

**Psychology 5-862**  
**Psychological Measurement: Theory and Methods**

Instructor:  
David J. Weiss  
N660a Elliott Hall

Fall 2009  
N391 Elliott Hall  
T, Th 11:15 - 12:30

Office hours:  
By appointment only  
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**Teaching Assistants:**

Jieun Lee, N663 EltH; Phone: 612-626-1017, E-mail: leex3828@umn.edu; Office hours: Fridays 2:00 – 3:00 p.m.  
Shannon Von Minden, N663 EltH; Phone: 612-626-1017, Email: thom2798@umn.edu;  
Office hours: Thursday 10:00 – 11:00.

All reading assignments (except the required textbook) are available on the course Web site:  
<https://moodle.umn.edu/course/view.php?id=6395>

There is a course lecture notes packet available at the Coffman Union Bookstore (\$22.20). This packet, which includes over 250 pages of lecture materials, is essentially required unless you enjoy taking lots of notes.

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Week 1 9/8, 9/10	Administrative matters, course overview, why measure? <b>Validity:</b> Logic of measurement and construct validity <i>Readings:</i> Betz & Weiss; Crocker & Algina, ch. 1
Week 2 9/15, 9/17	Construct validity, continued <i>Readings:</i> Cronbach & Meehl; Crocker & Algina, ch. 10; Messick; Guion
Week 3 9/22, 9/24	Multitrait-multimethod matrix. <i>Using correlational methods to demonstrate validity:</i> Bivariate correlation <i>Readings:</i> Campbell & Fiske; Cole, 1987; Guilford; Crocker & Algina, ch. 2, 11
Week 4 9/29, 10/1	Multiple correlation, canonical correlation, cross-validation Factors affecting correlations, <i>Readings:</i> Rodgers & Nicewander; McNemar, ch. 10; Wiggins, pp. 6-61,
Week 5 10/6, 10/8	Moderator variables, cluster analysis <i>Readings:</i> Zedeck; Borgen & Weiss, 1971
Week 6 10/13, 10/15	Factor analysis and components analysis <i>Readings:</i> Weiss (1970 & 1971); Crocker & Algina, ch. 13
Week 7 10/20, 10/22	<b>Reliability:</b> Differences between validity and reliability Conceptual foundation of reliability <i>Theories of Reliability:</i> True + error score theory, infinite parallel tests, domain sampling <i>Readings:</i> Crocker & Algina, ch. 6
Week 8 10/27, 10/29	<i>Estimation of reliability:</i> Test-retest, parallel forms, Split-test procedures Internal consistency methods: Kuder-Richardson formulas, Cronbach's alpha Hoyt's method <i>Readings:</i> Crocker & Algina, ch. 7, 9 (pp. 192-197); Ree & Carretta
Week 9 11/3	Generalizability theory, reliability of ratings <i>Readings:</i> Crocker & Algina, ch. 8; Marcoulides; Tinsley & Weiss

**Thursday, November 5, in class Midsemester Exam (subject to change)**

Week 10  
11/10, 11/12  
**Strategies of psychological measurement** and their characteristic problems  
Item analysis for prediction.  
*Constructing measuring instruments with classical test theory*  
*Readings:* Crocker & Algina, ch. 4, 5, 14, 17, 19

Week 11  
11/17, 11/19  
*Constructing measuring instruments with item response theory:*  
Item response functions, IRT models  
Information, conditional S.E.M., test design.  
Estimating trait levels  
*Readings:* Weiss & Yoes; Crocker & Algina,, ch. 15, 20

Week 12  
11/24  
Adaptive testing. Advantages of IRT over classical test theory.  
*Readings:* Visit and review <http://www.psych.umn.edu/psylabs/CATCentral/>

**Thursday, November 26. Thanksgiving, no class**

Week 13  
12/1, 12/3  
*Scaling:* Thurstone scales, Likert scales  
Guttman scales, relationships between scaling and IRT  
*Readings:* Crocker & Algina, ch. 3; Ghiselli et al., ch. 12,

Week 14  
12/8, 12/10  
Pair comparison scaling, multidimensional scaling  
Types of scores and their implications.  
*Readings:* Davison & Sireci

Week 15  
12/15  
**Special topics:** scoring, score transformations, score equating, item and test bias,  
criterion-referenced tests, validity generalization  
*Readings:* Crocker & Algina, pp. 197-214; ch. 12, 16, 18; Schmidt & Hunter;  
Brown, pp. 180-195;

**4:00pm-6:00pm Saturday, December 19**  
**FINAL EXAMINATION**

## Text

Crocker, L. & Algina, J. (2006). *Introduction to classical and modern test theory*, Wadsworth, or  
Crocker, L. & Algina, J. (1986). *Introduction to classical and modern test theory*. Orlando FL: Harcourt Brace.

## Required Readings

Betz, N. E., & Weiss, D. J. (2008). Validity. In B. F. Bolton & R. M. Parker, *Handbook of measurement and evaluation in rehabilitation* (chapter 3, pp. 57-80). Austin TX: PRO-ED.

Borgen, F. H. & Weiss, D.J. (1971). Research methodology: Cluster analysis and counseling research. *Journal of Counseling Psychology*, 18, 583-591.

Brown, F. G. (1983). *Principles of educational and psychological testing* (3rd ed). New York: Holt, Rinehart & Winston, pp. 180-195.

Campbell, D. T. & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin*, 56, 81-105. Reprinted in: Mehrens, W. A. & Ebel, R. L. (Eds.). (1967). *Principles of educational and psychological measurement*. Chicago: Rand McNally, pp. 273-302; and in Jackson, D. N. & Messick, S. (1967). *Problems in human assessment*. New York: McGraw-Hill, pp. 124-132.

Cole, D. A. (1987). Methodological contributions to clinical research: Utility of confirmatory factor analysis in test validation research. *Journal of Consulting and Clinical Psychology*, 55, 584-594.

Cronbach, L. J. & Meehl, P. E. (1955). Construct validity in psychological tests. *Psychological Bulletin*, 52, 281-302. Reprinted in: Jackson, D. N. & Messick, S. (Eds.). (1967). *Problems in human assessment*. New York: McGraw-Hill, pp. 124-131; and in Mehrens, W. A. & Ebel, R. L. (Eds.). (1967). *Principles of educational and psychological measurement*. Chicago: Rand McNally, pp. 243-270.

Davison, M. L. & Sireci, S.G. (2000). Multidimensional scaling. In H. E. A. Tinsley & S. D. Brown (Eds.). *Handbook of multivariate statistics and mathematical modeling* (pp. 323-352). San Diego: Academic Press.

Ghiselli, E. E., Campbell, J. P., & Zedeck, S. (1981). *Measurement theory for the behavioral sciences*. San Francisco: Freeman, chapter 12.

Guilford, J. P. (1973). *Fundamental statistics in psychology and education*. New York: McGraw-Hill, chapter 14.

Guion, R. (1977). Content validity--the source of my discontent. *Applied Psychological Measurement*, 1, 1-10.

Marcoulides, G. A. (2000). Generalizability theory. In H. E. A. Tinsley & S. D. Brown (Eds.). *Handbook of multivariate statistics and mathematical modeling* (pp. 527-551). San Diego: Academic Press.

McNemar, Q. (1969). *Psychological statistics* (4th ed.). New York: Wiley, chapter 10.

Messick, S. (1980). Test validity and the ethics of assessment. *American Psychologist*, 35, 1012-1027.

Ree, M. J. & Carretta, T. R. (2006). The role of measurement error in familiar statistics. *Organizational Research Methods*, 9, 99-112.

Rodgers, J. L. & Nicewander, A. (1988). Thirteen ways to look at the correlation coefficient. *The American Statistician*, 42, 59-66.

Schmidt, F. L. & Hunter, J. F. (1977). Development of a general solution to the problem of validity generalization. *Journal of Applied Psychology*, 62, 529-540.

Tinsley, H. E. A. & Weiss, D. J. (2000). Interrater reliability and agreement. In H. E. A. Tinsley & S. D. Brown (Eds.). *Handbook of applied multivariate statistics and mathematical modeling* (pp.95-124). San Diego: Academic Press.

Weiss, D. J. (1970). Factor analysis and counseling research. *Journal of Counseling Psychology*, 17, 477-485.

Weiss, D. J. (1971). Further considerations in applications of factor analysis. *Journal of Counseling Psychology*, 18, 85-92.

Weiss, D. J. & Yoes, M. E. (1991). Item response theory. Chapter 3 in R. K. Hambleton & J. N. Zaal (Eds.), *Advances in educational and psychological testing: Theory and applications*. Boston: Kluwer.

Wiggins, J. S. (1973). *Personality and prediction: Principles of personality assessment*. Reading MA: Addison-Wesley, pp. 6-61.

Zedeck, S. (1971). Problems with the use of "moderator" variables. *Psychological Bulletin*, 76, 295-310.