

Efficient Experimental Design Strategies In Toxicology and Bioassay

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Abstract:

Analysis of multcategory response data in which the multinomial dependent variable is linked to selected covariates includes several rival models. These models include the adjacent category (AC), baseline category logit (BCL), two variants of the continuation ratio (CR), and the proportional odds (PO). For a given set of data, the fits and predictions associated with these various models can vary quite dramatically as can the associated optimal designs (which are then used to estimate the respective model parameters).

Using real datasets, this talk first illustrates fits of these models to various datasets and highlights the associated optimal designs, pointing out the inadequacy of these experimental designs to detect lack-of-fit. We next introduce and illustrate a new generalized logit (GL) model which generalizes all of the above five models, and demonstrate how this GL model can be used to find "robust" optimal designs. These latter designs are thus useful for both parameter estimation and checking for goodness-of-fit. Extensions are also provided for synergy models used in bioassay. Key illustrations are provided as are appropriate software tools.

Keywords: Goodness-of-Fit, Multinomial Regression Models, Optimal Design, Robustness, Synergy