

A general processing tree (GPT) model family (e.g., Hu & Batchelder, 1994) is developed for measuring latent cognitive processes that may occur when subjects classify factorially defined stimuli. The GPT family for a two factor, four category design was shown to generalize Massaro and colleagues' fuzzy logic model of perception (FLMP) for this design. In fact, members of the family nest the GPT version of FLMP. The model family is based on the idea that the manifest categorical response depends on the joint outcomes of two dichotomous, latent processes. Closed-form expressions for maximum likelihood parameter estimates as well as their asymptotic variances are provided for all but one member of the model family. Members of the GPT family relax FLMP's processing assumptions in various ways, so these models can provide insight into the nature of processing in cases where FLMP is found to fail. Members of the model family were fitted to data from a speech perception experiment, and it was found that FLMP failed to fit the data, but two other models in the family provided an excellent account of the data. Finally, it is shown how to generalize the approach to different numbers of factors and categories.