

## Extended Bradley-Terry Models

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The simple Bradley-Terry model postulates a latent "ability" scale for compared objects, where differences in ability predict the binary outcomes of pair comparisons. Much-studied extensions in the literature include (i) the possibility that ability is related to object-specific, subject-specific or other predictor variables, and (ii) methods for dealing with tied outcomes. Such extensions are revisited in this talk. It will be argued that the dependence of ability on covariates often implies a complex random-effects structure, and also requires special methods for dealing with missing data and the construction of useful residuals. A new model for handling ties is suggested, which retains the simple interpretation of existing methods but is more general. The new "BradleyTerry2" package for R, which replaces the existing "BradleyTerry" package, is designed to allow flexible application of the methods described. The interface and facilities of the new package will be introduced mainly through examples of application to psychometric and other data.