational Research Association (AERA), American Psychological Association (APA), & National Council on Measurement in Education (NCME). (1999). *Standards for educational and psychological testing*. Washington, DC: American Psychological Association.
- Braun, H. I., Jackson, D. G., & Wiley, D. E. (Eds.) (2002). *The role of constructs in psychological and educational measurement*. Mahwah, NJ: Erlbaum.
- Cronbach, L. J. (1989). Construct validity after thirty years. In R. L. Linn (Eds.) *Intelligence: Measurement, theory, and public policy* (pp. 147-171). Urbana: University of Illinois Press.
- Embretson, S. E., & Hershberger, S. L. (1999). *The new rules of measurement: What every psychologist and educator should know*. Mahwah, NJ: Erlbaum.
- Gulliksen, H. (1950). *Theory of mental tests*. New York: John Wiley & Sons.
- Linn, R. L. (1989). (Eds.) *Educational measurement* (3ed ed.). New York: Macmillan.
- Lord, F. M., & Novick, M. R. (1968). *Statistical theory of mental test scores*. Reading, MA: Addison-Wesley.
- McDonald, R. P. (1999). *Test theory: A unified treatment*. Mahwah, NJ: Erlbaum.
- Thorndike, R. M., & Lohman, D. F. (1990). *A century of ability testing*. Chicago: Riverside.

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Corno, L., Cronbach, L. J., et al. (Eds.) (2002). *Remaking the concept of aptitude: Extending the legacy of Richard E. Snow*. Mahwah, NJ: Earlbaum.

Jackson, D. N., & Messick, S. (1967). *Problems in human assessment*. New York: McGraw-Hill.

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). *Experimental and quasi-experimental designs for generalized causal inference*. New York: MacMillan.

Wiggins, J. S. (1973). *Personality and prediction: Principles of personality assessment*. Reading, Mass: Addison-Wesley

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American Psychological Association Division 12 (Clinical) Presidential Task Force (1999). Assessment for the twenty-first century: A model curriculum. *The Clinical Psychologist*, 52, 10-15.

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