

## In memoriam Anton K. Formann

The well-known psychometrician, psychologist and statistician Professor Dr. Anton (Toni) K. Formann died unexpectedly on the 12<sup>th</sup> of July 2010 at only 60 years of age. We are deeply affected by his sudden and much too early death. We lose an excellent scientist, a fine colleague and a very dear friend.

In 1985, Toni earned his postdoctoral professorial qualification in psychology at the University of Vienna, where he also gained his postdoctoral professorial qualification in applied statistics in 1999. He graduated in 1998 at the University of Sheffield as a MSc (Statistics). In the year 2004, he became full professor for psychological methods at the University of Vienna, inheriting the chair of Professor Dr. Gerhard H. Fisher who had retired in 1998.



Toni studied Psychology at the University of Vienna from 1968 to 1973. In 1973 he graduated in Psychology with a PhD. With his doctoral “father” Gerhard G. Fischer as supervisor, he soon provided a doctoral thesis within Item Response Theory (IRT). Using Fischer’s Linear Logistic Test-Model (LLTM), a specialized case model of the Rasch model, he was probably the first researcher to start operationalising the so-called item-generating rules, the respective elementary rule parameters estimated by the LLTM to allow the composition of almost arbitrary items with item difficulties based on the user’s demand. The result was the widely used Viennese Matrices, which were published in 1979. In his early academic years, he made much effort to supply psychometric research with excellent computer software, which is used all over the world even though it was scarcely published. We mention only a FORTRAN-programme that estimates the parameters in the LLTM and especially the FORTRAN-programme MTEST for estimating the Rasch model parameters and processing several model checks; both of them are still the basis of actual pertinent software packages such as LPCM-Win and eRm.

Later, Toni made central contributions in Latent Class Analysis (LCA). Over many decades, Latent Class Analysis has remained in the frontiers of statistical research by developing its faces and conquering new application areas like medical diagnostic testing. The

central theme – the axiom of local independence – has become the underpinning driving force of almost any random effects modelling. As parameter estimation was a huge problem at the time – traditional software very often produced probability parameter estimations bigger than 1 or smaller than 0 – Toni introduced some re-parametrization using the logistic function which always keeps parameter estimation in the feasible region. Consequently, Toni published his suggestion at the beginning of the 1980s, almost at the same time as Goodman did his own one, who recommended to always set parameter estimations as 1 or 0 if any exceed the natural bounds involved during the iteration process. Toni applied linear parameter decompositions or, to say it more generally, implemented LCA-parameter restrictions. A very impressive facility of which was a model of different person classes, each of them confirming the Rasch model though the same items deconvolved for each class of different item parameter relations. This was in some ways an early version of what nowadays is known as the mixed Rasch model approach. The most prestigious of Toni's contributions were already published in his 1984 book: "The Latent Class Analysis" (in German).

By the way, Formann dealt with problems of Rasch model tests very early, in particular with Andersen's Likelihood Ratio test; he was one of three psychometricians who established in the late 1970s that this test fails in certain circumstances if applied conventionally. The source of the failure is a violation of boundary conditions and adjustments of the conventional test are necessary – nowadays an interesting arena for mathematical research. Toni had two suggestions regarding this issue: The first one was to use any item for partitioning the person sample in order to apply Andersen's test; the second one was to use LCA for partitioning the person sample in order to apply Andersen's test.

Later on he dealt with a lot of applications of all his methodical developments to problems of substantial contents. An example is his interest in the area of meta-analysis. Toni clearly recognized the importance of this field – given a situation in science where accumulated knowledge is exploding, but not always produces outcomes in a digestible format. Hence it is clearly necessary to develop tools which can help to integrate, analyse and put structure into the results of empirical research processes. One of Toni's recent papers addresses the problem of publication bias, a particular form of selection bias connected to the mechanism of research publications. Altogether, there are more than 50 papers, all of which were published in excellent methodical journals and numerous in the so-called first league, which includes *Biometrics*, *Journal of the American Statistical Association*, or *Psychometrika*.

But Toni Formann was not only an internationally renowned scientific expert who made many very important contributions. Toni was, above all, an extremely modest and very humorous man. His death is a tragic loss for his family, colleagues and friends. Many of us – and here we speak for the large group of his friends – will keep Toni in their minds for the rest of our lives.

*Dankmar Böhning (Reading, UK), Heinz Holling (Münster, Germany) & Klaus D. Kubinger (Vienna, Austria)*