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OBITUARY:
BRUCE MCARTHUR BLOXOM 1938–2020

Bruce McArthur Bloxom (b. Aug. 19, 1938) passed away on October 9, 2020 (age 82). Bruce's wife, Anne Lee Bloxom, preceded him in death by only two months. Bruce was born and raised in Washington State where his family owned apple orchards. Bruce earned his undergraduate degree at Princeton University in 1960. In the mid-1960s, Bruce graduated with a Ph.D. from The University of Washington in quantitative psychology. His major professor at the University of Washington was Dr. Paul Horst, one of the primary founders of the Psychometric Society. (Note that Bruce was the lead author of the obituary for Paul Horst that was published in *Multivariate Behavioral Research* in 1999.) From 1965 until 1989, Bruce taught at Vanderbilt University in the area of psychometrics. His research specialties were multidimensional scaling of human perceptions and preferences, and mathematical modeling of human response times.

Bruce Bloxom's scholarship was cutting edge. In fact, history shines an even brighter light on his work than was apparent during his productive career. In the period between 1950 and 1980, multidimensional scaling (MDS) was among the top measurement/data analytic methods under development. The first MDS models by Torgerson, Shepard, and Kruskal, which emerged from a theorem published by Young and Householder in *Psychometrika* in 1938, showed how to estimate coordinate values to place stimulus points into a Euclidean space. The distances between the stimuli were models of similarity ratings among the stimuli.

Using ratings reflecting similarity among stimuli allowed human perceptual and/or preference systems to be represented in a way that could be viewed visually. Thousands of applications of MDS have been published, in many different domains; examples include the relationship among products (e.g., cars, or laundry detergent), among people (e.g., athletes, or politicians), countries, animals, flowers, and even the presidents of the Psychometric Society.

Ultimately, MDS became most useful for psychological research when individual difference models were developed. The most well-known such model was Carol and Chang's (1970) INDSCAL model, which included a useful software implementation. But Bloxom's (1968) individual differences MDS model—published in an ETS technical report—preceded INDSCAL by a couple of years. Ultimately, he refined this model in a 1978 *Psychometrika* paper titled "Constrained multidimensional scaling in n spaces" (the "n spaces" included a space for each individual). His-

torical treatments of MDS give Bloxom priority and credit for this development. For example, Davison (1983, p. 121) notes that "Bloxom (1968), Carroll and Chang (1970), and Horan (1969) all describe the first model that incorporates subject dimension weights into Torgerson (1952) original metric distance model." These weighted MDS (WMDS) models estimated subject weights for the different dimensions in which the stimuli were scaled. Thus, if similarity ratings by 50 people among a set of 15 cars were scaled using MDS and the three dimensions underlying the stimulus configuration were interpretable as cost, power, and beauty, then someone who only weighted power in their similarity ratings could be distinguished from someone who weighted beauty and cost equally, but not power. A feature of this class of weighted MDS models—one that was unanticipated, but that many psychometricians noticed and commented on—was that the interpretable directions tended to fall close to the coordinate axes defining the dimensions. Whereas the original MDS models were characterized by rotational indeterminacy, some felt that the WMDS model helped to identify the dimensions. Bruce Bloxom's work set the stage for many future applications of the WMDS model.

However, Bruce was probably best known for his work on distributions of response time. Titles of exemplary papers include his 1979 *Psychometrika* paper, "Estimating an unobserved component of a serial response time model," and his Psychometric Society presidential address, published in *Psychometrika* (Bloxom, 1985b) under the title "Considerations in psychometric modeling of response time." Like his MDS work, this line of sophisticated mathematical modeling takes on additional context in retrospect. Another of his papers, also published in *Psychometrika* in 1985 (Bloxom, 1985a) was titled "A constrained spline estimator of a hazard function" (also see his 1984 *Journal of Mathematical Psychology* paper on a related topic). Reading through his methods papers on response time distributions brings clarity to the importance of his contribution. In 1985, hazards modeling was primarily a method used by demographers to produce life tables. Eventually it became a highly useful modern modeling method used to adjust for right truncation, when relevant outcomes over time may not have yet been realized. Ultimately, hazards modeling became a staple of both quantitative psychology and psychological research. (The reader can consult the Willet and Singer 1991 *Psychological Bulletin* article titled "Modeling the days of our lives" for a seminal applied publication in the psychology literature.) Bruce Bloxom recognized the potential application of hazards modeling— in the context of response time distributions—at least a decade before the general methodology community joined him. Today, hazards modeling is taught in many quantitative psychology Ph.D. programs, along with structural equation modeling, multi-level modeling, and time series analysis.

Virtually all of Bruce's research was published in *Psychometrika* and *Journal of Mathematical Psychology.* Bruce was elected President of the Psychometric Society in 1984 and served as associate editor of the *Journal of Mathematical Psychology*. Upon retirement from Vanderbilt in 1989, Bruce served as a senior scientist for the Department of Defense Personnel Testing Division in Monterey, CA, until he retired in 1995. During his retirement, Bruce devoted himself to learning the five-string banjo and performing as a tenor in the *Cypressaires*, a local barbershop choir. Friends and acquaintances of Bruce Bloxom remember him as one the nicest, kindest, and brightest persons they had ever known.

W. Alan Nicewander, Progressive Measurement, Inc., Monterrey CA, USA
Joseph Lee Rodgers, Vanderbilt University, Nashville TN, USA

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