

AUTOCATALYSIS IN MASS MIGRATIONS

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1. Background

Autocatalysis means a process where “presence of a small stable assembly (whose emergence is quite probable) enhances the probability that other elements would join the assembly, thus making it grow and become even more stable”. (Heylighen et al. 2006).

This means that the process is (one of) its own catalyst(s). Exhibition of autocatalysis results in a nonlinear system.

Autocatalysis is part of holistic philosophy where the basic idea is that together individual components create new systems.

5. Discussion

How to take *autocatalysis* into account in the field of social science?

- How to understand its influence on complex systems, for example on society both on micro and macro levels?
- Can we make better predictions of the behaviour of certain complex systems with the help of the concept of autocatalysis?

Work on the model would proceed with a simulation where feedbacks are incrementally added while trying to fit the parameters to existing data.

2. Examples

The term autocatalysis originates in thermodynamics.

Autocatalysis occurs in many biochemical reactions, especially in those relating to biological metabolism.

Idea of autocatalysis has been adopted to social sciences and is also utilized in futurology.

“Small fluctuations may be amplified to large, global effects by positive feedback or ‘autocatalysis’.”
- Heylighen et al. (2006)

4. Model

Examples of possible feedbacks:

Negative = STAY

- hardship of travel
- discouraging information about destination
- acquaintances choosing STAY
- long personal history in present location

Positive = LEAVE

- ease of travel
- encouraging information about destination
- acquaintances already in destination
- acquaintances choosing LEAVE
- threat of violence in present location
- short personal history in present location

3. Hypothesis

Our hypothesis is that individuals have unique thresholds to make a binary decision STAY vs. LEAVE. Their thresholds are defined by miscellaneous factors with varying weights. Negative feedbacks say STAY and positive feedbacks LEAVE.

The process evolves to a mass movement through strong positive feedback, autocatalysis. More and more people crossing their individual threshold choose LEAVE and form a positive feedback loop exponentially encouraging even larger amounts of people to make the decision to leave.