

A Bayesian approach for the analysis of cognitive social structures data

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The study of social interactions has a rich history in the behavioural sciences. A challenging area related to social interactions concerns interpersonal perceptions, that is, the views that subjects form about other subjects, possibly including themselves. The fundamental challenge involves the reconciliation of diverse perceptions. We may also be interested whether subjects perceive their own relationships in the same way as others perceive those relationships. This is an example of a question of “accuracy” which is an obvious yet difficult problem to address. A common definition of accuracy is a special type of consensus or interpersonal agreement among a group of judges. In the absence of a measure of absolute truth or a gold standard, the judgments of others are often used as a criterion.

Perhaps the most detailed form in which interpersonal perception data arise is referred to as “triadic” data. Triadic data are a complex data structure where responses are collected on a group of subjects. A group of n subjects gives rise to $n(n - 1)/2$ pairs of subjects, and in triadic data, every subject provides two responses on each pair. With triadic data, the formulation of realistic and tractable statistical models that address the inferential questions of interest has proven difficult. I will present a computationally tractable, fully Bayesian approach to the analysis of triadic data. Inference methodology is based on using Markov chain Monte Carlo methods as implemented in the software package WinBUGS. Two dataset examples will be presented to highlight the ease with which cognitive social structures can be analyzed.

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