

RMTD 430: Psychological Measurement
Fall, 2010

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Office Hours
Mondays and Wednesdays 2:30pm – 4:00pm

INTRODUCTION AND PURPOSES

The purpose of this course is to provide the student with an introduction to the conceptual, theoretical, and quantitative foundations of psychological measurement. Measurement theory is a branch of applied statistics that attempts to (1) describe and evaluate the quality of measurements in various substantive domains (e.g., psychology), (2) improve on the usefulness and meaningfulness of measures in these domains, and (3) propose theories and methods for developing new and better domain-specific measures. In this course, you will learn the concepts and methods of measurement theory as they apply to the measurement of psychological and educational constructs. Specifically, you will be exposed to foundational conceptual, quantitative, and technical principles of measurement theory so that you will gain the basic, doctoral-level background necessary to make maximum use of available psychological measures and to develop measures to suit your individual research and/or applied needs. Students wishing more advanced study of measurement topics should take advanced RMTD courses and seminars on Scaling, Linear Modeling, Factor Analysis, and Multivariate Statistics.

Although we will take a primarily conceptual rather than mathematical approach to the topic in this course, I will assume that all students have a basic familiarity with college algebra and elementary statistics. Those who may feel that their algebra and/or statistics backgrounds are deficient, should acquire relevant basic textbooks in these areas to consult during the course.

TEXTS

American Psychological Association (1999). Standards for educational and psychological testing. Washington, D. C.: American Psychological Association. (noted as Standards on attached course schedule)

Patten, M. L. (2010). *Proposing empirical research* (4th ed.). Glendale, CA: Pyczak.

READINGS: The following readings are required. The readings marked with an * are on

BlackBoard. The others are available electronically through the University's electronic journal data base.

1. Tinsley, H. E. & Weiss, D. J. (2000). Interrater reliability and agreement. In H.E.A. Tinsley & S. D. Brown (Eds.). *Handbook of Multivariate Statistics and Mathematical Modeling* (pp. 95-124). New York: Academic Press.*
2. Cronbach, L. J. & Meehl, P. E. (1955). Construct validity of psychological tests. *Psychological Bulletin*, *56*, 81-92.
3. Campbell, D. T. & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin*, *56*, 81-92.
4. Messick, S. (1980). Test bias and the ethics of assessment. *American Psychologist*, *35*, 1012-1027.
5. Rosenthal, R. & Rubin, D. B. (1982). A simple, general purpose display of magnitude of experimental effect. *Journal of Educational Psychology*, *74*, 160-169.
6. Sackett, P. R. & Wilk, S. L. (1994). Within group norming and other forms of score adjustment in preemployment testing. *American Psychologist*, *49*, 929-954.
7. 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.
8. Frazier, P. A., Tix, A. P., & Barron, K. E. (2004). Testing moderator and mediator effects in counseling psychology research. *Journal of Counseling Psychology*, *51*, 115-134.
9. Schmidt, F. L. & Hunter, J. E. (1996). Measurement error in psychological research: Lessons from 26 research scenarios. *Psychological Methods*, *1*, 199-223.
10. Schmidt, F. (2010). Detecting and correcting the lies that data tell. *Perspectives on psychological science*, *5*, 233-242.*
11. Hong, S., Malik, M. L., & Lee, M. K. (2003). Testing configural, metric, scalar, and latent mean invariance across genders in sociotropy and autonomy using a non-western sample. *Educational and Psychological Measurement*, *63*, 636-654.
12. Cokley, K., Komarraju, M., King, A., Cunningham, D., & Muhammad, G. (2003). Ethnic differences in the measurement of academic self-concept in a sample of African American and European college students. *Educational and Psychological Measurement*, *63*, 707-722.
13. Kahn, J. H. (2006). Factor analysis in counseling psychology research, training, and practice: Principles, advances, and applications. *The Counseling Psychologist*, *34*, 684-718.

14. Coward, W. M. & Sackett, P. R. (1990). Linearity of ability-performance relationships: A reconfirmation. *Journal of Applied Psychology, 75*,297-300.
15. Brannan, M. E. & Petrie, T. A. (2008). Moderators of body dissatisfaction-eating disorder symptomatology relationship: Replication and extension. *Journal of Counseling Psychology, 55*, 263-275.

EVALUATION

Grades for the course will be based on two exams, a research proposal, data analysis exercises, and outside readings. Data analysis exercises will be assigned in class to be completed as homework. These exercises are worth 15% of the final grade. The dates for the exams and proposal are noted on the attached syllabus. These are each worth 25% of the final grade. The research proposal should propose a measurement study on some topic of interest to the student. The proposal should include an introductory section (which concludes with a statement of the research question) and a methods section (which should include a description of subjects, instruments, procedures, and proposed data analyses). It is recommended that the student select a research topic that is germane to ongoing research in which he or she is engaged or to a proposed dissertation. The proposal should be written in APA style and will be graded for adherence to APA style requirements, writing, and content. Use the Patten text to help you develop and write the proposal.

In addition, students should become familiar with the journals in which measurement research is published and gain some practice reading such research. Thus, students are also required to read articles on measurement topics and summarize each article on a 4”X6” index card. A maximum of 10 reading summaries is required. Grades will be assigned on the basis of the number of articles read and summarized as follows: 10 = A, 9 = A-, 8 = B+, 7 = B, 6 = B-, 5 = C+, 4 = C, 3 = C-, 2 = D+, 1 = D, 0 = F. Outside readings are worth 10% of the final grade.

In order to receive credit for the reading, you should read an article on a measurement topic from a journal in the field (see below for examples), summarize (in your own words) the article on a 4”X6” index card, and turn the summary in at the beginning of class. **Only one card will be accepted each class period and it must be on a measurement topic to receive credit for it.**

Relevant Journals

Educational and Psychological Measurement
Measurement and Assessment in Counseling and Development
Psychological Assessment
Psychological Methods
Journal of Applied Psychological Measurement
Journal of Career Assessment
Journal of Personality Assessment
Journal of Psychoeducational Assessment
Psychometrika

Other Journals (e.g., Journal of Counseling Psychology, Journal of Multicultural Counseling and Development) will have some articles on measurement-related topics.

Academic Honesty

Academic honesty is an expression of interpersonal justice, responsibility and care, applicable to Loyola University faculty, students, and staff, which demands that the pursuit of knowledge in the university community be carried out with sincerity and integrity. The School of Education's Policy on Academic Integrity can be found at: http://www.luc.edu/education/academics_policies_integrity.shtml. For additional academic policies and procedures refer to: http://www.luc.edu/education/academics_policies_main.shtml

Accessibility

Students who have disabilities which they believe entitle them to accommodations under the Americans with Disabilities Act should register with the Services for Students with Disabilities (SSWD) office. To request accommodations, students must schedule an appointment with an SSWD coordinator. Students should contact SSWD at least four weeks before their first semester or term at Loyola. Returning students should schedule an appointment within the first two weeks of the semester or term. The University policy on accommodations and participation in courses is available at: <http://www.luc.edu/sswd/>

Harassment (Bias Reporting)

It is unacceptable and a violation of university policy to harass, discriminate against or abuse any person because of his or her race, color, national origin, gender, sexual orientation, disability, religion, age or any other characteristic protected by applicable law. Such behavior threatens to destroy the environment of tolerance and mutual respect that must prevail for this university to fulfill its educational and health care mission. For this reason, every incident of harassment, discrimination or abuse undermines the aspirations and attacks the ideals of our community. The university qualifies these incidents as incidents of bias.

In order to uphold our mission of being Chicago's Jesuit Catholic University-- a diverse community seeking God in all things and working to expand knowledge in the service of humanity through learning, justice and faith, any incident(s) of bias must be reported and appropriately addressed. Therefore, the Bias Response (BR) Team was created to assist members of the Loyola University Chicago community in bringing incidents of bias to the attention of the university. If you believe you are subject to such bias, you should notify the Bias Response Team at this link: <http://webapps.luc.edu/biasreporting/>

Conceptual Framework

Professionalism in the Service of Social Justice. As a doctoral-level psychologist, you can be a vehicle of social justice in whatever setting you work and in whatever role you exercise in your career. This course will provide you with the knowledge that you need to ensure that your research adheres to the highest standards of psychometric adequacy so that your findings and the inferences that can be drawn from your findings are trustworthy.

Technology

You will use technology in the data analysis exercises in this course.

Diversity

Your program is committed to issues of diversity, including, but not limited to, ability status, ethnicity, gender, race, sexual orientation, and social class. Among other things, you will learn in this course the meanings of culture fairness, test bias, and measurement invariance and how to assess each to ensure that the measurements that you use in your research have the same meanings to diverse groups and that the decisions that you make on the basis of measurement data are fair and equitable.

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COURSE SCHEDULE

DATE	TOPICS AND READINGS
F, September 3	ADMINISTRATIVE MATTERS, COURSE OVERVIEW, AND BASIC CONCEPTS <u>Readings:</u> Standards, pp. 1 – 6
F, September 10	<u>RELIABILITY</u> : CLASSICAL TEST THEORY AND IMPLICATIONS <u>Readings:</u> Standards, pp. 25-31
F, September 17	<u>RELIABILITY</u> : DOMAIN SAMPLING THEORY AND IMPLICATIONS <u>Readings:</u> Standards, pp. 31-36 <u>Data Analysis Exercise #1:</u> Estimating Reliability via Split-Half and Internal Consistency Methods
F, September 24	<u>RELIABILITY</u> : INTERRATER AGREEMENT AND RELIABILITY <u>Reading:</u> Reading # 1 (Tinsley & Weiss, 2000)
F, October 1	<u>CATCH UP AND REVIEW</u>
F, October 8	<u>MIDTERM EXAM</u>
F, October 15	<u>VALIDITY</u> : LOGIC OF THE VALIDATION PROCESS AND EVALUATING VALIDITY EVIDENCE <u>Readings:</u> Standards pp. 9-17; Readings 2 (Cronbach & Meehl, 1955) and 3 (Campbell & Fiske) <u>Data Analysis Exercise #2:</u> Analyzing Validity Evidence
F, October 22	<u>VALIDITY</u> : EVALUATING VALIDITY EVIDENCE (CONTINUED) <u>Readings:</u> Standards, pp. 17-24; Readings 9 (Schmidt & Hunter, 1996), 10 (Schmidt, 2010), and 14 (Coward & Sackett, 1990). <u>Data Analysis Exercise # 3:</u> Correcting Validity Estimates

- F, October 29 VALIDITY: EVALUATING VALIDITY EVIDENCE (FINISHED)
- Readings: Readings 8 (Frazier, Tix, & Barron, 2004), 15 (Brannan & Petrie, 2008) and 5 (Rosenthal & Rubin, 1982).
- F, November 5 VALIDITY: DIFFERENTIAL ITEM FUNCTIONING, MEASUREMENT INVARIANCE, TEST BIAS, AND CULTURAL FAIRNESS
- Readings: Standards, pp. 71-84; Readings 4 (Messick, 1980) and 6 (Sackett & Wilk, 1994)
- F, November 12 MEASUREMENT INVARIANCE CONTINUED
- Readings 11 (Hong et al, 2003), 12 (Cokley et al., 2003), and 13 (Kahn, 2006, especially pp. 701-715)
- F, November 19 CONSTRUCTION OF PSYCHOLOGICAL MEASURES
- Readings: Standards, pp. 37-44, Readings 7 (Fabrigar et al., 1999) and 13 (Kahn, 2006).
- Data Analysis Exercise #4: Using Factor Analysis
- F, November 26 NO CLASS—THANKSGIVING BREAK
- F, December 3 INTERPRETATION OF SCORES FROM PSYCHOLOGICAL MEASUREMENTS
- Note: Proposals Due**
- F, December 10 CATCH-UP AND REVIEW
- M, December 20 FINAL EXAM (4:15- 6:45)