【Grant-in-Aid for Scientific Research (S)】

Humanities and Social Sciences (Social Sciences)

Title of Project： Understanding of cognitive, neural and ecological bases of human collective behavior

Tatsuya Kameda
(The University of Tokyo, Graduate School of Humanities and Sociology, Professor)

Research Project Number：16H06324　Researcher Number：20214554
Research Area：Social Sciences
Keyword：Collective phenomena, computational approach, neurocognitive & cross-species experiment

【Purpose and Background of the Research】

Understanding mechanisms of collective behavior, whereby a local phenomenon is amplified to yield unexpected macro consequences, is one of the most urgent agendas in the contemporary social sciences. In this project, researchers in social sciences (social psychology, behavioral economics, experimental social sciences) and in natural sciences (animal behavior, cognitive neuroscience, mathematical biology) work together toward a systematic understanding of cognitive, neural and ecological bases of human collective behavior.

【Research Methods】

This study combines various methods and techniques from social and natural sciences, including computer simulations, mathematical modeling, cross-species experiments, neuro-physiological experiments, cognitive-behavioral experiments, and a large-scale internet experiment, toward a comprehensive understanding of human collective behavior. We focus on "computational algorithm" characterizing each agent's behavior and explore how the algorithm is implemented at the neuro-physiological levels. We also study how such individual-level algorithms may yield macro social phenomena through dynamic social interactions.

This project revolves around the four themes:
(1) Cross-species experiments on macro behavior using colonies/groups of ants, crows, and humans;
(2) Model-based behavioral-cognitive experiments about human small groups;
(3) Neuro-physiological experiments about behavioral and cognitive synchrony; and
(4) Mathematical modeling of synchronization processes and other mass phenomena.

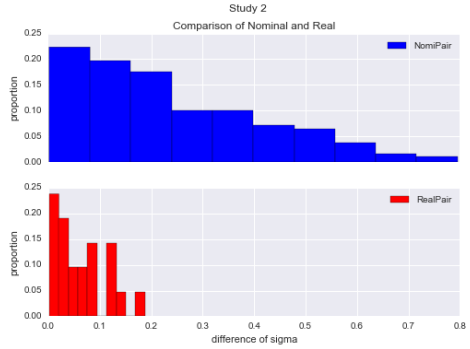

Figure 1 Convergence of cognitive metric for physical judgments through social interaction

【Expected Research Achievements and Scientific Significance】

This project is internationally unique in combining perspectives and methods from social and natural sciences, under a unified framework of "computational approach." It is expected to produce cutting-edge knowledge about human collective behavior and achieve high scientific impacts. It is also expected to produce practical knowledge about how to predict and control various mass behavior in the closely-connected modern society.

【Publications Relevant to the Project】

・ Kameda, T., & Hastie, R. (2015). Herd behavior: Its biological, neural, cognitive and social underpinnings. In R. Scott & S. Kosslyn (Eds.), *Emerging trends in the social and behavioral sciences*. Hoboken, NJ: John Wiley and Sons. DOI: 10.1002/9781118900772. etrds0157

・Kameda, T., Wisdom, T., Toyowaka, W., & Inukai, K. (2012). Is consensus-seeking unique to humans? A selective review of animal group decision-making and its implications for (human) social psychology. *Group Processes and Intergroup Relations*, 15, 673-689.

【Term of Project】FY2016-2020

【Budget Allocation】140,500 Thousand Yen

【Homepage Address and Other Contact Information】

http://www.tatsuyakameda.com/homeeng.html