How to create quality psychometric tests: Classical and state-of-the-art methods, University of Kent

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Abstract

This summer school held over five consecutive days will give you the knowledge necessary for **designing, developing and evaluating your own psychometric test**, or **adapting an existing test to another language, context or format.** The instructor, Dr. Anna Brown, will introduce participants to classical as well as state-of-the-art methods for test development and adaptation, and discuss contemporary issues in psychological testing. The sessions will combine theory and hands-on practical exercises in a computer class **using R** – a free software environment for statistical computing and graphics.

Learning Objectives

To familiarize participants with classical and modern methods of developing and adapting tests as part of a unified approach to psychological measurements, including theoretical knowledge and practical skills in analyzing data in a software environment.

Learning Outcomes

· Users of psychological tests (applied researchers or practitioners) will be able to consolidate their knowledge and receive a theoretical basis for further competent use and assessment of the quality of methods.

· Novice developers of psychological tests will receive the necessary knowledge and practical skills to start implementing specific projects to develop or adapt methods. The acquired knowledge is necessary, but usually not sufficient for complex projects; nevertheless, the developers will receive a basis allowing them to navigate the theory of psychological dimensions and determine suitable methods.

· Experienced test developers will be able to increase competence in modern methods of developing or adapting tests, and develop a unified approach to psychological measurements.

Prerequisites

This course will be useful for researchers or practitioners who use psychometric tests and would like to understand more about their properties, or those looking to develop or adapt psychometric tests. The course

would also be useful to seasoned test developers who are looking to upskill in modern methods for test development or adaptation, or build a unified approach to psychological measurement.

Participants should be familiar with basic statistical concepts, such as descriptive statistics, correlation, regression and hypotheses testing. Some knowledge of factor analysis is desirable but not essential. It is assumed that participants are completely new to R. Practical exercises are designed so that R functionality needed for analysis of psychometric scales is introduced throughout the course. However, **this is not a course in R** – therefore, participants experienced in R will find the course just as useful.

Schedule of the track №4

Day 1. Classical Test Theory

1. Introduction to psychological measurement –levels of measurement, types of psychological data and some basic scaling methods.

2. Item and test score. Classical item analysis.[Introducing R and first practical]

3. The true-score model and score reliability. [Practical using R]

4. The evolution of views on test validity. Content validity - content mapping; good item writing practice for various test types. [Exercise without computers]

Day 2. Test homogeneity and factor analysis

1. Test homogeneity (unidimensionality). Fitting a single-factor model to data. [Practical using R]

2. Best practice in modern Exploratory Factor Analysis (EFA). [Practical using R]

3. Factor analysis of categorical responses (when item responses are categories). [Practical using R]

Day 3. Introduction to Item Response Theory (IRT)

8. Models for dichotomous test items (correct/incorrect; yes/no). [Practical using R]

9. Models for polytomous test items (e.g. never/sometimes/frequently/always).

   [Practical using R]

10. Test scoring in IRT. The error around a score; item and test information and marginal reliability.[Practical using R]

11. Applications of IRT. Computer-adaptive testing.

Day 4. Measurement invariance and test adaptation

12. Measurement invariance(MI) as a necessary condition for comparability of test scores across populations.

13. Differential item functioning (DIF).Test impact and test bias. How to deal with DIF and partial measurement invariance. [Practical using R]

14. Best practice in test adaptation from one language/culture to another. Cross-cultural comparisons.[Exercise without computers]

15. Response biases – what effect they can have on measurement, and what can be done to control them. [Practical using R]

Day 5. Frontiers in psychological measurement

17. Simulations and serious games. Situational Judgement Tests (SJT) in traditional and new formats. Scoring SJT using nominal response model. [Practical using R]

18. Comparative judgements and ipsative (relative-to-self) response formats. Best practice in designing ipsative tests. [Exercise without computers]

19. Faking in high-stakes psychological assessments. The state-of-the-art in controlling faking behaviour.

20. Outlook for the future of psychological measurement.