Faculty:

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Course description:
This course focuses on defining, and providing examples of, measurement issues in clinical research. Theories of measurement, including classical test theory and generalizability theory will be discussed, and will form the basis for examining the psychometric properties of instruments. However, the course will focus primarily on providing students with practical skills that will allow them to locate, select, and evaluate instruments for use in clinical research. Key aspects of measure reliability -- including inter- and intra-rater, test-retest, parallel/alternate forms, and internal consistency -- and validity -- including content, criterion, and construct -- will be examined in detail. Additional topics include cultural issues in measurement, survey research methods, overview of health status measures, and writing the measurement section of a grant proposal.

Course objectives:
Specific objectives are to:
1) become sensitive to the universality and complexity of measurement issues;
2) become knowledgeable about measurement issues in specific areas of research interest;
3) become familiar with methods for testing the psychometric properties of measures used in clinical research;
4) describe and analyze the reliability and validity evidence for specific instruments; and
5) conduct basic psychometric analyses including internal consistency and factor analysis.

Course requirements:
Prerequisites:
Basic research methods course; Basic computer skills; Experience with a statistical program (e.g., STATA, SPSS, or SAS)

Location:
Room 117 Victoria Building
Room 126 Gardner Steel Building for computer session on July 21 and August 11

Course credits and contact hours:
1 credit; 16 contact hours; 1 session/week for 8 weeks (~2 hours each session)

Grading:
Letter grade, based on assignments and examination:
1) Summary of measurement issue in content area of interest (10%)
2) Full reliability and validity report on a single measure (25%)
3) Grant proposal descriptions of three measures (25%)
4) Final exam (40%)


Additional reading materials will be provided in course notebook.

Teaching methodology:

Each in-class session will be a combination of didactic instruction, small group activities, individual exercises, and/or computer-based experience. Seminar participation, written assignments, and a final exam are required work for this course.
Class sessions

Session 1  Overview & Introduction

July 8, 2004

Topics:
1. Introduction to the course
2. Variables and level of measurement
3. Overview of course content

Assignment due for next session: A critical aspect of this course will be to learn to apply knowledge about appropriate measurement to your own areas of research interest. As a first step, identify a current measurement issue in the published literature and write a short summary (~one page) of the issue that includes something about the history of the construct to be measured and the current state of measurement of the construct. Measurement issues may include, but are not limited to:
   - description of how a new measure was developed
   - refinement of an existing instrument
   - attempts to provide evidence for the reliability or validity of an instrument
   - use of an instrument in a new population

Session 2 Reliability

July 14, 2004

Topics:
1. Reliability in measurement
   - inter-rater
   - intra-rater
2. Class discussion: Instrumentation in student research areas

Readings: DeVellis, pp1-13


First measurement summary due.
Session 3 Reliability

**July 21, 2004** (meet in computer lab – 126 Gardner Steel Bld.)

Topics:
1. Reliability in measurement
   - test-retest
   - parallel/alternate form
   - internal consistency

2. Computer exercise -- evaluating internal consistency using SPSS

**Readings:**
- Carmines and Zeller, pp 9-16, 29-51
- DeVellis, pp 27-47


Session 4 Validity

**July 28, 2004**

Topics:
1. Validity in measurement
   - content/face
   - criterion
   - construct
     - convergent
     - discriminant
     - predictive
     - factor
   - generalizability

2. Measurement issues in assessing alcohol consumption: Andrea DiMartini, MD

**Readings:**
- Carmines and Zeller, pp 17-27
- DeVellis, pp 49-58


Session 5 Validity

August 4, 2004

Topics:
1. Validity in measurement
   - sensitivity
   - specificity
   - responsiveness
2. Cultural issues in measurement
3. Issues in Qualitative Measurement: Megan Crowley-Matoka, PhD


Assignment due for next session: When selecting or evaluating an instrument for possible inclusion in a research project, it is important to be fully aware of the instrument’s psychometric properties. Select a published instrument that is a possible candidate for inclusion in a research project of your own. Write a full summary (2-3 pages) of the evidence for the instrument’s reliability and validity. Note whether the instrument has been used and evaluated psychometrically in populations similar to the one used in your research.

Session 6 Factor Analysis

August 11, 2004 (meet in computer lab -- 126 Gardner Steel Bldg.)

Topics:
1. Introduction to Factor Analysis
2. Computer exercise -- conducting factor analysis
Readings: Carmines and Zeller, Appendix

DeVellis, pp 102-137


**Second measurement summary due.**

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**Session 7  Additional Topics**

**August 18, 2004**

Topics:
1. Survey research methods and questionnaire design
2. Selecting measures of health status
3. Instrument section of grant proposals

Readings: DeVellis, pp 154-160


**Assignment due for next session:** It is important to be able to communicate information about measures in a way that is clear and informative for manuscripts and for grant applications. Select three measures and write short summaries about them that would be appropriate for a grant application.

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**Session 8**

**August 25, 2004**

Final exam

Instrument section of a grant proposal due.