



PSYC 520 Fundamentals of Psychological Measurement

Units: 4

Term–Day–Time: Spring 2023–Mon & Wed–4:00-5:50 pm

Location: CPA 151

Instructor: Hok Chio (Mark) Lai

Office Hours: Mon 12:00–1:00 pm, and by appointment.

Contact Info: (Email) hokchiol@usc.edu, (Slack) <https://usc.enterprise.slack.com/>.

Timeline for replying to emails: within 48 hours.

IT Help: ITS, Blackboard

Contact Info:

ITS (Email, Monday – Friday, 8:00 A.M. – 6:00 P.M.) consult@usc.edu, (Phone, 24/7/365) 213-740-5555, (Online) [ServiceNow Portal](#)

Blackboard (Email, 24/7/365) blackboard@usc.edu, (Online Help) [Blackboard Help for Students](#)

Course Description

This is a graduate-level class covering topics in test theory for psychological measurement. Topics covered included factor analysis; latent variable; scaling; test construction; classical true score reliability model; generalizability theory; validity; decision-theoretic approaches to selection; item analysis; item response theory.

Learning Objectives

After the successful completion of this course, students will be able to . . .

1. Describe the theoretical foundation of psychological measurement;
2. Explain concepts pertaining to reliability and validity in psychological measurement;
3. Summarize the standards for test development;
4. Analyze item-level data using classical test theory, generalizability theory, and item response theory;

5. Conduct a research project analyzing real data with scale items;
6. Communicate research findings/products in an oral presentation and a written report.

Prerequisite(s): PSYC 501 (or a similar graduate-level introductory statistics class)

Co-Requisite(s): None

Concurrent Enrollment: None

Recommended Preparation: Experience with statistical software (preferably R)

Course Notes

Students are expected to have finished the reading assignments before class and actively participate in class discussions and activities. A typical class meeting will include lectures and small-group discussions/activities. This class also includes lab sessions for software demonstrations and for students to work on assignments. Lecture slides/notes will be available at .

Please note that the lectures will not cover everything in the textbook, and is not a replacement for completing the reading assignments. Similarly, the lecture slides only serve to guide class discussions and cannot replace the assigned readings.

Students are expected to bring their own laptops to class to follow the software demonstration and work on assignments during lab sessions.

Communication

To promote independence and critical thinking, students are encouraged to work through the following process for obtaining answers to course-related questions before contacting the instructor:

- consult the course syllabus;
- consult a classmate;
- post your questions on the Q&A channel on Slack;
- meet with the instructor during office hours or Q&A sessions on Tuesdays;
- for personal questions, email the instructor at hokchiol@usc.edu

Technological Proficiency and Hardware/Software Required

- [R](#) and [RStudio](#) are needed to complete the course assignments. It is highly recommended that students update to the latest versions of both software (R 4.2.0, RStudio 2022.07, or above). We will discuss how to set up R and RStudio in Week 1.
- Students will also need [Quarto](#) for completing assignments. If you have used R Markdown before, everything in R Markdown is still compatible with Quarto.

USC Computing Center Laptop Loaner Program

If you need a laptop to successfully participate in this class, you may be eligible for the [USC Computing Center Laptop Loaner Program](#).

USC Technology Support Links

[Blackboard help for students](#)

[Slack information for students](#)

[Software available to USC Campus](#)

Required Readings and Supplementary Materials

Bandalos, D. L. (2018). *Measurement theory and applications for the social sciences*. Guilford.

AERA, APA, and NCME (2014). *The standards for educational and psychological testing*. Author. [A free copy can be downloaded at <https://www.testingstandards.net/open-access-files.html>]

- Other required readings will be posted on Slack

Description and Assessment of Assignments

1. In-class exercises (10%). During the class meetings, students will participate in group exercises.
2. Mid-term examination (15%). The mid-term exam will assess students understanding of concepts covered in the class, up to Week 6 (e.g., test development, reliability, and validity). It is tentatively scheduled on February 22. More information about the exam will be announced in class.

3. Homework problems (40%). There will be 5-6 homework assignments for students to apply the concepts and techniques discussed in class.
You must submit your work electronically to Blackboard by the assigned due date. See policy on [late work](#).
4. Final project (35%). You will complete a research project analyzing some real data involving psychological measurement. Students can use either data they have collected or have access to, or publicly available data. Alternatively, the project can be a theoretical/methodological paper about certain aspects of psychological measurement. Students interested in other project ideas (e.g., software package development) should discuss their ideas with the instructor. Each student can choose to work on their own or with a partner. Each student/group will schedule an appointment with the instructor to talk about their project during Week 9 (before Spring recess).

The final project will include three components. Details will be announced during class.

- Prospectus (5%)
A prospectus about your project should be submitted by **Monday, March 6**. The prospectus should contain a concise description of what you (or your group) plan to do for your project, including the data source and a preliminary plan for analysis. The prospectus should be limited to 1 single-spaced page (excluding tables, figures, references, and other supplemental materials).
- Oral Presentation/Paper (15%)
On **April 24 or 26**, each group will give an 18-minute oral presentation (including Q&A) on their project. You will also need to submit your slides to Blackboard for grading **on the day of your presentation**, which should include a link to the reproducible codes for your analyses. A grading rubric on the research presentation will be posted on Blackboard.
- Final paper (15%)
The final paper is due **Wednesday, May 3, at 6:00 am Pacific Time** (the assigned final exam time for the class). There should also be a link to the reproducible codes for your analyses. The final paper should be 10-20 double-spaced pages of text (i.e., excluding the title page, abstract, references, tables, figures, and appendices).

Participation

Participation accounts for 10% of the course grade. To earn full credit for participation, students should complete and turn in all in-class exercises.

Grading Breakdown

Assignment	% of Grade
In-class exercises	10
Mid-term exam	15
Homework	40
Prospectus	5
Oral Presentation	15
Final paper	15
TOTAL	100

Grading Scale

Course final grades will be determined using the following scale

A	93-100
A-	89-92
B+	85-88
B	81-84
B-	77-80
C+	73-76
C	70-72
C-	Below 70 (failing)

Course-specific Policies

Assignment Submission

The assignments should be submitted through Blackboard by Monday before noon.

Grading Timeline

Generally, all graded work will be returned no later than one week from the submission deadline.

Late work

Late work will be penalized by a 10% deduction in the assignment grade every 24 hours late unless due to an emergency excused by the instructor. Email the instructor as soon as possible to discuss alternate arrangements due to an emergency.

Technology in the classroom

Phones

Your phone should be turned off or in silent mode (not on vibrate), and should not be used in the classroom.

Tablets and Laptops

During lecture time in the classroom, students can use tablets and laptops only for purposes of viewing course materials and taking notes. During the in-class exercises, students should use their laptops to complete the assignments.

Attendance

Students are expected to attend all Thursday class sessions on time. If they miss a session, they should complete the class exercises and turn in their work within the timeframe specified in [Description and Assessment of Assignments](#).

Classroom Norms

From USC's [Face Covering Policy](#) reviewed and revised on October 6, 2022,

All faculty, staff, students, and other persons are permitted and encouraged to wear face coverings in all other campus locations. This includes classes, libraries, recreational facilities, dining facilities, and athletic facilities.

The following applies to both in-person and online communications (e.g., Slack discussions and email communications)

- Respect each other's views.
- In written communication messages, make sure they are something you could say to someone to their face.
- Recognize and/or remember that we have different backgrounds.
- Criticize ideas, not individuals or groups.
- Either support statements with evidence, or speak from personal experience.

Course Evaluation

Student feedback is essential for the instructor and the Department to keep improving this course. Students are encouraged to share their feedback and suggestions in an early-term feedback survey around Weeks 4 to 5, and respond to the standard USC course evaluation survey at the end of the semester.

(Tentative) Course Schedule: A Weekly Breakdown

	Topics/Daily Activities	Readings	Assignment Dates
Week 1 Jan 9 & 11	<ul style="list-style-type: none"> • Course Introduction • Quarto 	<ul style="list-style-type: none"> • MT ch 1 • Markdown Basics 	
Week 2 Jan 16 & 18 (MLK Day)	<ul style="list-style-type: none"> • Norms & Standardized Scores 	<ul style="list-style-type: none"> • MT ch 2 • Standards ch 5 	<ul style="list-style-type: none"> • HW 1
Week 3 Jan 23 & 25	<ul style="list-style-type: none"> • Test Development Process • Cognitive & noncognitive items 	<ul style="list-style-type: none"> • MT ch 3, 4 (63–70), 5 • Standards ch 5 	<ul style="list-style-type: none"> • HW 2
Week 4 Jan 30 & Feb 1	<ul style="list-style-type: none"> • Item analysis 	<ul style="list-style-type: none"> • MT ch 6, 7 	
Week 5 Feb 6 & 8	<ul style="list-style-type: none"> • Reliability I • Reliability II 	<ul style="list-style-type: none"> • Standards ch 7 • MT ch 8 	<ul style="list-style-type: none"> • HW 3
Week 6 Feb 13 & 15	<ul style="list-style-type: none"> • Validity 	<ul style="list-style-type: none"> • Standards ch 2 • MT ch 11 	
Week 7 Feb 20 & 22 (President's Day)	<ul style="list-style-type: none"> • Mid-Term 	<ul style="list-style-type: none"> • Standards ch 1 	
Week 8 Feb 27 & Mar 1	<ul style="list-style-type: none"> • Interrater reliability 	<ul style="list-style-type: none"> • MT ch 9 	<ul style="list-style-type: none"> •
Week 9 Mar 6 & 8	<ul style="list-style-type: none"> • Generalizability theory 	<ul style="list-style-type: none"> • MT ch 10 	<ul style="list-style-type: none"> • HW 4
Mar 13 & 15	Spring Recess		
Week 10 Mar 20 & 22	<ul style="list-style-type: none"> • Exploratory factor analysis 	<ul style="list-style-type: none"> • MT ch 12 	
Week 11 Mar 27 & 29	<ul style="list-style-type: none"> • CFA 	<ul style="list-style-type: none"> • MT ch 13 	<ul style="list-style-type: none"> • HW 5

	Topics/Daily Activities	Readings	Assignment Dates
Week 12 Apr 3 & 5	• IRT	• MT ch 14	• HW 6
Week 13 Apr 10 & 12	• Bias & Fairness	• MT ch 16 • Standards ch 3	
Week 14 Apr 17 & 19	• Equating	• MT ch 18	
Week 15 Apr 24 & 26	Oral Presentation		
FINAL			Final paper (due May 3, 6:00 pm)

MT = Bandalos (2018, Measurement Theory). Standards = AERA, APA, and NCME (2014, Standards).

Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on [Research and Scholarship Misconduct](#).

Students and Disability Accommodations:

USC welcomes students with disabilities into all of the University’s educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Support Systems:

Counseling and Mental Health - (213) 740-9355 – 24/7 on call

studenthealth.usc.edu/counseling

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call

suicidepreventionlifeline.org

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press “0” after hours – 24/7 on call

studenthealth.usc.edu/sexual-assault

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office for Equity, Equal Opportunity, and Title IX (EEO-TIX) - (213) 740-5086

eeotix.usc.edu

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298

usc-advocate.symplicity.com/care_report

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

The Office of Student Accessibility Services (OSAS) - (213) 740-0776

osas.usc.edu

OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

USC Campus Support and Intervention - (213) 821-4710

campussupport.usc.edu

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity, Equity and Inclusion - (213) 740-2101

diversity.usc.edu

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 - 24/7 on call

dps.usc.edu, emergency.usc.edu

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 - 24/7 on call

dps.usc.edu

Non-emergency assistance or information.

Office of the Ombuds - (213) 821-9556 (UPC) / (323-442-0382 (HSC)

ombuds.usc.edu

A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

Occupational Therapy Faculty Practice - (323) 442-3340 or otfp@med.usc.edu

chan.usc.edu/otfp

Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.