UNIVERSITA' DEGLI STUDI DI BRESCIA
Dipartimento Metodi Quantitativi

Workshop

Rasch Models: Theory & Applications

Mercoledì 26 Gennaio 2011 alle ore 10.30

Dipartimento Metodi Quantitativi

C.da S. Chiara, 50 – Brescia

NEW INSIGHT ON THE ROLE OF THE "PATTERN" IN RASCH MEASUREMENT

LUCIO BERTOLI-BARSOTTI
Dipartimento di Matematica Statistica Informatica e Applicazioni, Università di Bergamo

MEASUREMENT ERROR IN COVARIATES ESTIMATED WITH THE RASCH MODEL

MICHELA BATTAUZ, RUGGERO BELLIO, ENRICO GORI
Dipartimento di Scienze Statistiche, Università di Udine

ESTIMATION PROCEDURES FOR RASCH AND STRUCTURAL EQUATIONS MODELS

ANNA SIMONETTO
Dipartimento Metodi Quantitativi, Università di Brescia

EFFECTS OF DIF ITEMS ON RASCH MEASURES

SILVIA GOLIA
Dipartimento Metodi Quantitativi, Università di Brescia

USING RASCH ANALYSIS TO MEASURE SOCIAL INTEGRATION

CHIARA ZANAROTTI, LAURA PAGANI
Dipartimento di Scienze Statistiche, Università Cattolica di Milano
Dipartimento di Scienze Economiche e Statistiche, Università di Udine

ADJUSTING FOR ILL-CONDITIONED DATA SETS IN RASCH MODELS

TOMMASO LANDO, LUCIO BERTOLI-BARSOTTI
Dipartimento di Matematica Statistica Informatica e Applicazioni, Università di Bergamo

THE RASCH-RASCH MODEL FOR MISSING NOT AT RANDOM:
AN APPLICATION TO THE HIV-1 VCT DATASET

ANTONIO PUNZO, LUCIO BERTOLI-BARSOTTI
Dipartimento Impresa Culture e Società, Università di Catania
Dipartimento di Matematica Statistica Informatica e Applicazioni, Università di Bergamo

RISK PROFILE USING RASCH ANALYSIS

VALERIA CAVIEZEL, SERGIO ORTOBELLI, LUCIO BERTOLI BARSOTTI
Dipartimento di Matematica Statistica Informatica e Applicazioni, Università di Bergamo

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Participation is free but a registration before 20th January 2011 is required: send an e-mail to carpita@eco.unibs.it with your name and affiliation.

Prof. Maurizio Carpita

Abstract

NEW INSIGHT ON THE ROLE OF THE "PATTERN" IN RASCH MEASUREMENT

LUCIO BERTOLI-BARSOTTI

As is well known, in the family of Rasch models the Sum Scores (SS), of persons and/or items, are sufficient statistics for the corresponding sets of location parameters. Indeed, under suitable conditions SS are co-monotone with respect to the (joint) maximum likelihood estimates (JMLE). Moreover, SS based estimates coincide with the JML estimates, in the simple Rasch model (RM). Nevertheless, the pattern plays an important role for Rasch measurement - e.g., first of all, in stating the conditions for the existence of maximum likelihood estimates of the parameters. This becomes also more apparent when considering alternative estimation approaches. After a brief presentation of the Minimum Chi-Square (Minchi) estimation method, exact formulas for Minchi estimates and residuals are derived for the RM.

MEASUREMENT ERROR IN COVARIATES ESTIMATED WITH THE RASCH MODEL

MICHELA BATTAUZ, RUGGERO BELLIO, ENRICO GORI

The Rasch model estimation provides a measure with error of the latent trait values. When this latent variable is included in a further model as covariate, it is necessary to adjust for the presence of measurement error in order to obtain unbiased estimates. This work presents various techniques for measurement error adjustment when the latent covariates are estimated with the Rasch model. Generalized linear models, ordered response models and linear mixed models are considered.

ESTIMATION PROCEDURES FOR RASCH AND STRUCTURAL EQUATIONS MODELS

ANNA SIMONETTO

We are interested in measuring, using statistical models, aspects of subjective perceptions and assessments and to understand their dependencies. We will focus on the statistical properties of some parameters estimators of the regression models with variables affected by measurement errors and we make a comparative analysis of the two different approaches: the Item Response Model (IRM) and the Structural Equation Model (SEM).

EFFECTS OF DIF ITEMS ON RASCH MEASURES

SILVIA GOLIA

Differential item functioning (DIF) is understood to be present when something about the characteristics of a test taker interferes with the relationship between ability and item responses. When DIF is present, an impact on the estimated ability measure could be expected. Two types of DIF can be identified: uniform and nonuniform. The present simulation study addresses the issue in assessment of the impact of both kinds of DIF on the measures obtained applying the Rasch model when the questionnaire is formed by polytomous items.

USING RASCH ANALYSIS TO MEASURE SOCIAL INTEGRATION

CHIARA ZANAROTTI, LAURA PAGANI

The aim of this paper is to construct a composite indicator of social integration by subsequent aggregations of simple indicators using Rasch parameters. In particular the Item Location Parameters are used to weight different aspects of social integration while Person Location Parameters contribute to set up the integration measure. The proposed indicator is applied to a survey about integration of immigrants in Italy.

ADJUSTING FOR ILL-CONDITIONED DATA SETS IN RASCH MODELS

TOMMASO LANDO, LUCIO BERTOLI-BARSOTTI

By construction, the Rasch measure corresponding to an extreme total score is not estimable. For this reason in applications, a fractional score point value is subtracted (added) to the perfect (zero) total scores, in order to obtain finite estimates (see for example the command "EXTRSC" in the software package Winsteps). An alternative approach is proposed to solve this problem, within the more general context of an ill-conditioned data set case.

THE RASCH-RASCH MODEL FOR MISSING NOT AT RANDOM: AN APPLICATION TO THE HIV-1 VCT DATASET

ANTONIO PUNZO, LUCIO BERTOLI-BARSOTTI

A class of IRT models for dichotomies, called Rasch-Rasch Models, is introduced for the case of missing not at random. Their parameterization satisfies the following conditions: first, the missing-data process depends on a person latent trait - say response propensity - that is distinct from the latent ability (a similar bi-dimensional parameterization holds for the items); second, the model belongs to the Rasch family of models. An application to a 15-item questionnaire, that is part of the HIV-1 VCT dataset, is illustrated in order to exemplify the models and appreciate their advantages.

RISK PROFILE USING RASCH ANALYSIS

VALERIA CAVIEZEL, SERGIO ORTOBELLI, LUCIO BERTOLI BARSOTTI

In this paper we propose a valuation of the investors' predisposition to risk/earn in order to account the minimal requirements that Italian financial institutions must satisfy by law (DL 58, 1998). We proceed by analyzing a test applied to the potential investors. In particular we identify a questionnaire whose items describe different characteristics of the latent variable (predisposition to risk/earn). Thus, we suggest to analyze: the investors' financial knowledge (financial products, institutions, etc.), the investors' temporal horizon and the personal aversion to risk. The Rasch analysis applied to the results of the tests permits to better define the investor's risk profile.