

## Abstract

The study of emergent, bottom-up, processes has long been of interest within organizational and group research. Emergent processes refer to how dynamic interactions among lower-level units (e.g. individuals) over time form a new, shared, construct or phenomena at a higher level (e.g. work group). To properly study the emergence of shared constructs one needs models, and data, that both take into account variability across individuals and groups (multilevel), and variability over time (longitudinal). This article makes three contributions to the modelling and theory of consensus emergence. First, we formulate two separate patterns of consensus emergence; homogeneous and heterogeneous. Homogeneous consensus emergence is characterised by gradual and almost deterministic adjustments of the individual trajectories, whereas heterogeneous consensus emergence show more randomly oscillating trajectories towards consensus. Second, we introduce a model-invariant statistic that measures the strength of the consensus; and allows for comparisons between different models and patterns of consensus emergence. Third, we show how Gaussian Processes can be used to further extend the consensus emergence models, allowing them to capture nonlinear dynamics, on both individual and group levels, in emergent processes. Using an established data set, we show that conclusions on the pattern of consensus emergence can change depending on whether the nonlinear group mean change over time is adequately modelled or not. Thus it is crucial to correctly capture the group dynamics to properly understand the consensus emergence.