

Course Description

Psychometrics – An introduction to Classical Test Theory (CTT), Generalizability Theory (GT) & Item Response Theory (IRT)

7.5 credits, third cycle, full time

Course coordinator / teacher /examinator

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Language

If necessary, the lectures are given in English.

Prerequisites and conditions for access to the course:

Admitted to third cycle studies in social science research subject, including public health.

Course Coordinator:

Department of Psychology, Stockholm University

Introduction

Psychometrics is a field of study concerned with the theory and technique of psychological research measurement. Psychometric quality has important implications for the proper interpretation of psychological research and practice. This course is designed to enable PhD students to evaluate a variety of assessment instruments useful for measuring characteristics of individuals (e.g., personality, abilities, attitudes and related psychological constructs). After successful completion of the course, students will be prepared to evaluate assessment instruments that are targeted toward specific measurement purposes.

Classical Test Theory (CTT)

The first part is intended to provide students with a solid foundation in classical test theory (e.g., true score and measurement *error*). CTT can be used to evaluate psychological properties of the measurement instruments reliability and validity. Both Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) are discussed as methods to evaluate instruments using CTT.

Generalizations Theory (GT)

The second part gives the student an introduction to GT. Although *error* could represent many different types of error, such as rater or instrument error, CTT only allows us to estimate one type of error at a time. Essentially it throws all sources of error into one random error term. The advantage of GT theory lies in the fact that researchers can estimate what proportion of the total variance in the results is due to the individual factors that often vary in assessment, such as setting, time, items, and raters. Another important difference between CTT and GT is that the latter approach takes into account how the consistency of outcomes may change if a measure is used to make absolute versus relative decisions. Students will learn various statistical software (packages) that can be used in the analysis.

Item Response Theory (IRT)

The third part gives an introduction to Item Response Theory (IRT). IRT relaxed the assumption of CTT and GT that all items are assumed to be replications of each other or in other words items are considered to be parallel instruments. Instead, the IRT model reflect the probability that a person having a given level of a psychological characteristic will respond in a certain way to an item having a given set of psychometric qualities. IRT can treat the discrimination (parameter a), difficulty (parameter b) and guessing probability (parameter c) of each item as information to be incorporated when scaling items.

IRT can treat scales having items with only two response options or multiple response possibilities (e.g., 5-point or 7-point response formats). Students will be introduced to different different statistical approaches available within the program R that can be used in the analysis.

After completing the course, the student will be able to:

- identify, assess and evaluate psychometrics properties of psychological measurements.
- identify, assess and evaluate the possibilities and limitations for each psychometric theory (CTT, GT, IRT),
- present and discuss own research findings in a paper

Learning environment

Active participation in a one-day seminar.

Examination

An individually written paper (APA style) with psychometrics analysis of the data using CTT, GT and/or IRT. The paper shall include:

- an introduction with a theoretical rationale for what is measured
- a method section describing participant sampling, study design, measures, and the chosen psychometric analysis
- a result section including a summary of the collected data and analyses
- a discussion section evaluating and interpreting the psychometric findings. In interpreting the results, the author shall consider and discuss sources of bias and other threats to internal validity, imprecision of measures, and other weaknesses of the study. Limitations and an argumantation of the importance of the findings and recommendations for further study shall conclude the discussion

The written paper shall be uploaded on Fastreg (date given at the beginning of the course).

The examiner will provide written feedback within two weeks and the students will then have the opportunity rewrite the paper within two weeks. The examiner will provide individual student grade on the final version of the paper.

Grades and grade criteria

Pass. For a passing grade the student achieved the expected learning outcomes of the course.

Fail. The psychometric analysis is insufficiently described in such a way that the expected learning outcomes are not met. Students who have not been approved have the opportunity to rewrite the paper.

Plagiarism and self-plagiarism

It is of course permissible to quote other sources, but both direct and indirect quotes must always be provided with correct and complete reference data. Copying or printing of a shorter or longer section and identifying oneself as the author of the text is prohibited. It is considered plagiarism. It is not allowed in the longer pieces to quote your own previous graded texts (so-called self-plagiarism). Plagiarism is regarded as a fundamental breach, not only against an established research ethics code, but also on a general approach to their own and others' texts. Plagiarism is unauthorized cheats and will always be the subject of a disciplinary matter, which can lead to suspension.

Literature

Furr, R.M. (2011). *Scale Construction and Psychometrics for Social and Personality Psychology*. 2011. SAGE Publications. ISBN 9780857024046.

In-depth literature (about 400 pages) about CTT, GT and IRT in the form of articles selected for each individual student