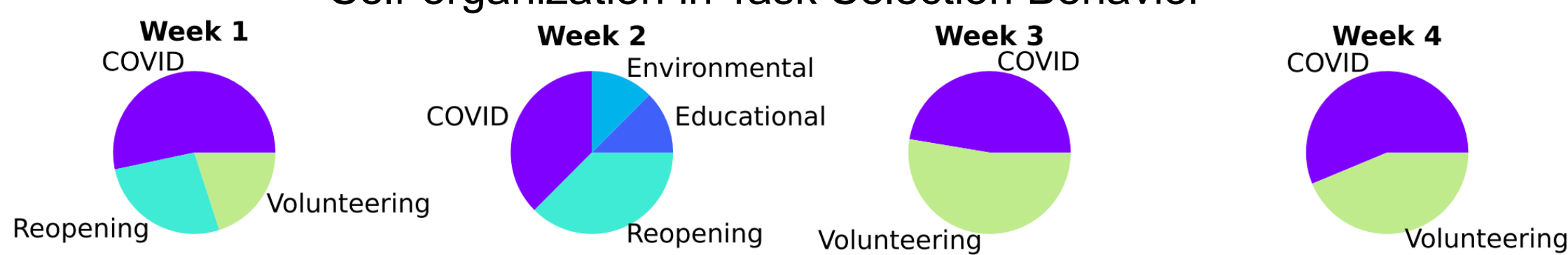


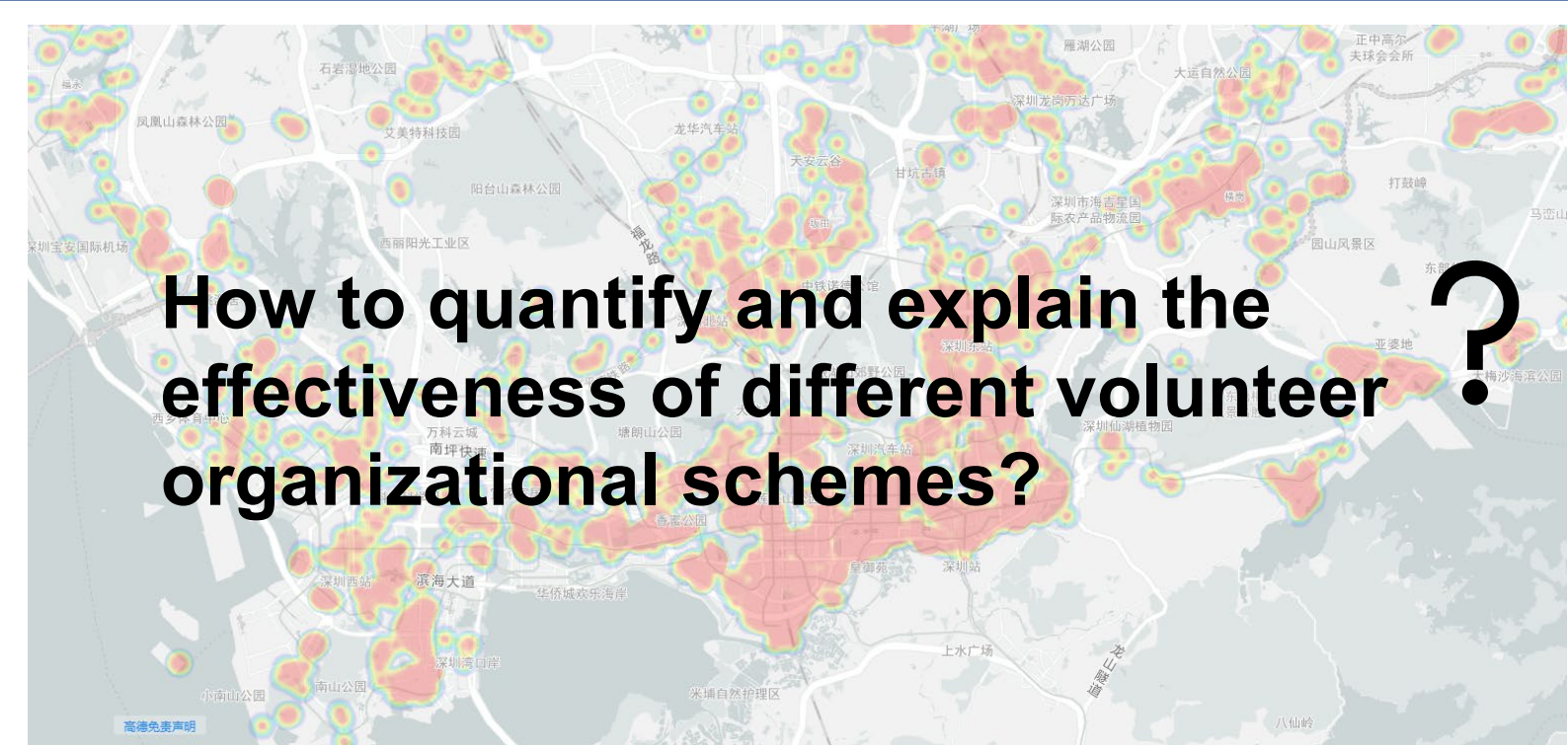


Research Questions

Self-organization in Task Selection Behavior

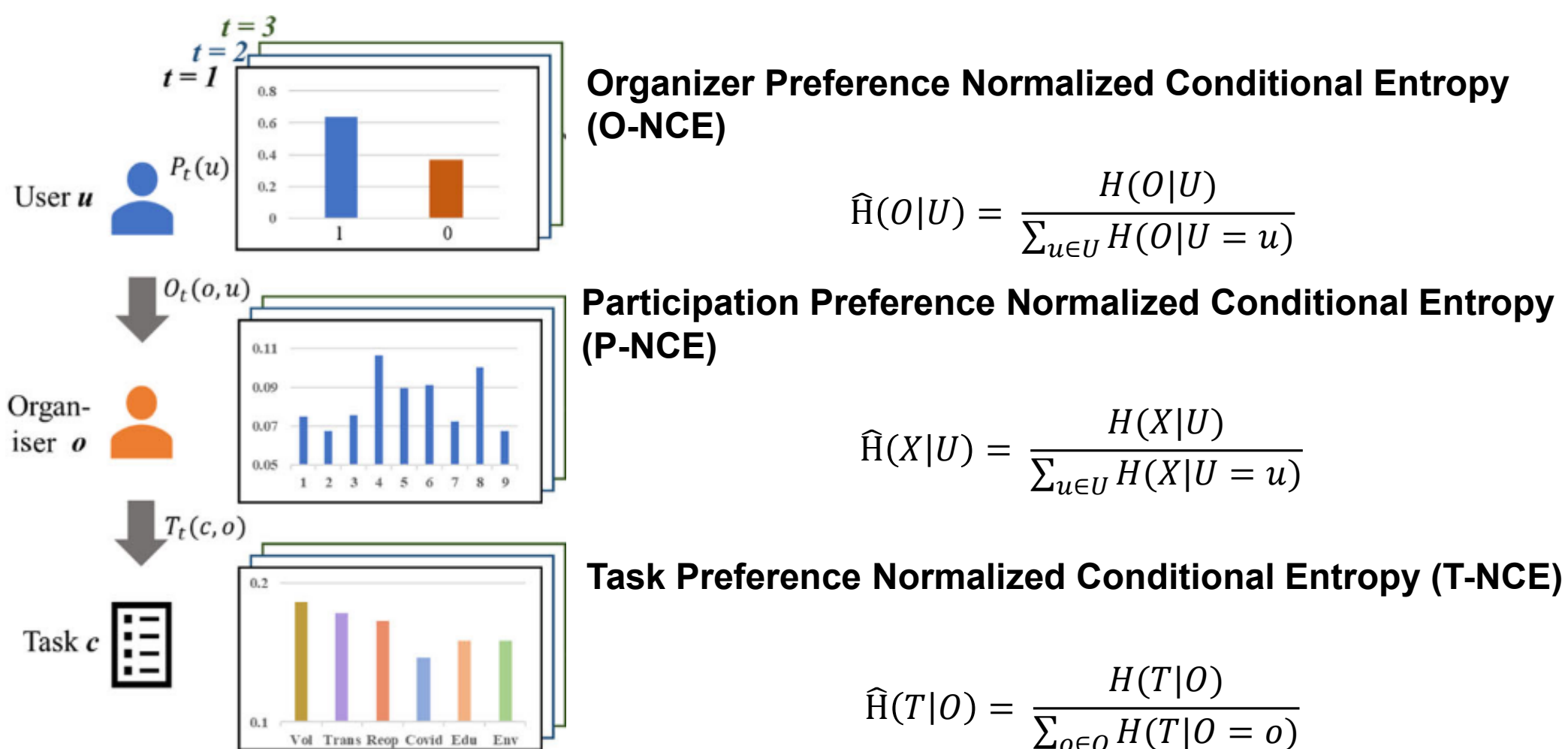


Self-organisation: a process in which system entropy first increases and then decreases, in the absence of an apparent external force.



Self-organization in Volunteer Behavior

Estimate Behavioral Preference



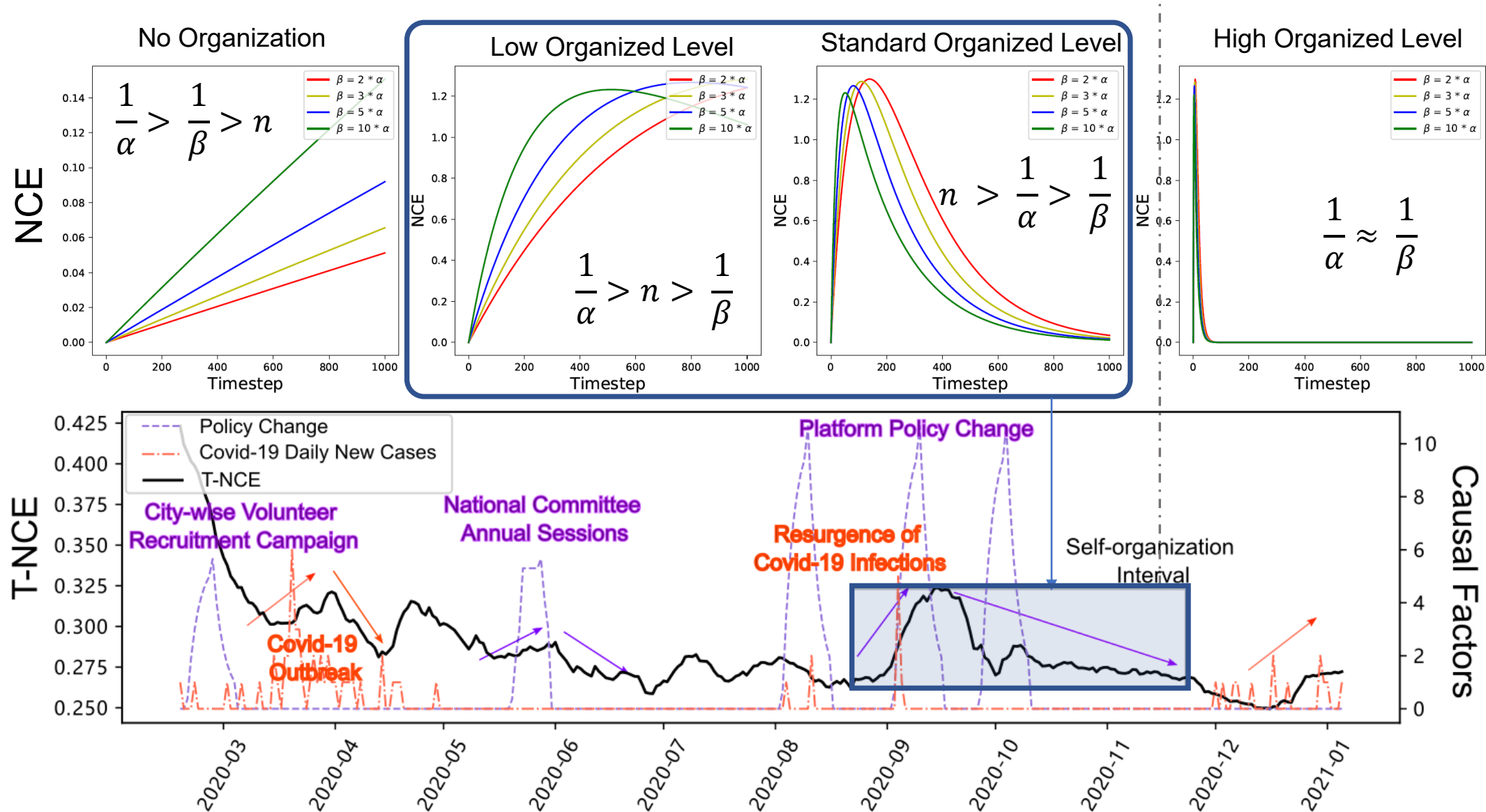
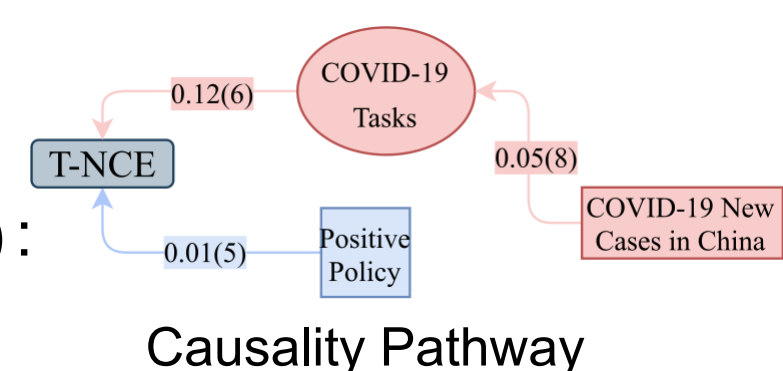
Self-organization of Shenzhen Volunteers

Double Exponential Model

$$NCE(t) = A * M * (e^{-\alpha t} - e^{-\beta t}),$$

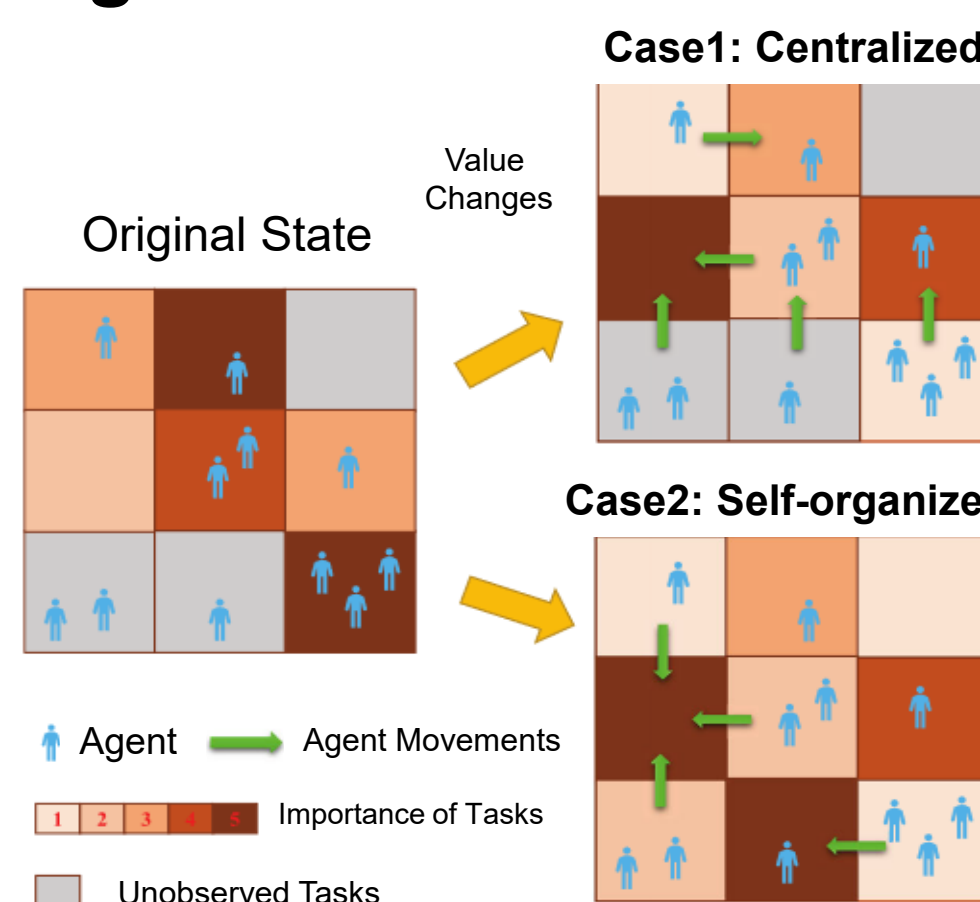
where M is the peak value, $A = f(\alpha, \beta)$:

$$A(\alpha, \beta) = \frac{1}{e^{-\alpha \frac{\ln(\beta) - \ln(\alpha)}{(\beta - \alpha)}} - e^{-\beta \frac{\ln(\beta) - \ln(\alpha)}{(\beta - \alpha)}}$$



Optimize Organizational Effectiveness

Agent-based Simulation Setup



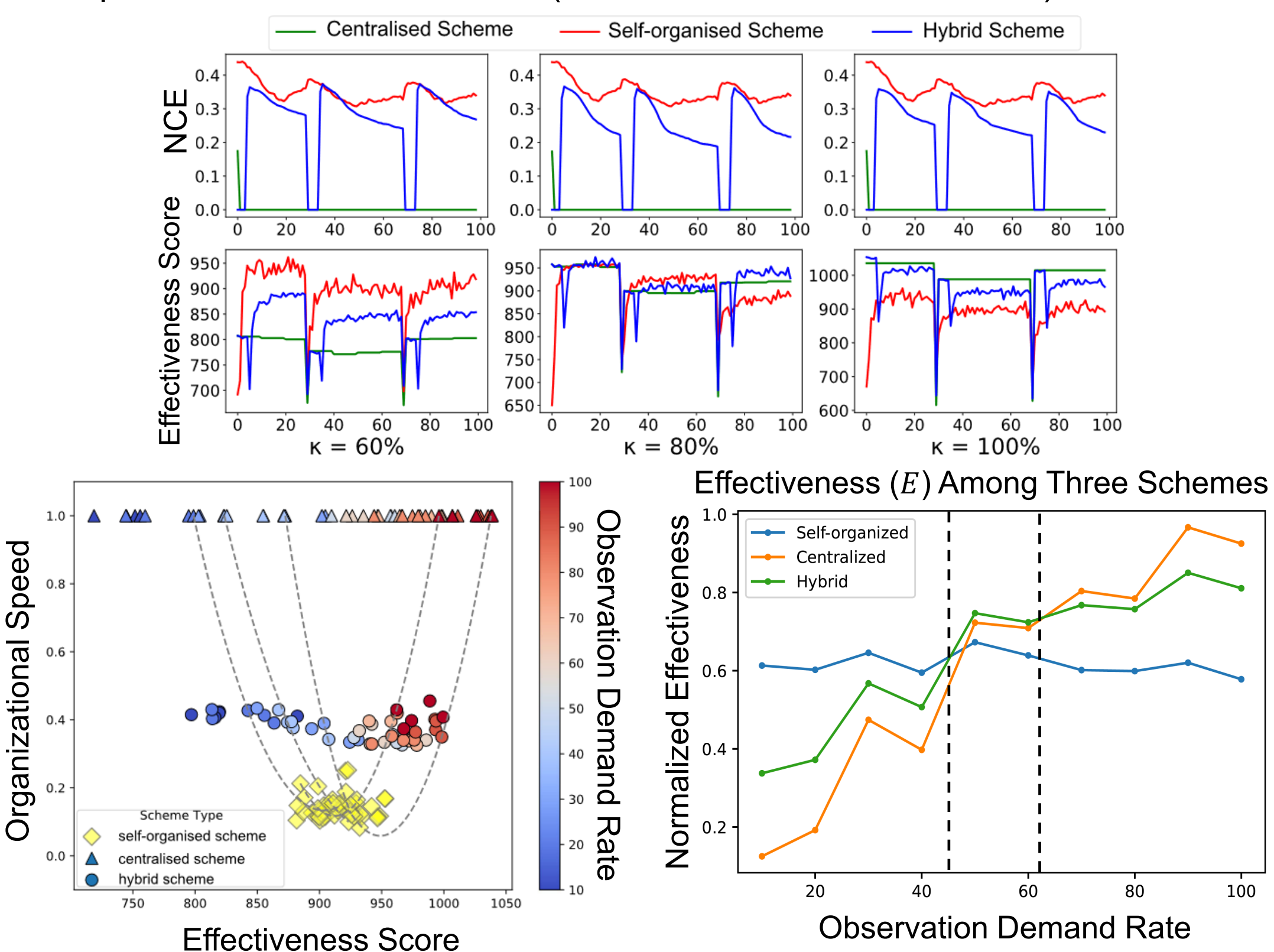
Model Parameters:

- Scheme Type
- Number of Agents
- Observation Demand Rate (κ)
- Grid Value Change Frequency
- Number of Centralized Steps



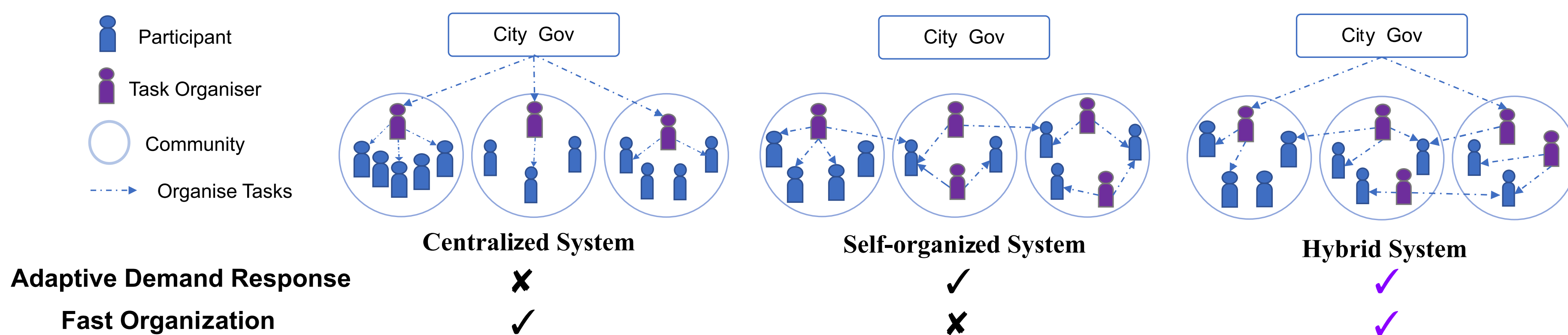
Simulation Results

Comparisons Under Different κ (Fraction κ of the Task Values)



- When κ is low, $E_{\text{Self-organized}} > E_{\text{Centralized}}$
- When κ is large, $E_{\text{Self-organized}} < E_{\text{Centralized}}$

Conclusions



Top-down centralized leadership combined with bottom-up self-organization can respond to the rapidly changing external environment and generate the strongest organizational effectiveness.

Reference & Acknowledgements

Zhang, Anping, et al. "Optimising self-organised volunteer efforts in response to the COVID-19 pandemic." *Humanities and Social Sciences Communications* 9.1 (2022): 1-12.

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