

Three-way social network data occurs when every actor in a social network generates a digraph of the entire network. This paper presents a statistical model based on cultural consensus analysis for aggregating these separate digraphs into a single, consensus digraph. In addition, the model allows estimation of separate hit and false alarm rates for each actor that can vary within each actor in different regions of the digraph. Several standard signal detection models are used to interpret the hit and false alarm parameters in terms of knowledge and response bias. Published three-way data by Kumbasar, Romney, and Batchelder (*American Journal of Sociology*, 1944) is analyzed, and the model reveals that both response bias and knowledge decrease with distance from ego.