Psychometrika

CONTENTS

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A NEW ERA OF PUBLISHING FOR PSYCHOMETRIKA

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The Psychometric Society Board of Trustees, Editorial Council, and the Editors of *Psychometrika* express their deep appreciation to Cynthia Null, Managing Editor and Tim Null, Technical Editor, who stepped down from their posts in June 2004, after more than 25 years of service to the Society. Cynthia and Tim shepherded the Society and the Journal through times of great change in academic publishing; introduced electronic submission of manuscripts, LaTeX-based typesetting, and color figures for the journal; and developed an electronic archiving system culminating in the *Psychometrika* CD-ROM set, which contains all issues of the journal from its inception in 1936 to the 2000 volume. The journal's reputation for high quality, editorial accuracy, and professional style would not be what it is today without them.

We also extend our thanks to Integre Technical Publishing Company, Inc., of Albuquerque, NM, and Cadmus Professional Communications of Linthicum, MD, who have for many years provided typesetting, production, printing, and mailing services of the highest caliber for the journal. The new arrangement reflects the fact that the Society does not have the resources to continue to self-publish the journal, and we regret that we cannot continue to work with these two fine organizations.

During the transition from self-publishing to publishing in partnership with Springer, *Psychometrika* Volume 69 (2004) is being published under the very capable production management of our Editorial Assistant, Gwen Eastmond. We anticipate being caught up in all publication delays related to the transition before the March 2005 issue, and this simply would not be possible without Gwen's dedication and hard work on Volume 69.

FIRST ANNOUNCEMENT—CALL FOR PAPERS

IMPS 2005 ANNUAL MEETING OF THE PSYCHOMETRIC SOCIETY

JULY 5-8, 2005

TILBURG UNIVERSITY, THE NETHERLANDS

The 70th Annual Meeting of the Psychometric Society and the 14th International Meeting of the Psychometric Society (IMPS2005) will be held at Tilburg University, Tilburg, The Netherlands, July 5–8, 2005. Pre-conference workshops will be held Monday, July 4, 2005, with the main conference running from Tuesday to Friday, July 5–8, 2005.

Persons interested in organizing a symposium should contact Ulf Böckenholt at ulf.bockenholt@mcgill.ca.

Persons wishing to present talks (contributing sessions or poster sessions) should send titles and abstracts of no more than 200 words. Abstracts should be e-mailed to "pmetrika@uncg.edu." The subject header of the e-mail should include a reference to IMPS2005.

The following information should be included in attachment:
E-mail address for contact person
Name, institutional affiliation, mailing address, and e-mail address for each author
Name of the presenter of the submission
Type of submission (Contributing or Poster session)
Title of submission
Topic area of submission (see list below)
Abstract ($<$ 200 words)
The attached file should be in text format (.doc, .rtf, .txt).

References should not be included with abstracts.

Each person is permitted to present at most one contributed paper. This restriction does not prevent a keynote speaker or an invited speaker from also presenting one contributed paper, nor does it limit the number of papers on which one can be listed as a coauthor.

The deadline for abstract submission is March 1, 2005. You will be notified by March 31 whether your presentation is accepted.

Topic area choices are (AAP) Applications, (BSI) Bayesian Statistical Inference, (CDA) Categorical Data Analysis, (CTT) Classical Test Theory, (CCC) Classification, Clustering, and Correspondence Analysis, (EDA) Exploratory Data Analysis, (FAC) Factor Analysis, (GRM) Graphical Models, (IRT) Item Response Theory, (GLM) Generalized Linear Models, (LDA) Longitudinal Data Analysis, (MDS) Multidimensional Scaling, (MVA) Multivariate Analysis, (ODS) Optimal/Dual Scaling, (SEM) Structural Equation Modeling, (VCA) Variance Components Analysis, (OTR) Others (please specify)

Further details will be posted on the Society's website as they become available: http://www.psychometrika.org/meeting/2005/index.html

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Guanzhong Luo
Robert J. Mislevy
Irini Moustaki
Sophia Rabe-Hesketh

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PSYCHOMETRIKA—VOL. 69, NO. 4, 513–545
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GEOMETRIC REPRESENTATION OF ASSOCIATION BETWEEN CATEGORIES

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Categories can be counted, rated, or ranked, but they cannot be measured. Likewise, persons or individuals can be counted, rated, or ranked, but they cannot be measured either. Nevertheless, psychology has realized early on that it can take an indirect road to measurement: What can be measured is the strength of association between categories in samples or populations, and what can be quantitatively compared are counts, ratings, or rankings made under different circumstances, or originating from different persons. The strong demand for quantitative analysis of categorical data has thus created a variety of statistical methods, with substantial contributions from psychometrics and sociometrics. What is the common basis of these methods dealing with categories? The basic element they share is that the sample space has a special geometry, in which categories (or persons) are point masses forming a simplex, while distributions of counts or profiles of ratings are centers of gravity, which are also point masses. Rankings form a discrete subset in the interior of the simplex, known as the permutation polytope, and paired comparisons form another subset on the edges of the simplex. Distances between point masses form the basic tool of analysis. The paper gives some history of major concepts, which naturally leads to a new concept: the shadow point. It is then shown how loglinear models, Luce and Rasch models, unfolding models, correspondence analysis and homogeneity analysis, forced classification and classification trees, as well as other models and methods, fit into this particular geometrical framework.

Key words: Categorical data, simplex, triangular plot, paired comparisons, rank orders, permutation polytope, center of gravity, BTL model, Rasch model, inertia, association model, variation, multidimensional unfolding, biplot, multinomial response model, loglinear model, forced classification, classification tree.

1. Introduction

One hundred years ago, Charles Spearman created, in two papers in the *American Journal of Psychology* (Spearman, 1904a, 1904b), factor analysis, classical test theory, and the rank correlation coefficient. It was a sheer explosion of psychometric ideas that were both fundamental and influential; they gave psychology for the first time a solid way to evaluate quantitatively several quality aspects of the measurement of individual differences (reliability, validity, and correction for attenuation). Wilhelm Wundt had supervised his doctoral thesis, but it was especially the work of Francis Galton, who had done so much to put individual differences on the agenda, that influenced Spearman.[1] At the occasion of the 100th anniversary of Spearman's main contributions to psychometrics, I am delighted to dedicate my presidential address to this quantitative psychologist of great distinction.

The story of Spearman's rank correlation is rather ironic, because Spearman (1904a) admitted in a note that the general idea of looking at rank differences was first due to Alfred Binet,

This paper is based on my Presidential Address delivered at the 69th Annual Meeting of the Psychometric Society, Pacific Grove, California, June 14–17, 2004. It was completed during a stay as Fellow of the Netherlands Institute for Advanced Study in the Humanities and Social Sciences (NIAS) in Wassenaar, The Netherlands.

I would like to thank Marike Polak, Frank Busing, Elise Dusseldorp, and Angela Jansen for their help in the data analyses and the preparation of the figures, and Laurence Frank for her assistance during the oral presentation. I am also very lucky to have a career-long personal coach, Jacqueline J. Meulman, with whom I share so many interests and perspectives.

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[1]For a summary of Charles Spearman's major achievements and some references to historical appraisals of his work, see Williams, Zimmerman, Zumbo, and Ross (2003).

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A HIERARCHICAL BAYESIAN PROCEDURE FOR TWO-MODE CLUSTER ANALYSIS

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This manuscript introduces a new Bayesian finite mixture methodology for the joint clustering of row and column stimuli/objects associated with two-mode asymmetric proximity, dominance, or profile data. That is, common clusters are derived which partition both the row and column stimuli/objects simultaneously into the same derived set of clusters. In this manner, interrelationships between both sets of entities (rows and columns) are easily ascertained. We describe the technical details of the proposed two-mode clustering methodology including its Bayesian mixture formulation and a Bayes factor heuristic for model selection. We present a modest Monte Carlo analysis to investigate the performance of the proposed Bayesian two-mode clustering procedure with respect to synthetically created data whose structure and parameters are known. Next, a consumer psychology application is provided examining physician pharmaceutical prescription behavior for various brands of prescription drugs in the neuroscience health market. We conclude by discussing several fertile areas for future research.

Key words: Cluster analysis, hierarchical Bayesian analysis, finite mixture models, consumer psychology.

1. Introduction

Two-mode cluster analysis involves the simultaneous and joint amalgamation of both the row and column objects contained in a two-mode data matrix. Examples of such two-mode data include: asymmetric two-mode proximity data (e.g., confusions data), two-way dominance data (e.g., subjects eliciting preferences or choices with respect to different column objects), two-way profile data (e.g., objective quantitative features or attributes for a set of designated objects), etc. A number of psychometric and classification related procedures for the clustering of such two-mode data have been published over the past few decades. Eckes and Orlik (1991, 1993) provide a classification of such two-mode clustering procedures involving three general categories: (a) direct clustering methods which perform a permutation or reorganization of the rows and columns of the data matrix, and yield clusters which are interpretable directly with respect to the original data (e.g., McCormick, Schweitzer & White's (1972) bond energy algorithm including Arabie, Schleutermann, Daws, & Hubert's (1988) modification; Eckes & Orlik's (1991, 1993) cluster-by-cluster approach); (b) additive clustering approaches which represent the proximities

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LOCAL INFLUENCE ANALYSIS OF NONLINEAR STRUCTURAL EQUATION MODELS

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By regarding the latent random vectors as hypothetical missing data and based on the conditional expectation of the complete-data log-likelihood function in the EM algorithm, we investigate assessment of local influence of various perturbation schemes in a nonlinear structural equation model. The basic building blocks of local influence analysis are computed via observations of the latent variables generated by the Metropolis-Hastings algorithm, while the diagnostic measures are obtained via the conformal normal curvature. Seven perturbation schemes, including some perturbation schemes on latent vectors, are investigated. The proposed procedure is illustrated by a simulation study and a real example.

Key words: Benchmark, conformal normal curvature, local influence, Metropolis-Hastings algorithm, Q-displacement function.

1. Introduction

In structural equation modeling, it has recently been recognized that nonlinear relations among latent variables are important for establishing more meaningful models for some complex situations. For example, see Schumacker and Marcoulides (1998) and references therein on the importance of quadratic and interaction effects of latent factors in various applied researches. Owing to the strong demand for methods for assessing these relationships, analysis of nonlinear structural equation models (NSEMs) has received a lot of attention recently; see Schumacker and Marcoulides (1998). For instance, product indicator methods that used the LISREL (Jöreskog & Sörbom, 1996) program have been proposed to analyze models with quadratic and interaction terms of latent variables; see, for example, Kenny and Judd (1984), among others. Lee and Song (2003) developed a Bayesian approach for estimation and model comparison. For maximum likelihood (ML) estimation, Lee and Zhu (2002) developed a procedure via a Monte Carlo EM algorithm (Dempster, Laird & Rubin, 1977; Wei & Tanner, 1990). Results from a comparative study (Lee, Song, & Poon, 2004) indicate that the Bayesian and ML approaches are in general better than the product indicator approaches. So far, analysis on NSEMs is only focused on estimation; nothing has been done on sensitivity analysis for further understanding of the ML estimation.

Local influence analysis is a general statistical technique to assess the stability of the estimation outputs with respect to the model inputs. Model inputs may include data, parameters to be estimated, errors and model specifications, assumptions, or other characteristics. Outputs may include the parameters estimates, final objective function values, estimates of residuals and standard errors, etc. The main purpose of local influence analysis is to draw statisticians' attention to influential aspects of the inputs in relation to the underlying model and problem. It may be

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SELECTION OF VARIABLES IN EXPLORATORY FACTOR ANALYSIS: AN EMPIRICAL COMPARISON OF A STEPWISE AND TRADITIONAL APPROACH

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The purpose of this study was to investigate and compare the performance of a stepwise variable selection algorithm to traditional exploratory factor analysis. The Monte Carlo study included six factors in the design; the number of common factors; the number of variables explained by the common factors; the magnitude of factor loadings; the number of variables not explained by the common factors; the type of anomaly evidenced by the poorly explained variables; and sample size. The performance of the methods was evaluated in terms of selection and pattern accuracy, and bias and root mean squared error of the structure coefficients. Results indicate that the stepwise algorithm was generally ineffective at excluding anomalous variables from the factor model. The poor selection accuracy of the stepwise approach suggests that it should be avoided.

Key words: Stepwise variable selection, exploratory factor analysis, goodness-of-fit, varimax rotation, statistical bias, selection accuracy, pattern accuracy.

Selection of Variables in Exploratory Factor Analysis: An Empirical Comparison of Stepwise and Traditional Approaches

Exploratory Factor Analysis (EFA) is among the most widely used statistical methods in psychological research. Despite the popularity of the method, concerns have been raised with respect to the quality of EFAs reported in the psychological literature (Fabrigar, Wegener, MacCallum, & Strahan, 1999). Criticism of the work in this area stem, to a large extent, from questionable methodological decisions made by researchers. Fabrigar et al. (1999) identified five major methodological issues requiring decisions on the part of the researcher in the implementation of exploratory factor analysis. These include (a) the selection of variables to be used in the study, the size and nature of the sample, and consideration of the psychometric properties of the measures, (b) the determination of whether EFA is the most appropriate form of analysis given the goals of the research project, (c) the choice of method to fit the common factor model (e.g., factor extraction procedures), (d) the criteria to employ to determine the number of factors to retain, and (e) the method for rotating factors to yield a final interpretable solution. Failure to make an appropriate decision regarding one or more of these methodological issues may lead to erroneous results and limit the utility of the factor analysis.

Over the years, much attention has been given in the literature to several of the methodological decisions noted above (e.g., methods of factor extraction, the number of factors to retain, and factor rotation methods). In contrast, research methodologists have given limited consideration to variable selection. Little, Lindenberger, and Nesselroade (1999) have suggested that the selection of indicators (or variables) has typically relied on informal or intuitive reasoning or historical precedent. They note that the issue of variable selection is directly related to the quality of the research design and the value of the results.

Requests for reprints should be sent to Kristine Y. Hogarty, Department of Educational Measurement and Research, University of South Florida, 4202 E. Fowler Ave., EDU 162, Tampa, FL 33620. E-mail: hogarty@tempest.coedu.usf.edu

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THE GREATEST LOWER BOUND TO THE RELIABILITY OF A TEST AND THE HYPOTHESIS OF UNIDIMENSIONALITY

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To assess the reliability of congeneric tests, specifically designed reliability measures have been proposed. This paper emphasizes that such measures rely on a unidimensionality hypothesis, which can neither be confirmed nor rejected when there are only three test parts, and will invariably be rejected when there are more than three test parts. Jackson and Agunwamba's (1977) greatest lower bound to reliability is proposed instead. Although this bound has a reputation for overestimating the population value when the sample size is small, this is no reason to prefer the unidimensionality-based reliability. Firstly, the sampling bias problem of the glb does not play a role when the number of test parts is small, as is often the case with congeneric measures. Secondly, glb and unidimensionality based reliability are often equal when there are three test parts, and when there are more test parts, their numerical values are still very similar. To the extent that the bias problem of the greatest lower bound does play a role, unidimensionality-based reliability is equally affected. Although unidimensionality and reliability are often thought of as unrelated, this paper shows that, from at least two perspectives, they act as antagonistic concepts. A measure, based on the same framework that led to the greatest lower bound, is discussed for assessing how close is a set of variables to unidimensionality. It is the percentage of common variance that can be explained by a single factor. An empirical example is given to demonstrate the main points of the paper.

Key words: Reliability, congeneric test, unidimensionality of a test.

It is a well-known fact that the reliability of a test, defined as the ratio of true score to observed score variance, cannot generally be determined from a single test administration, but requires the use of a parallel test. More often than not, parallel tests are not available. In such cases, two approaches are popular to obtain indirect information on the reliability of the test: Either lower bounds to reliability can be used, or one may resort to hypotheses about the nature of the test parts.

Evaluating lower bounds to the reliability, such as Guttman's λ_3 (Guttman, 1945), also known as coefficient alpha (Cronbach, 1951) has gained wide popularity. A lower bound that is nearly always better than alpha is Guttman's λ_4. It is the highest alpha that can be obtained by splitting up the items in two parts (not necessarily of equal numbers) and treating those two parts as novel "items." Jackson and Agunwamba (1977) proposed the greatest lower bound (glb) to reliability. It exceeds all other lower bounds by using the available information implied by the observed covariance matrix exhaustively.

When lower bounds are high enough, the reliability has been shown adequate by implication. However, when lower bounds are low, they are of no avail. Also, lower bounds to reliability involve some degree of sampling bias. This is well known for alpha, λ_4, and glb. Whereas alpha in small samples tends to slightly underestimate the population value (Feldt, Woodruff, & Salih, 1987; Van Zijl, Neudecker, & Nel, 2000; Yuan & Bentler, 2002), λ_4 and glb may grossly overestimate the population values when computed in small samples (Verhelst, 1998; Shapiro & Ten Berge, 2000).

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The authors are obliged to Henk Kiers for commenting on a previous version. Gregor Sočan is now at the University of Ljubljana.

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EQUIVALENT MIRID MODELS

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It is shown that in the context of the Model with Internal Restrictions on the Item Difficulties (MIRID), different componential theories about an item set may lead to equivalent models. Furthermore, we provide conditions for the identifiability of the MIRID model parameters, and it will be shown how the MIRID model relates to the Linear Logistic Test Model (LLTM). While it is known that the LLTM is a special case of the MIRID, we show that it is possible to construct an LLTM that encompasses the MIRID. The MIRID model places a bilinear restriction on the item parameters of the Rasch model. It is explained how this fact is used to simplify the results of Bechger, Verhelst, and Verstralen (2001) and Bechger, Verstralen, and Verhelst (2002), and extend their scope to a wider class of models.

Key words: MIRID, LLTM, identifiability, model equivalence.

MIRID is an abbreviation for "model with internal restrictions on the item difficulties." The MIRID model is proposed by Butter (1994) and Butter, De Boeck, and Verhelst (1998) as a model for sets of items consisting of *subtasks*, items that require a single operation, and *composite* tasks, items that require a number of these operations simultaneously. For example, consider a set of three math items where the first item requires an addition, the second item requires a subtraction, and the third item combines the addition and subtraction operations of the other two. Further examples come up in later sections.

Assume that for a set of items, the Rasch model is valid with the additional restriction that the difficulty of the composite items is a linear combination of the difficulties of the subtasks. In other words, assume that the difficulties of the composite tasks consist of a regression on the subtask difficulties. The MIRID model treats the regression weights as (unknown) parameters. In contrast, in the Linear Logistic Test Model (LLTM, Schleiblechner, 1972; Fischer, 1995) they are assumed to be known, fixed quantities. In this sense, the MIRID model is a generalization of the LLTM. Treating both the subtask difficulties and the regression weights as parameters means that the model is bilinear (i.e., linear in each parameter) rather than linear.

Each MIRID represents a substantive theory about the component structure of the items. Our main purpose is to demonstrate that different theories may nevertheless give rise to equivalent MIRID models. This means, among other things, that it is not clear which items are to be regarded as subtasks and which as composite tasks. This is a serious problem because from a substantive point of view it is much more interesting to test different componential hypotheses against each other rather than against the Rasch model, which does not account for mental operations (or components). We give conditions for equivalence of MIRID models and illustrate them with some examples. These conditions extend similar results of Bechger et al. (2002) for the LLTM.

Parameter nonidentifiability can be considered as a form of model equivalence, and hence conditions for parameter identifiability can be obtained from the conditions on model equivalence. We show that for the particular class of nonlinear logistic test models being considered here, it is possible to simplify the cumbersome identifiability results from Bechger et al. (2001).

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THE ORDER-RESTRICTED ASSOCIATION MODEL: TWO ESTIMATION ALGORITHMS AND ISSUES IN TESTING

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JEROEN K. VERMUNT

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This paper presents a row-column (RC) association model in which the estimated row and column scores are forced to be in agreement with an a priori specified ordering. Two efficient algorithms for finding the order-restricted maximum likelihood (ML) estimates are proposed and their reliability under different degrees of association is investigated by a simulation study. We propose testing order-restricted RC models using a parametric bootstrap procedure, which turns out to yield reliable p values, except for situations in which the association between the two variables is very weak. The use of order-restricted RC models is illustrated by means of an empirical example.

Key words: Row-column association models, order-constraints, ML estimation algorithms, parametric bootstrap.

1. Introduction

Nowadays, several statistical tools are available to analyze ordinal categorical data, such as correspondence analysis, regression models for transformed cumulative probabilities, and log-linear and log-bilinear association models (see, e.g., Agresti, 2002; Clogg & Shihadeh, 1994). Goodman (1979) presented a class of log-linear and log-bilinear models to study the bivariate association between ordinal variables. This family contains four types of association models—uniform, row, column and row-column (RC)—suited for the analysis of ordinal data.

Nevertheless, association models are not really ordinal models because ordinal models assume a monotone relationship, no more and no less. The uniform association model assigns a priori scores to the categories of the row and column variables, which means that the variables are treated as interval level. The row model assumes that the column scores are known and that the row scores are unknown parameters. This model treats the column variable as an interval level variable and (since there is no guarantee that the estimated row scores have the assumed order) the row variables as nominal. The same applies to the column model. In the log-bilinear RC association model, both the row and column scores are estimated without order restrictions. Again, there is no guarantee that the category scores have the right order since the same ML estimates would be obtained if the levels are permuted in any way. Therefore, some restrictions should be imposed on the row and column scores to analyze ordinal relations.

Several methods have been proposed to overcome the problem that row or column scores do not have the assumed ordering. A first class of methods adapts the Goodman (1979) unidimensional Newton algorithm to deal with inequality restrictions. Both the work of Agresti, Chuang, and Kezouh (1987) on order-restricted row models and of Ritov and Gilula (1991) on order-restricted RC models fit within this framework. A different type of method based on

Francisca Galindo performed this research as a part of her PhD. dissertation project at Tilburg University.

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PSYCHOMETRIKA—VOL. 69, NO. 4, 655–660
DECEMBER 2004

POSITIVE LOADINGS AND FACTOR CORRELATIONS FROM POSITIVE COVARIANCE MATRICES

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In many instances it is reasonable to assume that the population covariance matrix has positive elements. This assumption implies for the single factor analysis model that the loadings and regression weights for best linear factor prediction are positive. For the multiple factor analysis model where each variable loads on a single factor and a hierarchical factor model, it implies that the loadings and the factor correlations are positive. For the latter model it also implies that the regression weights for first- and second-order factor prediction are positive.

Key words: Classical test theory, congeneric tests, structural equation models, hierarchical factor analysis, regression weights, best linear factor prediction.

Introduction

"It is a universally accepted fact that intertest correlations for mental abilities are positive" (Thurstone, 1947, p. 342). In addition, there are several other situations in which the estimated covariances between observable variables are positive (Spearman, 1927). An application of the strong law of large numbers reveals that if the observations are identically and independently distributed and the population covariance matrix has positive elements, then the estimated covariances are positive with probability one as the number of observations increases without bound (e.g., Serfling, 1980, p. 69). It is therefore reasonable to make the assumption that the population covariance matrix is positive in its elements. The purpose of the current note is to give various implications of this assumption for the loadings, factor correlations, and regression weights for factor prediction with respect to several models for factor analysis.

Definitions for Factor Analysis

In the model for factor analysis $\mathbf{X} = \mathbf{\Lambda F} + \mathbf{E}$, where $\mathbf{X}$ is the random vector with p observable variables, $\mathbf{\Lambda}$ the loadings matrix of order p by m, $\mathbf{F}$ the random vector with m factors scaled to have unit variance, $\mathbf{E}$ the random vector with p error variables. These random variables are assumed to have expectation zero. Let $\mathbf{\Lambda}$ be of full rank, $\text{Var}[\mathbf{F}] = \mathbf{\Phi}$ the positive definite factor correlations matrix, $\text{Var}[\mathbf{E}] = \mathbf{\Psi}$ the diagonal positive definite error variance matrix, $\text{Var}[\mathbf{X}] = \mathbf{\Sigma}$ the positive definite covariance matrix of the observable variables, and $\mathbf{\Gamma} = \mathbf{\Lambda}'\mathbf{\Psi}^{-1}\mathbf{\Lambda}$. From the assumption that $\mathbf{F}$ and $\mathbf{E}$ are mutually uncorrelated, it follows that

$$\mathbf{\Sigma} = \mathbf{\Lambda\Phi\Lambda}' + \mathbf{\Psi}. \tag{1}$$

The best linear factor predictor $\hat{\mathbf{F}}$ can be written as (Lawley & Maxwell, 1971, pp. 107–109)

$$\hat{\mathbf{F}} = \mathbf{\Phi\Lambda}'\mathbf{\Sigma}^{-1}\mathbf{X} = (\mathbf{\Phi}^{-1} + \mathbf{\Gamma})^{-1}\mathbf{\Lambda}'\mathbf{\Psi}^{-1}\mathbf{X}, \tag{2}$$

I would like to thank Conor Dolan for fruitful discussions on factor analysis, and the associate editor as well as three reviewers for making useful remarks on earlier versions of the manuscript.

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PROGRAM OF THE 69TH ANNUAL MEETING OF THE PSYCHOMETRIC SOCIETY

The 69th Annual Meeting of the Psychometric Society (IMPS2004) was held in Pacific Grove, California from June 14 through June 17, 2004. Richard Patz was the Organizing Committee Chair, and local arrangements were made by Willem Heiser, Bob Cudeck, and Hillary Michaels. This year we were pleased to acknowledge financial contributions from CTB/McGraw-Hill and the Educational Testing Service.

Monday, June 14

PRESESSION WORKSHOP

MULTILEVEL AND LATENT VARIABLE MODELING OF DISCRETE DATA. Facilitators: Sophia Rabe-Hesketh, University of California Berkeley and Anders Skrondal, Norwegian Institute of Public Health

THE KERNEL METHOD OF OBSERVED SCORE TEST EQUATING. Facilitators: Paul. W. Holland, Alina A. von Davier, Dorothy T. Thayer, Educational Testing Service

PRESESSION ACTIVITIES

Registration
Editorial Council Meeting I
Editorial Council Meeting II
Welcome Reception

Tuesday, June 15

CHAPEL SESSIONS

WELCOME. Willem Heiser

KEYNOTE LECTURE. Chair: Willem Heiser

R. Duncan Luce; *Measurement Analogies: Comparisons of Behavioral and Physical Measures*

INVITED LECTURE. Chair: Lori D. McLeod

Paul De Boeck; *Double Structure Item Response Models*

TOPICS IN MULTIVARIATE ANALYSIS (Contributed Session). Chair: Carolyn Anderson

Greg Welch, Kevin H. Kim; *An Evaluation of the Fleishman Transformation for Simulating Non-Normal Data in Structural Equation Modeling*

Masashi Miyamura, Yutaka Kano; *Robustified Covariance Selection*

Roger E. Millsap, Oi-Man Kwok; *Partial Invariance and Selection Accuracy in Two Populations*

Judit Antal, Tamas Antal; *Assessing Rater Behavior in Large Scale Assessment*

Ling Peng, Adam Finn; *What Exactly do Consumers Respond to in a Concept Test?*

CURLEW SESSIONS

PSYCHOMETRIC RESEARCH ASSOCIATED WITH A LARGE, OPERATIONAL CAT SYSTEM (Invited Session). Chair: Alan Nicewander

Iosif Krass, Alan Nicewander; *The Effects of Item Position on the Calibration of Items Seeded into Adaptive Tests*

Alan Nicewander, Rebecca Hetter, Gray Thomasson, Iosif Krass, Mary Pommerich, Daniel Segall, Kathleen Moreno; *A Stimulation Study of Parametric and Non-Parametric Algorithms for Calibrating 3-PL and Non-3PL Items Seeded into Adaptive Tests*

Daniel O. Segall; *Modeling and Detecting Collaboration: A Multidimensional Item Response Theory Approach*

Mary Pommerich, Daniel O. Segall, Iosif A. Krass; *Evaluating the Scale of Items within CAT Pools Using Adaptive Data*

TOPICS IN ESTIMATION (Contributed Session) Chair: Daniel M. Bolt

Jimmy de la Torre; *Improving the Accuracy of Ability Estimates through Simultaneous Estimation and Incorporation of Ancillary Variables*

Janneke te Marvelde; *A Comparison of Methods to Investigate an Invariante Ordering of Polytomous Items*

Koken Ozaki, Hideki Toyoda; *Paired Comparison IRT Model by 3-Value Judgment: Estimation of Item Parameters Prior to the Administration of the Test*

Jennifer Hatfield; *A Comparison of Dichotomous and Nominal Polytomous Item Response Theory Models as Applied to Multiple Choice Test Items*

Tamas Antal, Judit Antal; *Stability of Some Item Response Theory Monte-Carlo Goodness of Fit Indices*

MARLIN SESSIONS

RELIABILITY (Contributed Session). Chair: Bert F. Green

Tenko Raykov, John Tisak; *Studying Stability of Reliability in Repeated Measures Models Eliminating Variable Specificity*

Hideki Toyoda, Kentaro Nakamura; *The Reliability of Students Evaluating University Teaching: An Analysis of Four-Facet Data by Generalizability Model and Structural Equation Modeling*

Xiang Bo Wang, Louis Mi Wang; *Investigating the Properties of the Reliability Estimation Formula by Gulliksen*

Joseph A. Olsen; *Estimating and Comparing Classical Test Theory Measurement Models*

Hidetoki Ishii, Hiroshi Watanabe; *Bayesian Consideration of Test-Retest Reliability Coefficients*

NEW MODELS FOR THE ANALYSIS OF CHANGE (Contributed Session). Chair: Shelley A. Blozis

Michael W. Browne, Guangjian Zhang; *Exploratory Factor Analysis of Lagged Correlation Matrices*

Guangjian Zhang; *Bootstrapping Dynamic Factor Analysis*

Nilam Ram, Sy-Miin Chow, Kevin J. Grimm, Frank Fujita, John R. Nesselroade; *Examining the Dynamics of Pleasant and Unpleasant Emotions Using Spectral Analysis and the Rating Scale Model*

Sy Miin Chow, John R. Nesselroade; *A Monte Carlo Comparison of Methods for Fitting Nonlinear Dynamic Models*

Ellen Hamaker, Peter Molenaar; *Towards an Integration of Intraindividual and Interindividual Techniques*

SCRIPPS SESSIONS

INVITED LECTURE. Chair: Terry Ackerman

Henk Kelderman; *Measurement Models Based on Item Exchangeability*

APPLICATIONS OF IRT MODELS (Contributed Session). Chair: Werner Wothke

Derek Briggs, Mark Wilson; *Generalizability Theory in Item Response Modeling*

Lori D. McLeod, Sheri E. Fehnel; *Defining Minimal Clinically Important Differences: Does Item Response Theory Have the Answer?*

Thomas R. O'Neill; *Using Paired Comparisons and a One-Faceted Rasch Model to Create the Semantic Construct of Frequency*

Christopher W.T. Chiu; *Visualizing Standard Error of Equating Using the Bootstrap and the SEER Methods*

Daniel Bolt, Andrew Mroch; *Application of a Mixture IRT Model for Cognitive Diagnosis*

ESTIMATION OF PROFICIENCY DISTRIBUTIONS FROM MATRIX SAMPLE ASSESSMENTS: RESEARCH ON IMPROVING CURRENT PRACTICE (Invited Session). Chair: John Mazzeo

Catherine McClellan; *Basics of Large-Scale Educational Surveys*

John R. Donoghue; *Estimation of Proficiency Distributions from Matrix Sample Assessments: Context and Current Procedures*

Amy R. Dresher, John R. Donoghue, John Mazzeo; *Comparing Bias, Precision, and Stability of Estimation of Group-Level Statistics Based on High Dimensional and Low Dimensional Population Models*

Sandip Sinharay, Matthias von Davier; *Application of Stochastic EM Methods to Latent Distribution Models*

Matthias von Davier; *Current Developments in Estimating Latent Distributions*

Brian Junker; *Summary and Discussion*

BOARD OF TRUSTEES MEETING

VIEWPOINT SESSIONS

INVITED LECTURE. Chair: Michael Browne

Robert I. Jennrich; *Rotation Algorithms: From beginning to end (?)*

MULTIVARIATE ANALYSIS (Contributed Session). Chair: Ulf Böckenholt

Heungsun Hwang, Yoshio Takane; *Generalized Structured Component Analysis*

Yoshio Takane, Michael A. Hunter, Heungsun Hwang; *An Improved Method for Generalized Structured Component Analysis*

Adam R. Hafdahl; *Refinements for Random-Effects Meta-Analysis of Correlation Matrices*

Kohei Adachi; *A Quasi Tucker2 Method Based on Principal Component Analyses of Slices of a Three-Way Array*

Philippe Huber, Elvezio Ronchetti, Maria-Pia Victoria Feser; *Estimation of Generalized Linear Latent Variable Models*

MULTIPLE CORRESPONDENCE ANALYSIS AND RELATED NONLINEAR METHODS (Invited Session). Chair: Kohei Adachi

Kohei Adachi; *Exploring Nonlinear Inter-Variable Relations by a Variant of Nonmetric Principal Component Analysis*

Tatsuo Otsu; *Linking Tests by Nonlinear Factor Analysis for Continuous and Binary Variables*

Cornelius M. van Putten, Arianne Smits, Mark de Rooij; *Stability of Category Quantifications in Multiple Correspondence Analysis Under Two Ways to Remove Outlier Dominance: A Case Study*
Heungsun Hwang, William R. Dillon, Yoshio Takane; *An Extension of Multiple Correspondence Analysis for Capturing Unobserved Respondent Heterogeneity*
Shizuhiko Nishisato; *Dual Scaling Approach to Correlation Between Categorical Variables*

PLENARY SESSION

Excursion around Monterey

Wednesday, June 16

CHAPEL SESSIONS

EQUATING AND LINKING (Contributed Session). Chair: Cees A.W. Glas
Paul Holland; *Linking Tests*
Wim J. van der Linden; *Evaluating Equating Error in Observed-Score Equating*
Mei Liu, Paul Holland; *Population Invariance of Non-Linear Equating Using LSAT Test Data*
Xueli Xu, Young-Sun Lee, Jeff Douglas; *Nonparametric IRT Equating*
Matthias von Davier, Alina von Davier; *A Unified Framework for IRT Scale Linking and Scale Transformations*

MULTIDIMENSIONAL MODELS (Contributed Session). Chair: Kelly Godfrey
Mary Ann Simpson, Terry A. Ackerman; *Parameter Recovery in Markov Monte Carlo Chain (MCMC) Estimation of a Generalized MIRT Model*
Lihua Yao, Richard D. Schwarz; *Multidimensional Models for Tests Consisting of Mixed Item Types*
Tsung-Hsun Tsai, Robert Sykes, Matthew Gordon; *Significant Characteristics of Anchor Items in the Common-Item, Nonequivalent Groups Design*
Wen Zhang, James O. Ramsay; *Bivariate Functional Regularization for the Detection of Cortical Region Transition*

INVITED LECTURE Chair: Ab Mooijaart
Albert Satorra; *Structural Equation Models for Complementary Data*

EXTENDING IRT MODELS (Contributed Session). Chair: David Thissen
Frank Rijmen; *An IRT Model with a Parameter-Driven Process for Change Peter van Rijn; Dynamic Item Response Models*
Francis Tuerlinckx; *Estimating Acquaintance Volume with a Hierarchical IRT Model*
Margo G.H. Jansen; *A Comparison of Latent Trait Models for Speed Tests with Different Distributional Assumptions*
Kathleen Scalise; *A New Approach to Computer Adaptive Assessment with IRT Construct-Modeled Item Bundles (Testlets): An Application of the BEAR Assessment System*

CURLEW SESSIONS

TOPICS IN DATA ANALYSIS (Contributed Session). Chair: Brian Junker
Klaas Sijtsma, Andries van der Ark; *Outlier Detection in Test and Questionnaire Data*
Todd C. Headrick; *Distribution Theory for the Power Method*
Coen A. Bernaards, Thomas R. Belin, Joseph L. Schafer; *Robustness of a Multivariate Normal Approximation for Imputation of Incomplete Binary Data*
Joost R. van Ginkel; *Multiple Imputation of Item Scores in Test and Questionnaire Data, and Influence on Psychometric Results*
Todd E. Bodner; *The Level-of-Imputation Question for Massively Missing Composite Variable Data*

APPLICATIONS OF MCMC METHODS TO ITEM RESPONSE THEORY (Invited Session). Chair: Wim J. van der Linden
Cees A.W. Glas, Jean-Paul Fox; *Analysis of Variance and Regression Using Multilevel IRT*
Richard J. Patz, Lihua Yao; *Hierarchical and Multidimensional Models for Measuring Developmental Growth in Educational Achievement*
Wim J. van der Linden; *Multilevel Modeling of Speed and Accuracy on Test Items*
Gunter Maris; *The Power of Posterior Predictive Checks*
Jimmy de la Torre; *Model Evaluation and Selection in Cognitive Diagnosis: An Analysis of Fraction Subtraction Data*

NONNORMAL STRUCTURAL EQUATION MODELING (Invited Session). Chair: Yutaka Kano & Ke-Hai Yuan
Yutaka Kano, Shohei Shimizu; *Between ICA and SEM*
Ke-Hai Yuan, Peter M. Bentler; *Standard Errors and Asymptotic Robustness in Multilevel Models with Distributional Violations*
Shohei Shimizu, Aapo Hyvarinen, Yutaka Kano; *Exploratory Causal Inference Using Nonnormality*

Hirokazu Yanagihara; *Corrected Version of AIC for Selecting Multivariate Normal Linear Regression Models in a General Nonnormal Case*
Haruhiko Ogasawara; *Asymptotic Robustness of the Normal Theory Asymptotic Biases Under Nonnormality in Structural Equation Modeling*

MARLIN SESSIONS

DIFFERENTIAL ITEM FUNCTIONING (Contributed Session). Chair: Sandra Neustel
Hua-Hua Chang, Jiahe Qian, Pei-Hua Chen, Ying Cheng; *Adjustment of BIB Data for DIF Testing*
Maria Orlando, Kitty S. Chan; *Evaluating DIF in Psychological Scales: Is Statistical Significance Enough?*
Randall MacIntosh, Elizabeth Cauffman; *An Assessment of DIF on the Basis of Race/Ethnicity in The Massachusetts Youth Screening Instrument (Maysi 2) Among a Sample of Incarcerated Adolescent Offenders*
Xin Feng, Zhiliang Ying; *Detection of Differential Item Functioning in Computerized Adaptive Testing Using Measurement Error Models*
Louis T. Mariano, Maria Orlando; *A Bayesian IRT Model for Comparative Item Performance under Dual Administration Modes*

MODELS FOR LONGITUDINAL DATA (Contributed Session). Chair: Robert C. MacCallum
Andreas G. Klein; *Efficient Estimation of Nonlinear Effects in Both Cross-Sectional and Longitudinal SEM*
Jeffrey Harring; *Statistical Methods for the Analysis of Repeated Measurements Data: A Model Comparison Approach*
Shelley A. Blozis; *A Second-Order Structured Latent Curve Model for Normal Repeated Measures*
Kevin J. Grimm, John J. McArdle, Fumiaki Hamagami; *Growth Mixture Modeling of Cognitive Abilities in the Berkeley Studies*
Eisuke Segawa; *A Growth Model for Multilevel Ordinal Data*

SCALING TECHNIQUES IN VARIOUS DATA ANALYTIC SETTINGS (Invited Session). Chair: Mark de Rooij
Laurence E. Frank, Willem J. Heiser; *Statistical Inference in Feature Network Models and Additive Trees*
Matthijs J. Warrens; *On Ordering Properties of Classical Optimal Scaling*
Marike Polak, Willem J. Heiser, Mark de Rooij; *Correspondence Analysis as an Alternative to Principal Component Analysis for Single-Peaked Data*
Rien van der Leeden, Marike Polak, Renske Doorenspleet; *Scaling of Democracy: Exploring Changes Over Time*

SCRIPPS SESSIONS

ESTIMATION AND MODEL SPECIFICATION (Contributed Session). Chair: Andreas G. Klein
Ab Mooijaart; *Model Selection in Latent Variable Models when Common Statistical Assumptions are Violated*
Hiroto Murohashi, Hideki Toyoda; *Model Specification Searches Using Genetic Algorithms for Factor Analysis*
Wai-Yin Poon, Sik-Yum Lee; *Structural Equation Model Analysis of Missing and Heterogeneous Data*
Sik-Yum Lee, Xin-Yuan Song; *A Unified Maximum Likelihood Approach to Structural Equation Models with Missing Non-Standard Data*
Xin-Yuan Song, Sik-Yum Lee; *ML Analysis of a Multi-Sample Nonlinear Structural Equation Model with Fixed Covariates and Ordinal Variables*

LATENT CLASS AND GENERALIZED LINEAR MODELS (Contributed Session). Chair: Paul De Boeck
Ingmar Visser; *Multivariate Latent Markov Models for Arbitrary Length Time Series: An Implementation and Application*
Samantha Bouwmeester; *Studying Cognitive Developmental Stages: A Comparison of the Binomial Mixture Model and the Latent Class Model*
Samuel Copt, Maria-Pia Victoria-Feser; *High Breakdown Inference in the Mixed Linear Model*
Timothy R. Johnson; *Generalized Linear Models with Ordinally-Observed Covariates*

INVITED LECTURE Chair: Roger Millsap
Robert C. MacCallum, Michael W. Browne, Li Cai; *Testing Differences between Models: Power Analyses and Null Hypotheses*

EVALUATING MODEL FIT (Contributed Session). Chair: Margo G.H. Jansen
Tron Foss, Karl G. Joreskog, Ulf Henning Olsson; *Does the Satorra-Bentler Scaled Chi-Square Statistic Approximate Zero when the Kurtosis Approximates Infinity*
Victor L. Willson, Zhongmiao Wang; *Indifference Regions for Goodness of Fit Indices in SEM*
Victoria Savalei; *A Statistically Justified Pairwise ML Method for Incomplete Nonnormal Data: A Comparison with Direct ML and Pairwise ADF*
Duan Zhang, Victor L. Willson; *Empirical Power and Type I Error Rates for Cross-Level Interactions in Multilevel Analysis*
Nathan A. Vandergrift; *Residuals Based Examination of Fit for Non-Dynamically Consistent Models*

VIEWPOINT SESSIONS

SCALING AND CLUSTERING (Contributed Session). Chair: Patrick E. Shrout
Hans Colonius, Ehtibar N. Dzhafarov; *Multidimensional Scaling of Fechnerian Distances*
Ehtibar N. Dzhafarov, Hans Colonius; *Fechnerian Scaling of Discrete Object Sets*
Douglas Steinley; *Profiling Local Optima in K-Means Clustering: Developing a Diagnostic Technique*
Choulakian Vartan, Allard Jacques, Almhana Jalal; *The Robustified Centroid Method Ratna Nandakumar, Lawrence Hotchkiss; Diagnostic Tools for Modeling Attitudinal Data*

ASSOCIATION MODELS AND RELATED METHODS (Invited Session). Chair: Paul Holland (Carolyn J. Anderson)
Mark de Rooij; *The Analysis of Change, Newton's Law of Gravity and the RC(M)—Association Model*
Jee-Seon Kim, Jeroen K. Vermunt; *A Family of Longitudinal Association Models with Latent Variables*
Carolyn J. Anderson, Hsiu-Ting Yu; *Relationships Between Item Response Theory Models and Log-Multiplicative Association Models*
Hsiu-Ting Yu, Carolyn J. Anderson; *Empirical Comparisons of Estimates of Item Response Theory Models and Log-Multiplicative Association Models*

INVITED LECTURE Chair: Shizuhiko Nishisato
Akinori Okada, Tadashi Imaizumi; *A Joint Space Model of Asymmetric Multidimensional Scaling*

PERSPECTIVES ON ITEM RESPONSE MODELING (Invited Session). Chair: Mark Wilson
Paul De Boeck; *Explanatory Measurement: A Case Study of Modeling Coping with Stress*
Derek Briggs, Alicia Alonzo, Cheryl Schwab, Mark Wilson; *Modeling Partial Information in Multiple Choice Items*
Insu Paek, Mark Wilson; *Type I Error and Power of Multidimensional and Unidimensional DIF Methods in a Multidimensional Test: MRCML DIF Model, RCML DIF Model, and SIBTEST*
Margaret L. Wu, Raymond J. Adams; *User-Defined Fit Statistics for the RCML Models*

PLENARY SESSION

2004 Dissertation Award Presentation and Address
2004 ETS Student Travel Awards Presentation

PRESIDENTIAL ADDRESS. Chair: William Stout
Willem Heiser; *Geometric Representation of Association between Categories*

PSYCHOMETRIC SOCIETY BUSINESS MEETING

CONFERENCE DINNER

Thursday, June 17

CHAPEL SESSIONS

ESTIMATION AND COMPUTATION (Contributed Session). Chair: Fumiko Samejima
Carol M. Woods, David M. Thissen; *Item Response Theory with Estimation of the Latent Population Distribution Using Spline-Based Densities*
David Thissen, Cheryl D. Hill; *Infinite Slope Estimates in Item Response Theory*
Werner Wothke, George Burket, LiSue Chen, Furong Gao, Lianghua Shu, Mike Chia; *Multimodal Likelihoods in IRT-Based Response-Pattern Scoring: Will the Real Maximum Likelihood Score Please Stand Up?*
Gilles Raiche, Jean-Guy Blais; *Comparison of the Marginal Bias and Standard Error of Proficiency Level According to True and Estimated Proficiency Levels*
Elena A. Erosheva; *Bayesian Estimation of a Latent Trait Model with Bounded Continuous Latent Variables*

KEYNOTE LECTURE. Chair: Lawrence Hubert
Geoff McLachlan; *Mixture Model-Based Clustering of High-Dimensional Data*

CURLEW SESSIONS

COMPUTERIZED ADAPTIVE TESTING (Contributed Session). Chair: Francis Tuerlinckx
Hui Deng, Tim Ansley; *An Investigation of Stratified and Maximum Information Item Selection Procedures in Computerized Adaptive Testing*
Cees A.W. Glas; *Violations of Ignorability in Computerized Adaptive Testing*
Michael C. Edwards, David Thissen; *Defining and Finding Optimal Designs for uMFS CATs*
Po-His Chen, Wen-Chung Wang; *Influence of the Number and Magnitude of Testlets in Computerized Adaptive Testing*
Ying Cheng, Hua-Hua Chang, Yi Qing; *Two-Phase Item Selection with Realistic Content Balancing Constraints in Computerized Adaptive Testing*

ASSESSING PERSON FIT (Contributed Session). Chair: Samantha Bouwmeester

Anna Villa T. Dagohoy, Cees A.W. Glas; *Lagrange Multiplier Person Fit Tests for Polytomous IRT Models*
Wilco H.M. Emons; *Person-Fit Analysis for Polytomous Items in Personality Assessment*
Leonardo S. Sotaridona, Seung W. Choi, Rob R. Meijer; *The Effect of Misfitting Response Vectors on Item Calibration and Test Equating*

MARLIN SESSIONS

APPLICATIONS TO SUBSTANTIVE PROBLEMS (Contributed Session). Chair: Ratna Nandakumar
Jun Corser Li; *A Multilevel Covariance Structure Model for Causal Connection Research of Group Effectiveness*
Hideki Toyoda, Akihiro Saito; *Exploratory Positioning Analysis: Multi-Mode Multivariate Analysis for Semantic Differential Data*
Jennifer L. Ivie; *Using Structural Equation Modeling to Assess the Role of Rules Problem Solving as in the Raven's Matrices Test*
Xiang Bo Wang, Wayne Camara, Jennifer Kobrin, Ying Zhou; *Accounting for Factors Affecting the SAT Performance of Asian American and Pacific Islander Students*
Julius M.M. Kitutu; *Post High School Career Expectations: A Comparative Study Between Pittsburgh (USA) and Essen (Germany)*

GRADED RESPONSE MODEL (Contributed Session). Chair: Bruce Bloxom
Fumiko Samejima; *LPE Graded Response Model, A Natural Expansion of the Logistic Positive Exponent Family of Models for Dichotomous Responses*
Cheryl D. Hill; *Precision of Parameter Estimates for the Graded Item Response Model*
Tzur Karelitz; *Ordered Category Attribute Coding Framework for Cognitive Assessment*

SCRIPPS SESSIONS

MEASUREMENT PROBLEMS IN SUBSTANTIVE DOMAINS (Contributed Session). Chair: Tenko Raykov
Xiaoying Jiang, Grace E. Kissling; *Using a Quadratic Discriminant Model to Predict Baccalaureate Nursing Students' Passing Rate on NCLEX-RN*
Mark Otten; *A Longitudinal Examination of the Dimensionality and Predictors of Sport Confidence*
Claus H. Carstensen, Andreas Voss, Wilfried Bos; *Reading Comprehension of Primary School Students—A Unified Cognitive Process or Interacting Component Processes?*
Dennis Hocevar, Susan Page Hocevar; *What is Good for Science is not Good Enough for Public Policy*
Chun-Wei (Kevin) Huang, Robert J. Mislevy; *An Application of the Andersen/Rasch Multivariate Measurement Model within the Framework of Evidence-Centered Design to Explore Students' Problem-Solving in Physics*

APPLICATIONS OF IRT TO TESTING PROBLEMS (Contributed Session). Chair: Mark Reckase
Leonardo Sotaridona, Launa Hodgson, Erica Connelly; *Identifying the Test Form*
Furong Gao; *Empty Bubble: Which Test Form Should the Response Be Scored With?*

VIEWPOINT SESSIONS

TEST ASSEMBLY AND ITEM SELECTION (Contributed Session). Chair: Wilco H.M. Emons
Mark D. Reckase; *Using IRT to Design a Fixed Length Test*
Ron Armstrong, Dmitry Belov; *A Method for Determining Multiple Non-Overlapping Linear Test Forms*
Tim Davey, Elizabeth Stone; *A Trend Model for Monitoring Item Security Under Continuous Testing*
Irina Grabovsky, David Swanson; *An Application of Integer Programming to Optimal Test Assembly with Psychometric and Scheduling Constraints*
Dmitry Belov, Alexander Weissman; *Combinatorial Analysis for Determining Item Pool Usability in Computerized Adaptive Testing*

LARGE-SCALE STUDENT PROFILE SCORING—FOUNDATIONS AND METHODS (Invited Session). Chair: Lou DiBello
Jeff Douglas, Louis Roussos, Bill Stout; *Introduction to Profile Scoring*
Lou DiBello, Jon Templin, Bob Henson; *Applications to Operational Tests—Next Generation TOEFL*
Andrew Ho, Diego Zapata, Jon Templin; *Fast Classification and Other Operational Issues for Large Scale Testing*
William Stout; *Roundtable Discussion of Foundational Issues*

PLENARY SESSION

Bonfire Party

END OF MEETING

BUSINESS MEETING MINUTES
Asilomar Conference Center, Monterey California
Wednesday, June 16, 2004

Willem Heiser, President of the Society, called the meeting to order at 5:40 P.M. Twenty-nine members of the Society were present.

Minutes of the 2003 Business Meeting that were published in the December 2003 issue of Psychometrika were approved.

Two elections were held. Lori McLeod was re-elected as treasurer. Her term will run through 2007. Terry Ackerman was re-elected as secretary. His term will run through 2007 also.

Dr. McLeod presented the report from the Membership Committee. On behalf of the Committee she nominated 77 individuals for regular membership into the Society. A motion to accept these individuals was passed. A list of the new/reinstated members is given below:

NEW/REINSTATED MEMBERS

Husein Abdul-Hamid	Joseph Featherstone	Kan Kuang Huei	Gill Sitarenios
Judit Antal	Kevin J. Flannelly	Sik Yum Lee	Leonardo Sotaridona
Derek Briggs	Laura Foreman	Shing On Leung	Andrea Thornton
Seung Choi	Barbara Foster	Yanmei Li	Igor Tulin
Erica Connelly	Maryann Fraboni	Shih-Chieh Liao	Bor-yaun Twu
Bruce Cooil	Mark Frame	Nelson Lim	Kay Um
Eric Crane	Tim Gaffney	William Lorie	C.M. van Putten
Adam Davey	James Graham	Randy MacIntosh	Stephane Vautier
Jan Deleeuw	Michael Greenacre	Louis Mariano	Bernard P. Veldkamp
Richard DeShon	Sean Hammond	Scott McNary	Ingmar Visser
William R. Dillon	Eunice Han	Glenn Milewski	Giorgio Vittadini
Jeff Douglas	Paul Hanges	Thomas O'Neill	Matthias & Alina von Davier
Amy Dresher	Bruce Hardie	Pamela Paek	Andreas Voss
Robert Durrenberger	David Hessen	Francesco Palumbo	Xiang Wang
Ehtibar Dzhafarov	Fu-Chang Hu	Anthony Paolo	Hector Weissberger
Michael Eid	Rianne Janssen	Teresa Roberts	Alexander Weissman
Cathy Epstein	Cathleen Kennedy	Gary Schaeffer	Jody Wheaton
Luis Escurra Mayaute	Jee-Seon Kim	Masood Shaikh	Edward Wiley
Jamshid Etezadi	Julius Kitutu	Sandip Sinharay	Hirokazu Yanagihara

Dr. McLeod reported that the following 87 individuals were granted student membership by the Board of Trustees.

STUDENT MEMBERS

Soyeon Ahn	Bruno Giordano	Craig Marker	Ilse Stuive
Felipe Aparicio Acosta	Kevin Grimm	Katherine Masyn	Ya-Hui Su
Ethan Arenson	Johnna Gueorguieva	Vladimir Migunov	Irene Tarakanita
Sanjoy Bhattacharjee	Ellen Hamaker	Masashi Miyamura	Janneke Te Marvelde
Serge Boule	Jeffrey Harring	Kentaro Nakamura	Laik Woon Teh
Patricia M. Carlin	Jennifer Hatfield	Mike Opferman	Khee Shoon Teo
Lutmar Carmala	James Henson	Stanislawa Ostasiewicz	Reginald Tucker
Cheng-Te Chen	Andrew Ho	Mark Otten	Roberto Valusso
YingQiu Chen	Rink Hoekstra	Koken Ozaki	Joost Van Ginkel
Ying Cheng	Shu-Jung Hu	Chanho Park	Wolfgang Viechtbauer
Chao Nien Chern	Philippe Huber	Ling Peng	Matthijs Warrens
Carolotta ChingTing Fok	In-Jun Jeong	Thomas Proctor	Greg Welch
Samuel Copt	Tzur Karelitz	Nilam Ram	Craig Wells
David Dailey	Ken Kelley	Joseph Rausch	Zhang Wen
Rob Daniel	Ji Young Kim	Akihiro Saito	Brad Ching-Chao Wu
Darrell DeMartino	Irene Klugkist	Victoria Savalei	Svetlana Yaroshevskaya
Tri Do	Katrin Kraus	Kathleen Scalise	Haniza Yon
Renee Dowdy	Kyuseop Kwak	Verena Schmittmann	Matthew Young
Andrew Ermolaev	Philippe Le Brock	Patt Sealy	Hsiu-Ting Yu
Betsy Feldman	Tae Hun Lee	Shohei Shimizu	Duan Zhang
Frank Gallo	Tianli Li	David Slegers	Yue Zhao
Rene Gempp	Guangming Ling	Marieke Spreeuwenberg	

Dr. McLeod gave the Treasurer's report. She stated that the balance of funds from the previous year totaled $41,766. In the 2003 fiscal year the Society had receipts totaling $176,269. Most of this income, $132,580, came from institutional subscriptions. Disbursements for the 2003 fiscal year totaled $171,286 leaving a balance of $54,693. She has hired an accountant, Philip Tutor, to help organize accounting reports and yearly budgets.

Brian Junker, Psychometrika Editor-in-Chief, reported on the Editorial Council meeting. He noted that negotiations had begun with three publishers Erlbaum, Springer, and Wiley. With the endorsement of the Editorial Council, the Board of Trustees has decided to move publication of Psychometrika from a fully self-published journal by the Society to a joint venture with one of these publishers. Because of the tight timelines in completing negotiations, a subcommittee composed of Klaas Sitsma, Brian Junker, Lori McLeod and Willem Heiser were given the charge to handle negotiations subject to approval of the Editorial Council and the Board of Trustees. There has been considerable discussion in the previous year about how to set up the best possible arrangement for this new style of managing the Journal. The major issues have been maintaining the high scientific quality of Psychometrika, retaining full editorial control over substantive and stylistic content, and negotiating a beneficial financial agreement. Discussions with representatives of these publishers have been constructive. Prospects for a successful transition seem promising.

After 22 years of devoted service, Cynthia and Tim Null announced their intention to step down as managing and technical editors of Psychometrika. During their tenure, Psychometrika has gone to a new physical layout. Manuscript submissions have evolved to an efficient and modern LaTeX format. All previous volumes, from 1936 to the present, have been transferred to CD-ROM, making the journal more convenient and accessible. Throughout this long period of creative and attentive service, the physical appearance and business operation of Psychometrika have been maintained with the highest standards. On behalf of the Society, Dr. Heiser thanked the Nulls for incomparable service and wished them well in their new endeavors. Dr. Null acknowledged the Society's thanks and offered some memories of her tenure with the Society.

Dr. Heiser reported on the Trustees meeting. He commented on how new sources of funding were being sought for annual meetings. The opening evening reception and the printing costs for the program at this year's meeting were made possible through $3600 in donations from CTB-McGraw Hill. Educational Testing Service also provided financial support by giving two $500 graduate student travel grants. The support of these activities is noteworthy and much appreciated. It signifies a valuable and mutually beneficial collaboration between the Society and colleagues at both insitituions. Hopefully more of such funding will occur for future meetings.

Dr. Ackerman reported the 2004 election results: Albert Satorra was elected to the Editorial Council. Jim Ramsay, Akinori Okada were elected to the Board of Trustees. Ulf Böckenholt was elected as president-elect. The winner of the 2004 Dissertation Award was Denny Borsboom from the University of Amsterdam. His advisor was Gideon Mellenburgh. The two Graduate Travel Grants winners were Anna Dagohoy from the University of Twente and Tzur Karelitz from the University of Illinois.

Rich Patz, Chair of the 2004 Conference Organizing Committee, gave a report on the Monterey meeting. Dr. Patz indicated that this year's meeting has about 200 attendees (including 43 students) from 12 countries. He indicated that the finances were well planned out with the organizing committee and that the Society should make money on the conference. A final accounting and report will be forthcoming. It was commented that this meeting could serve as a good template for future meetings.

Dr. Heiser reported that next year's meeting will be held at the University of Tilburg in The Netherlands on July 5-8, 2005, with pre-conference workshops on July 4, 2005. Klaas Sijtsma and Andries van der Ark are heading the organizing committee along with Bob Cudeck and Ulf Böckenholt.

The meeting was adjourned at 6:25 P.M.

Terry Ackerman
Secretary

REPORT OF THE TREASURER OF THE PSYCHOMETRIC SOCIETY

SUMMARY OF FINANCIAL POSITION

12/31/2003 Report

	2003
Current Assets	
Cash on hand	0
Bank of America-Checking	29,037
Bank of America-Savings	25,656
Net Assets (Balance of Funds)	54,693
Balance of Funds from Previous Year	**41,776**
Receipts	
CD sales	8,050
Annual Meeting	2,085
Dues-Members	33,129
Donations	0
Reprints/Back Issues/Mailing Lists	279
Journal Subscriptions - Institutions	132,580
Interest Income	147
Total Income and Receipts	176,269
Subtotal of Available Funds	**218,045**
Disbursements	
Annual Meeting	5,665
CD Archive	0
Journal Printing & Mailing	
Cadmus: press and storage	37,587
Integre: typesetting	12,788
FBPCS	3,421
Bank Credit Card & Other Charges	1,701
Stipend Editor	5,000
Editor Asst. & Office Expenses	44,819
Stipend Managing Editor	3,000
Managing Editor Asst. & Office Expenses	35,436
Stipend Secretary	2,250
Secretary Office Expenses	392
Stipend Treasurer	1,500
Treasurer Office Expenses	1,209
Dissertation Prize	529
Presidential Discretionary Fund	0
Non-office Travel	0
Office Travel and Expenses	15,989
Total Disbursements	171,286
Subtotal of Available—Total Disbursements	**46,759**
2002 Reimbursement from UNC-G for overcharge	6,500
2002 Clearing in 2003 and 2003 Expenses/Credits Outstanding	1,434
Balance of Funds 12/31/2003	**54,693**

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b. Paid and/or Requested Circulation	(1)	Paid/Requested Outside-County Mail Subscriptions Stated on Form 3541. *(Include advertiser's proof and exchange copies)*	0	0
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c. Total Paid and/or Requested Circulation *[Sum of 15b. (1), (2),(3),and (4)]* ▶			1520	1648
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	(2)	In-County as Stated on Form 3541	0	0
	(3)	Other Classes Mailed Through the USPS	2	2
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i. Total *(Sum of 15g. and h.)* ▶			2271	2361
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Lou D McLeod — 10/7/04

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