

Psychometric Theory
PSYC 6349

<u>Class Information</u>	<u>Instructor Information</u>
Term: Fall, 2009 (August 27 – December 10, 2009) Time: Thursdays (2:00 – 4:50 p.m.) Location: LS Building, Room 101 Credit hours: 3 Websites: www.uta.edu/faculty/scielzo ; www.scielzo.com	Shannon Scielzo, Ph.D. Office Hours: Tuesdays, 3:00-4:00 p.m., and by appointment. Email: scielzo@uta.edu Office Phone: 817-272-5464

Course Description:

This course is designed to introduce students to Psychometric theory, and provide the basic skills necessary to evaluate the merits of psychological tests and the interpretations of inferences from these measures. Moreover, students should obtain a basic foundation in understanding test development. The material will cover research, theories, and applications of a wide range of psychological testing concepts. For example, we will examine classical test theory views of reliability and item analysis, validity, and test development principles. Moreover, modern approaches to test theory, including item response theory and generalizability theory will be covered.

Course Presentation:

This is a relatively applied course that attempts to teach the basics of psychological testing through hands-on projects, group collaboration, and active participation in class lectures. Thus, in order to maximize learning in this course it is important that everyone participates in class discussion, such as by contributing personal examples or ideas, and by asking questions. It is imperative that the values, questions, and comments presented by other individuals in this classroom be respected. Every individual will bring with him/her unique and diverse perspectives from which we can all benefit.

Required Texts:

Nunnally, J. & Bernstein, I. (1994) *Psychometric Theory (3rd Ed.)*. New York: McGraw Hill.

Allen, M. J. & Yen, W. M. (1979). *Introduction to Measurement Theory*. Long Grove, IL: Waveland Press.

Additional Readings:

AERA, APA, & MCME (1999). *Standards for educational and psychological testing*. Washington, DC: American Psychological Association.

Baker, F. (2001). The basics of item response theory. Eric Clearinghouse on Assessment and Evaluation. College Park, MD: University of Maryland.

- Campbell, D. T., & Fiske, D. W. (1959). Convergent and discriminant validation by the multitrait-multimethod matrix. *Psychological Bulletin*, 56, 81-105.
- Comrey, A. L. (1988). Factor-Analytic Methods of Scale Development in Personality and Clinical Psychology. *Journal of Consulting and Clinical Psychology*, 56(5), 754-761.
- Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. *Psychological Bulletin*, 52, 281-302.
- Cureton, E. E. (1950). Validity, reliability, and baloney. *Educational and Psychological Measurement*, 10, 94-96.
- Embretson, S. E. (1996). The new rules of measurement. *Psychological Assessment*, 8, 341-349.
- Hays, R. D., Anderson, R., & Revicki, D. (1993). Psychometric considerations in evaluating health-related quality of life measures. *Quality of Life Research*, 2, 441-449.
- Messick, S. (1995). Validity of psychological measurement: Validation of inferences from persons' responses and performances as scientific inquiry into score meaning. *American Psychologist*, 50, 741-749.
- Schmitt, N. (1996). Uses and abuses of coefficient alpha. *Psychological Assessment*, 8, 350-353.
- Schmitt, N., & Stults, D. M. (1986). Methodology review: Analysis of the multitrait-multimethod matrices. *Applied Psychological Measurement*, 10, 1-22.
- Schwarz, N. (1999). Self-reports: How the questions shape the answers. *American Psychologist*, 54, 93-105.
- Shavelson, R. J., Webb, N. M., & Rowley, G. L. (1989). Generalizability theory. *American Psychologist*, 44, 922-932.
- Shrout, P. E., & Fleiss, J. L. (1979). Intraclass correlations: Uses in assessing rater reliability. *Psychological Bulletin*, 86, 420-428.
- Wanous, J. P., & Hudy, M. J. (2001). Single-item reliability: A replication and extension. *Organizational Research Methods*, 4(4), 361-375.
- Wanous, J. P., Reichers, A. E., & Hudy, M. J. (1997). Overall job satisfaction: How good are single-item measures? *Journal of Applied Psychology*, 82(2), 247-252.

Note: Additional readings may be added.

Assessment of Progress Toward Objectives

Exams: There will be two exams, a midterm and a comprehensive final exam. Dates for these exams are listed on the tentative course schedule. Any changes to exam dates will be announced in class, and you are responsible for attending class for such announcements. Exams will cover material from lectures, readings, and any other assignments given. Expect to be able to give advice for good psychometric practice, summarize research, describe controversies, explain key terms, respond to applied problems, explain key formulas, and provide criticism of poor psychometric practice. You are expected to take exams during scheduled meeting

times and bring testing materials (i.e., blank paper and writing utensils) to each exam. If you have an acceptable absence (as defined by official UTA policy) you may make up a missed exam. This will consist of completion of an assignment deemed commensurate or more difficult. To invoke this policy, you must provide documentation of the absence by the Friday following the scheduled exam and you must make up the exam within one week of the scheduled exam. This make-up policy is for highly unusual circumstances only. Failure to follow this policy will result in you receiving a “0” on the exam. You are expected to work independently on exams, and you will be given a course grade of “F” if you fail to behave in accordance with UTA’s guidelines on academic integrity.

Test Development Project: You will practice your skills by developing a psychological measure. For the class project, you will be expected to identify a currently unaddressed need in the field of Psychology, and develop a measure (and respective test manual) to address this deficiency. I recommend picking a topic related to some of your current research – many of you may decide to use your measures and data for upcoming projects, theses, and dissertations.

You have two options for this project: You may either actually collect data for validation of your measure, or, you may create fictitious data (that demonstrates support for the use of your measure). However, if the latter route is chosen, the ‘validation efforts’ demonstrated will need to be substantially more comprehensive (and the majority of the points provided under the general criteria provided below should be addressed). If the former route is chosen, it is imperative that you begin working on your IRB materials as early in the semester as possible.

Below is an outline of the general criteria for the project. You are encouraged to structure your manual to make it as comprehensible as possible depending on your construct - thus, it is likely that you will not follow the order (nor utilize the headings) given below. However, I expect that each of these points be addressed somewhere within your manual (whenever these points are applicable to your construct/methodology). Furthermore, dependent on the construct you are assessing, additional information may be necessary. Be sure when addressing these points that you demonstrate mastery of the topics you are discussing.

- Test Development
 - Test Conceptualization
 - What is the purpose of your measure?
 - What construct will you measure?
 - How does your construct relate to other measures?
 - How does your construct relate to outcome variables?
 - Are there sub-constructs?
 - How does your construct meet an unmet need?
 - Include a nomological network
 - What population should this scale be assessing?
 - What is already known about this construct?
 - Will this scale typically be employed in conjunction with other measures?
 - What are the potential positive/negative implications of using this scale?
 - Include sufficient literature to support your assertions
 - Test Construction
 - How many items did you initially develop, and why?
 - How were items developed?
 - How did you choose to scale your measure, and why?
 - How did you score your scale, and why?

- Review, Revision, and Tryout
 - Item Tryout
 - How did you test your scale? What methodology(ies) did you employ, and why?
 - What population(s) did you use? Was this consistent with the population to which you hope to generalize your findings?
 - Were expert reviews and bias reviews conducted?
 - Item Analysis
 - How did you go about deciding which items to retain?
 - How were reliability and validity assessed?
 - Explain why the various forms of reliability and validity were chosen
 - Be comprehensive – consider the various issues and concerns that we discuss in class
 - Include an MTMM matrix if applicable
 - Did you have missing data? If so, how did you deal with it?
 - Do you have sufficient domain coverage?
 - Test Revision
 - How many iterations of revisions have you gone through thus far?
 - Did you cross validate your findings?
- Final Scale
 - How many items did you retain in the ‘final’ scale?
 - Were additional studies conducted?
 - How do we interpret scores?
 - In some cases, some of the points under the review, revision and tryout section may be more applicable here and vice versa
- Discussion
 - What are the theoretical and practical implications of your scale?
 - Limitations and Future Research
 - What further plans might you implement to further examine your measure?
 - Thoroughly discuss the limitations associated with the particular approach(es) that you undertook
- Test Materials
 - Include all test materials (e.g., instructions, scale items, etc.)
- References
- Figures/Tables as needed to support your arguments
- General Criteria
 - The manual should be written following APA 6th edition guidelines
 - Include appropriate headings/subheadings to facilitate communication of your ideas
 - The document should be free of spelling/grammatical errors
 - There is no minimum nor maximum page requirement for this project. - However, I expect that your arguments should be well supported.

I am expecting to receive numerous drafts and provide feedback to you for this project, under the understanding that feedback will be provided to you within a two-week period. Failure to seek feedback during the course of the completion of your project will likely result in a lower grade, as you will probably fail to address issues/concerns that I might otherwise have brought to your attention.

Class Assignments and Participation: You are expected to attend every class session, participate in class discussions and activities, and come prepared for class. Coming prepared means that you are ready to discuss the assigned readings (you may be called on at random to summarize and lead discussion on class readings) and have adequately completed any assignments that are due.

If you have missed no more than 1 class activity, you will receive 100% (i.e., the full 20 % of your total grade) for participation. If you miss 2 activities, your assignment and participation grade will be reduced to 75%. If you miss 3 activities, your assignment and participation will be reduced to 50%. If you miss 4 activities, it will drop to 25%. And, if you miss 5 or more, your assignment and participation grade will be 0%. If you must miss a class for a religious holiday/purpose, please notify me know at your earliest convenience.

Quizzes: Quizzes will be periodically administered to assess student learning, covering material from class readings and lectures. Quiz grades will be averaged.

Criteria for Grade:

Midterm Exam	20%
Comprehensive Final Exam	20%
Quizzes	20%
Test Development Project	20%
Class Assignments & Participation	20%

Overall Course Evaluation:

90-100%	= A
80-89%	= B
70-79%	= C
60-69%	= D
0-59%	= F

Course Prerequisites:

Graduate standing or permission of instructor. However, it is recommended that students entering this class have a strong statistical background and be well-versed in psychological concepts/principles.

Student Code of Conduct:

Students who engage in any activities that lead to classroom disruption may be directed to leave the class, may be withdrawn from the class, receive a disciplinary warning, probation, suspension, expulsion, or other appropriate and authorized actions.

Academic Integrity:

It is the philosophy of The University of Texas at Arlington that academic dishonesty is a completely unacceptable mode of conduct and will not be tolerated in any form. All persons involved in academic dishonesty will be disciplined in accordance with University regulations and procedures. Discipline may include suspension or expulsion from the University.

"Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts." (Regents' Rules and Regulations, Part One, Chapter VI, Section 3, Subsection 3.2, Subdivision 3.22)

"Copying another student's paper or any portion of it is plagiarism. Additionally, copying a portion of published material (e.g., books or journals) without adequately documenting the source is plagiarism. If one or more words in sequence are taken from a source those words must be placed in quotes and the source referenced with author's name, date of publication, and page number of publication. If the author's rephrased, by transposing words or expressing the same idea using different words, the idea must be attributed to the author by proper referencing, giving the author's name and date of publication. If a single author's ideas are discussed in more than one paragraph, the author must be referenced at the end of each paragraph. Authors whose words or ideas have been used in the preparation of a paper must be listed in the references cited at the end of the paper. Students are encouraged to review the plagiarism module from the UT Arlington Central Library via <http://library.uta.edu/tutorials/Plagiarism>"

Americans with Disabilities Act:

The University of Texas at Arlington is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 93112 -- The Rehabilitation Act of 1973 as amended. With the passage of new federal legislation entitled Americans with Disabilities Act - (ADA), pursuant to section 504 of The Rehabilitation Act, there is renewed focus on providing this population with the same opportunities enjoyed by all citizens. As a faculty member, I am required by law to provide "reasonable accommodation" to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing faculty at the beginning of the semester and in providing authorized documentation through designated administrative channels.

Student Support Services:

The University supports a variety of student success programs to help you connect with the University and achieve academic success. They include learning assistance, developmental education, advising and mentoring, admission and transition, and federally funded programs. Students requiring assistance academically, personally, or socially should contact the Office of Student Success Programs at 817-272-6107 for more information and appropriate referrals.

Drop for Non-payment of Tuition:

If you are dropped from this class for non-payment of tuition, you may secure an Enrollment Loan through the Bursar's Office. You may not continue to attend class until your Enrollment Loan has been applied to outstanding tuition fees.

Withdrawal Deadline: The last day to drop this class without academic penalty is October 30th.

Syllabus Changes: I reserve the right to make changes to this syllabus or course schedule according to the learning needs of the class.

Your Success! As a final note, it is very important to me that you succeed in this course. I hope that you enjoy this course, successfully complete it, and benefit from the concepts that you learn from it in the future. Please contact me with any concerns or problems that you may have.

Tentative Course Schedule

<i>Date</i>	<i>Topic</i>	<i>A & Y</i>	<i>N & B</i>	<i>Articles/Other Materials</i>
27-Aug	Introduction, Statistical Foundations Review	Ch. *2	Chs. 1 & *5	
3-Sep	Scaling and Test Construction September 9 - Census Date		Chs. 2 & 8	Cronbach Cureton Schwarz
10-Sep	Scaling and Test Construction Contd. Introduce the * <i>Standards for Educational and Psychological Testing</i> .			Wanous (1997 & *2001)
17-Sep	Reliability	Ch. *4	Ch. 6	Hays Schmitt (1996)
24-Sep	Reliability		Ch. 7	Shrout Shavelson
1-Oct	Validity	Ch. *5	Ch. 3	Messick Campbell Schmitt (1986)
8-Oct	Validity			
15-Oct	Midterm Exam			
22-Oct	Test Development Workday			
29-Oct	Special Problems in CTT October 30 - Last day to drop classes!	Ch. 3	Ch. 9	
5-Nov	Recent Developments in Test Theory/ IRT	Ch. 11	Ch. 10	Embretson
12-Nov	Recent Developments in Test Theory/ IRT			*Baker
19-Nov	Factor Analysis/Confirmatory Factor Analysis		Chs. 11-13	Handouts
26-Nov	<i>Thanksgiving Holiday</i> . No class - Study!			
3-Dec	Profile Analysis, Discriminant Analysis & MDS. Scale Development Project Due		Ch. 14	
10-Dec	Final Exam - 2:00p.m. -4:30 p.m. http://www3.uta.edu/registrar/FinalFall2009.asp			

Note: * These are optional but suggested readings.