

# An Agent-Based Simulation of the Emergence of Societal Phenomena Using a Group Cognition Model

その他のタイトル	グループ認知モデルを用いた社会現象の創発に関するエージェントベースシミュレーション
学位授与年月日	2017-09-15
URL	<a href="http://doi.org/10.15083/00077585">http://doi.org/10.15083/00077585</a>

## 論文の内容の要旨

論文題目 An Agent-Based Simulation of the Emergence of Societal Phenomena Using a Group Cognition Model  
(グループ認知モデルを用いた社会現象の創発に関するエージェントベースシミュレーション)

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**Abstract:** Phenomena like norms, public opinions, and social movements are based on individual actions and their interactions as the building blocks. Usually the interactions are modeled by creating some agents that are more influential than others. In this study, the emergence of such phenomena is modeled as a bottom-up process where all agents have an equal level of influence on each other. There is also no leading agent that can coordinate, reward, or punish other agents. A group-cognition model based on the concept of mutual belief and mental subgrouping is used as the basis to understand bottom-up emergence of societal phenomena in an agent society. By using the concept of mutual belief and mental subgrouping, this study attempts to model the mechanism of how individual decision making and incomplete interaction between the agents shape a societal phenomenon. ‘Mutual belief’ describes agents’ interaction as a set of individual cognition and belief about other agent’s cognition. ‘Mental subgrouping’ describes the strategy of aggregating such belief when there are many other agents to interact with. The model is implemented in a multi-agent simulation and norm emergence is simulated under various cognitive strategies based on the proposed model. The result shows that mental subgrouping and awareness to other agents’ expectation prevent the society to overconsume common resources, even though there is no leading agent and the communication between agents are not perfect.

**Keywords:** *Norm emergence, Group cognition model, Multi agent simulation, Social simulation*