

EPSY 5221: Principles of Educational & Psychological Measurement

Fall Semester, 2019

Mondays & Wednesdays, 2:30-3:45

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Classroom: 530b Bruininks Hall
Office: 170 Education Sciences
Office Hours: By appointment

Texts:

Bandalos, D.L. (2018). *Measurement theory and applications for social sciences*. New York, NY: Guilford Press.

This book is available through the library as an ebook. See the link at the class website.

AERA, APA, & NCME. (2014). *Standards for educational and psychological testing*. Washington DC: American Educational Research Association.

The Course:

This course provides opportunities to learn the core ideas, crosscutting concepts, and practices of educational and psychological measurement. There are three goals.

Goal I. Understand and apply the basic principles of educational and psychological measurement, including methods of construction, evaluation, and improvement of assessments. This goal area includes an introduction to measurement, scoring, test development, item development, and item analysis.

Goal II. Understand and apply a framework for validation and basic psychometrics. This goal area includes the definition of validity, the essentials of classical test theory, and the principles of reliability and generalizability theory.

Goal III. Understand and apply advanced topics in measurement theory. This includes understanding the differences between exploratory and confirmatory factor analysis and the basics of item response theory analysis. We investigate the principles of test fairness and very briefly review methods of standard setting and equating.

Throughout the course, we will attend to several methods of assessment such as classroom assessment, standardized testing, and complex performance assessment. We will review applications of testing in areas including achievement (knowledge, skills, and abilities), aptitudes, interests, social and emotional learning, and personality. We will address special issues related to fairness and accessibility. Finally we consider the challenges of applying measurement principles in practice – given the many constraints measurement specialists encounter in diverse settings including early childhood, K-12 education, higher education, licensure, certification, and professional settings.

Validity

The most important psychometric issue in measurement regards validity. Validity is the extent to which theory and evidence support the intended inferences and uses of test scores – and more broadly, assessment results. We will explore a comprehensive framework of validity that encompasses the work of validity theorists over the past century. The heart of the work of measurement specialists is in the securing of validity evidence to support test score inferences and uses.

A current issue in validity regards educational equity and achievement gaps. We will discuss many aspects of educational equity as the topics in educational and psychological measurement relate to the persistent challenges in addressing educational disparities.

Item Development

Items (test questions or tasks) are the building blocks of measurement. At the 2009 NCME meeting, Mark Reckase (NCME President) argued:

Test items are complicated. They are the equivalent of small poems. Credit should be given for great item writing. Cognitive scientists have long identified multiple cognitive skills that are required to interact with an item (e.g., reading, specialized vocabulary, knowledge of MC items, knowledge of the subject area). A careful review of any testing program will identify poorly worded test items... written by persons with minimal training and inadequate insights into their audience. We need to do much more work to produce quality test items.

Item writing research has been limited, although it has been in the research literature for nearly 100 years. Item writing research also has been presented in the literature of many areas, including marketing, medicine, language, architecture, youth development (and education and psychology). The course provides a solid review of the theory and practice of evidence-based item development, as a foundation for good measurement, including practice in reviewing and editing items and item writing.

Appropriate Test Use & Fairness

Many examples of test misuse can be found throughout the media, published literature, and in practice. Aside from abuses of tests, test fraud, and cheating, there are many more subtle forms of test misuse. Tests can be used to promote equity and improve teaching and learning, or they can be used as barriers and applied to purposes for which no evidence is available to support. And, at times, tests are used inappropriately to inform teaching and learning – purposes beyond the designed capacity of some tests. At the heart of educational and psychological testing is clarifying the importance of connecting purpose with design and intended use.

Primary Course Objectives:

Specific objectives for each session are closely aligned with the Bandalos chapters and core ideas and practices of educational and psychological measurement.

Generally, the student will be able to:

- ◆ Assist in the development of measures of educational and psychological constructs;
- ◆ Interpret test and assessment scores from a variety of sources;
- ◆ Develop and review test items, and conduct item analysis;
- ◆ Evaluate measures of educational and psychological constructs;
- ◆ Design and conduct validity (and reliability) studies;
- ◆ Apply principles of measurement for responsible and fair test use.

Course Requirements:

Readings. You are encouraged to read the assigned portions of the textbook prior to discussion in class. We will not cover all of the material in the text during class discussion—you are responsible for material covered in the textbook and class.

Quizzes. Throughout the course, there will be several quizzes. The quizzes will be used for class discussion only – these are not counted in final grades.

Two Exams. The first exam covers the first half of the course and contain selected-response (about 2/3) and constructed-response (about 1/3) items requiring explanation and application of key concepts. We will construct the test blueprint for the first exam in class. The second exam covers classical test theory, reliability, and the applications of testing in the second half of the course. It will also include revisiting areas that were challenging from the first exam.

Three Test Theory Assignments. The three assignments include (a) Classical Test Theory (30 pts), (b) Generalizability Theory (30 pts), and (c) Item Response Theory (40 pts). These can be completed in small groups (no more than 3 per group). Each group should submit a single report. Each assignment may be submitted twice for full credit. Assignments are due one week following the date of assignment.

Test Use Scenario Review. Submit a brief review of a testing scenario (2 to 3 pages, single-spaced, 1 inch margins, 12 pt. font). Identify an example of test use where the test has a positive outcome, at any level from early childhood to professional licensure. This review should include: (a) a clear description of the test and how it is being used (what, where, why, who...); (b) the positive outcome of the use of this test; (c) any potential limitations or negative consequences; and (d) identify at least four standards that are being addressed particularly well in this case (list the standard number and the standard itself – then describe how the scenario illustrates meeting the standard. The scenario could be based on a news article, a research study, a case you are familiar with, or a testing program that is described online.

Exams are worth 20% of course grade; test theory assignments are worth 65% of course grade; Test Use Scenario is worth 15% of course grade.

EPSY 5221 Topic & Reading Schedule 2019

	MONDAY		WEDNESDAY	
September	2	LABOR DAY	4	What is Measurement? [1]
	9	Statistics for Measurement (review)	11	Norms & Scores [2] <i>Testing Standards</i> Chapter 5
	16	Validity [11]	18	Validity [Kane, 2013] <i>Testing Standards</i> Chapters 1
	23	Test Development [3] <i>Testing Standards</i> Chapter 4	25	Item Development – SR/CR Items [4: 54-70]
October	30	Item Writing Workshop	2	Constructing Measures - preschool to higher ed
	7	Noncognitive Measurement [5] <i>Testing Standards</i> Chapter 10	9	Item Analysis [6] & intro to jMetrik <i>[Intro to Lab 1]</i>
	14	Careless Responding <i>Testing Standards</i> Chapters 2	16	Performance Assessment [4: 71-81]
	21	Part I Review	23	EXAM I
	28	Introduction to Classical Test Theory [7]	30	Reliability [8, 9]
November	4	Generalizability Theory [10]	6	G-Theory in Practice <i>[Intro to Lab 2]</i>
	11	EFA [12], CFA [13]	13	Item Response Theory [14]
	18	Item Response Theory <i>[Intro to Lab 3]</i>	20	IRT in Practice
	25	Validity & Reliability Studies	27	<i>[Thanksgiving]</i>
December	2	Achievement v. Aptitude <i>Testing Standards</i> Chapter 9, 12 [DUE: Test Use Scenario]	4	Bias, Fairness, & Legal Issues [16] <i>Testing Standards</i> Chapter 3
	9	Accessibility <i>Testing Standards</i> Chapter 8 Handout: EXAM II	11	Standard Setting & Equating [skim 17, 18] DUE: EXAM II

[Bandalos Chapters in Brackets]

Format for Submitting Assignments via EMAIL:

Submit assignments in Word format, in an email message with **EPSY5221 in the subject line**, using the following document naming system:

Lastname-course-assignment-yearmonthday.docx

For example: **Gabel-EPSY5221-lab1-20191016.docx**

This indicates an assignment from Gabel in EPSY5221 for Lab 1, 2019 October 16.

Note on Grading Policy:

Evaluation of successful achievement of the course objectives is based on a grading policy that is focused on learning. Projects that require more time are weighted more and each project can be resubmitted for completeness. The focus is on achievement of the learning objectives, acknowledging that learning occurs over time. Your grade will reflect your knowledge, skills, and abilities relative to course learning objectives at the end of the course.

Instruction:

Each course meeting will include lecture on key points of the day's topic(s) and a period of class discussion. Many of the sessions will include time to debate issues and challenge assumptions raised by students, the instructor, and the text author. Several sessions will include small group work (e.g., writing and critiquing test items, evaluating validity studies). As the instructor, I accept the following responsibilities: to present material in a clear and contextualized format, to provide opportunity for students to pursue additional clarification in and out of class, to develop and employ fair and meaningful assessment activities, to use results of evaluation activities for instructional feedback, and to provide opportunities for recourse if students believe they have been unfairly evaluated.

Technology:

Technology is becoming increasingly important in education and we will pursue learning with the aid of technology in several ways. Students are encouraged to submit assignments electronically. Students should investigate measurement-related web sites to support their reading and project work. Additional readings and resources are available at the class website. A class website has been developed that contains class resources, as well as links to additional resources, publicly available software, and some class notes. Canvas is available to us to support online discussions.

Diversity:

The College of Education and Human Development is committed to have every course contribute to our understanding of diversity, including but not limited to: age, creed, disability, ethnicity, gender, global perspectives, international background, language background, learning differences, marital status, multicultural perspectives, national origin, public assistance status, race, religion, sex, sexual orientation, and veteran status. Each of these characteristics plays a role in educational and psychological measurement. They are factors that contribute to individual differences -- they (may) affect the constructs we set out to measure and the way we interpret and report test results. These issues will be addressed throughout the course and will be used as topics of debate and considerations in cases of responsible test use.

Late Work and Incompletes

Late work will be accepted, but please notify me so I can keep track of your work – no points will be deducted for late work. It is up to you to stay on track. An incomplete (I) will be assigned only if agreed to prior to the last week of class. If at the end of the semester course work is incomplete and no prior notification has been given, the grade based on points obtained at that time will be awarded. Without a prior agreement, no options will be given to submit incomplete work after grades have been submitted.

Makeup Work for Legitimate Absences:

Students will not be penalized for absence during the semester. This is a more flexible policy than that generally given based on University policy. For information on the U's policy regarding absences, please see: <http://policy.umn.edu/education/makeupwork>

Returning Papers, Exams, and Projects

Given the size of the class and the extensiveness of student projects, I will try to return work within one week of the due date. If assignments are submitted after the due date, it will likely take longer to review and return. If you submit paper forms of assignments and, at the end of the semester, you would like to receive remaining work through U.S. mail, submit a self-addressed stamped envelope. Otherwise, you may pick up final projects after grades are submitted in the Psychological Foundations' office in 250 Education Sciences Building with a student ID. Papers will be available there until February 1. Uncollected papers will be destroyed at the end of spring semester.

Academic dishonesty: academic dishonesty in any portion of the academic work for a course shall be grounds for awarding a grade of F or N for the entire course.

University Grading Policy

<https://policy.umn.edu/education/gradingtranscripts>

A	4.000 - Represents achievement that is outstanding relative to the level necessary to meet course requirements
A-	3.667
B+	3.333
B	3.000 - Represents achievement that is significantly above the level necessary to meet course requirements
B-	2.667
C+	2.333
C	2.000 - Represents achievement that meets the course requirements in every respect
C-	1.667
D+	1.333
D	1.000 - Represents achievement that is worthy of credit even though it fails to meet fully the course requirements
S	Represents achievement that is satisfactory, which is equivalent to a C- or better.

Letter Grade	Percentage
A	95-100%
A-	90-94.9%
B+	85-89.9%
B	80-84.9%
B-	75-79.9%
C+	70-74.9%
C	65-69.9%
C-	60-64.9%

How to Access Your Grades

Go to OneStop for Students (<http://onestop.umn.edu/onestop/>), click on Grades & Transcripts; on the right side under Quick Links, click on Grades/Unofficial transcript.

Workload Expectation (Policy: [Expected Student Academic Work per Credit](#))

The Senate affirms the standard (first adopted by the University Senate on February 16, 1922, and reaffirmed 1993) that one semester credit is to represent, for the average University of Minnesota undergraduate student, three hours of academic work per week (including lectures, laboratories, recitations, discussion groups, field work, study, and so on), or approximately 45 hours of work over the course of an enrollment period. Expectations of faculty and students will be made clear. It is expected that the academic work required of graduate and professional students will exceed three hours per credit per week or 45 hours per semester.

Scholastic Dishonesty

You are expected to do your own academic work and cite sources as necessary. Failing to do so is scholastic dishonesty. Scholastic dishonesty means plagiarizing; cheating on assignments or examinations; engaging in unauthorized collaboration on academic work; taking, acquiring, or using test materials without faculty permission; submitting false or incomplete records of academic achievement; acting alone or in cooperation with another to falsify records or to obtain dishonestly grades, honors, awards, or professional endorsement; altering, forging, or misusing a University academic record; or fabricating or falsifying data, research procedures, or data analysis.

Conduct Code:

http://regents.umn.edu/sites/regents.umn.edu/files/policies/Student_Conduct_Code.pdf. If it is determined that a student has cheated, he or she may be given an "F" or an "N" for the course, and may face additional sanctions from the University. For additional information, please see: <http://policy.umn.edu/education/instructorresp>.

The Office for Student Conduct and Academic Integrity has compiled a useful list of Frequently Asked Questions pertaining to scholastic dishonesty:

<http://www1.umn.edu/oscai/integrity/student/index.html>. If you have additional questions, please clarify with your instructor for the course. Your instructor can respond to your specific questions regarding what would constitute scholastic dishonesty in the context of a particular class-e.g., whether collaboration on assignments is permitted, requirements and methods for citing sources, if electronic aids are permitted or prohibited during an exam.

University Policies

See <http://onestop.umn.edu/onestop/faculty/Teaching/Policies.html> for a list of policies related to teaching with links to those policies.

Also see <http://policy.umn.edu/Policies/Education/Education/STUDENTRESP.html> for University policies related to Teaching and Learning – Student Responsibilities.

Student Conduct Code

The University seeks an environment that promotes academic achievement and integrity, that is protective of free inquiry, and that serves the educational mission of the University. Similarly, the University seeks a community that is free from violence, threats, and intimidation; that is respectful of the rights, opportunities, and welfare of students, faculty, staff, and guests of the University; and that does not threaten the physical or mental health or safety of members of the University community.

As a student at the University you are expected adhere to Board of Regents Policy: Student Conduct Code. To review the Student Conduct Code, please see:

http://regents.umn.edu/sites/default/files/policies/Student_Conduct_Code.pdf.

Note that the conduct code specifically addresses disruptive classroom conduct, which means "engaging in behavior that substantially or repeatedly interrupts either the instructor's ability to teach or student learning. The classroom extends to any setting where a student is engaged in work toward academic credit or satisfaction of program-based requirements or related activities."

Use of Personal Electronic Devices in the Classroom

Using personal electronic devices in the classroom setting can hinder instruction and learning, not only for the student using the device but also for other students in the class. To this end, the University establishes the right of each faculty member to determine if and how personal electronic devices are allowed to be used in the classroom.

<http://policy.umn.edu/Policies/Education/Education/STUDENTRESP.html>.

Appropriate Student Use of Class Notes and Course Materials

Taking notes is a means of recording information but more importantly of personally absorbing and integrating the educational experience. However, broadly disseminating class notes beyond the classroom community or accepting compensation for taking and distributing classroom notes undermines instructor interests in their intellectual work product while not substantially furthering instructor and student interests in effective learning. Such actions violate shared norms and standards of the academic community.

<http://policy.umn.edu/Policies/Education/Education/STUDENTRESP.html>

Sexual Harassment

"Sexual harassment" means unwelcome sexual advances, requests for sexual favors, and/or other verbal or physical conduct of a sexual nature. Such conduct has the purpose or effect of unreasonably interfering with an individual's work or academic performance or creating an intimidating, hostile, or offensive working or academic environment in any University activity or program. Such behavior is not acceptable in the University setting. For additional information, please consult Board of Regents Policy:

<http://regents.umn.edu/sites/regents.umn.edu/files/policies/SexHarassment.pdf>

Equity, Diversity, Equal Opportunity, and Affirmative Action

The University provides equal access to and opportunity in its programs and facilities, without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression. For more information, please consult Board of Regents Policy:

http://regents.umn.edu/sites/regents.umn.edu/files/policies/Equity_Diversity_EO_AA.pdf

Disability Accommodations

The University of Minnesota is committed to providing equitable access to learning opportunities for all students. The Disability Resource Center is the campus office that collaborates with students who have disabilities to provide and/or arrange reasonable accommodations. If you have, or think you may have, a disability (e.g., mental health, attentional, learning, chronic health, sensory, or physical), please contact Disability Resource Center at 612-626-1333 to arrange a confidential discussion regarding equitable access and reasonable accommodations. If you are registered with Disability Resource Center and have a current letter requesting reasonable accommodations, please contact your instructor as early in the semester as possible to discuss how the accommodations will be applied in the course.

<https://diversity.umn.edu/disability/>.

Mental Health and Stress Management:

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance and may reduce your ability to participate in daily activities. University of Minnesota services are available to assist you. You can learn more via the Student Mental Health Website: <http://www.mentalhealth.umn.edu>.

Academic Freedom and Responsibility:

Academic freedom is a cornerstone of the University. Within the scope and content of the course as defined by the instructor, it includes the freedom to discuss relevant matters in the classroom and conduct relevant research. Along with this freedom comes responsibility. Students are encouraged to develop the capacity for critical judgment and to engage in a sustained and independent search for truth. Students are free to take reasoned exception to the views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled.* When conducting research, pertinent institutional approvals must be obtained and the research must be consistent with University policies.

Reports of concerns about academic freedom are taken seriously, and there are individuals and offices available for help. Contact the instructor, the Department Chair, your adviser, the associate dean of the college, or the Vice Provost for Faculty and Academic Affairs in the Office of the Provost.

College of Education & Human Development Mission Statement

The mission of the University of Minnesota College of Education and Human Development is to contribute to a just and sustainable future through engagement with the local and global communities to enhance human learning and development at all stages of the life span.

Department of Educational Psychology Mission Statement

Educational psychology involves the study of cognitive, emotional, and social learning processes that underlie education and human development across the lifespan. Research in educational psychology advances scientific knowledge of those processes and their application in diverse educational and community settings. The department provides training in the psychological foundations of education, research methods, and the practice and science of counseling psychology, school psychology, and special education. Faculty and students provide leadership and consultation to the state, the nation, and the international community in each area of educational psychology. The department's scholarship and teaching enhance professional practice in schools and universities, community mental health agencies, business and industrial organizations, early childhood programs, and government agencies.

Quantitative Methods in Education Mission Statement

To prepare students to become cutting-edge professionals in educational measurement, evaluation, statistics, and statistics education, through excellence in teaching, research, and service; and through investigating and developing research methodology in education.

Six Intellectual Principles of Ph.D./Ed.D./Master's Research Education

(Currently under review)

1. *Scholarly Formation*
2. *Communication*
3. *Leadership and Collaborative Skills*
4. *Global Context*
5. *Professional Responsibility*
6. *Personal and Professional Management Skills*

The College Commitment to Diversity and Inclusion:

We affirm the contributions of all people in our community. Diversity and equity are at the core of our mission in the College of Education and Human Development.

We explicitly reject bias, discrimination, and exclusion on the basis of race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression.

We all are responsible for recognizing, confronting, and addressing bias and discrimination and diligently working for positive change in support of equity and diversity.