

## Cognitive Psychometric Models (CPM) A workshop @ NTCU by Xiangen Hu

The CPMs are based on two applications of a family of Multinomial Models. One is **Multinomial Processing Tree** (MPT) model (W. H. Batchelder, 1998; W. H. Batchelder, Hu, & Riefer, 1994; W. H. Batchelder & Riefer, 1999; William H. Batchelder & Riefer, 1980; Hu & Batchelder, 1994; Matzke, Dolan, Batchelder, & Wagenmakers, 2015; Oravecz, Anders, & Batchelder, 2015; Wu, Myung, & Batchelder, 2010). MPT models are cognitive measurement models for categorical data. They describe observed response frequencies from a finite set of response categories (i.e., responses following a multinomial distribution) with a finite number of latent states. Each latent state is reached by particular combinations of cognitive processes; processes that are assumed to take place in an all-or-nothing fashion. Another example is the **Culture Consensus Model** (William H. Batchelder & Romney, 1988; Romney, Weller, & Batchelder, 1986). The Cultural consensus theory supports a framework for the measurement and evaluation of beliefs as cultural; shared to some extent by a group of individuals. Cultural consensus models guide the aggregation of responses from individuals to estimate (1) the culturally appropriate answers to a series of related questions (when the answers are unknown) and (2) individual competence (cultural competence) in answering those questions. The theory is applicable when there is sufficient agreement across people to assume that a single set of answers exists. The agreement between pairs of individuals is used to estimate individual cultural competence. Answers are estimated by weighting responses of individuals by their competence and then combining responses. This workshop will introduce some basic theory and some applications of CPM. Relevant references below:

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