SOCIAL SIMULATION

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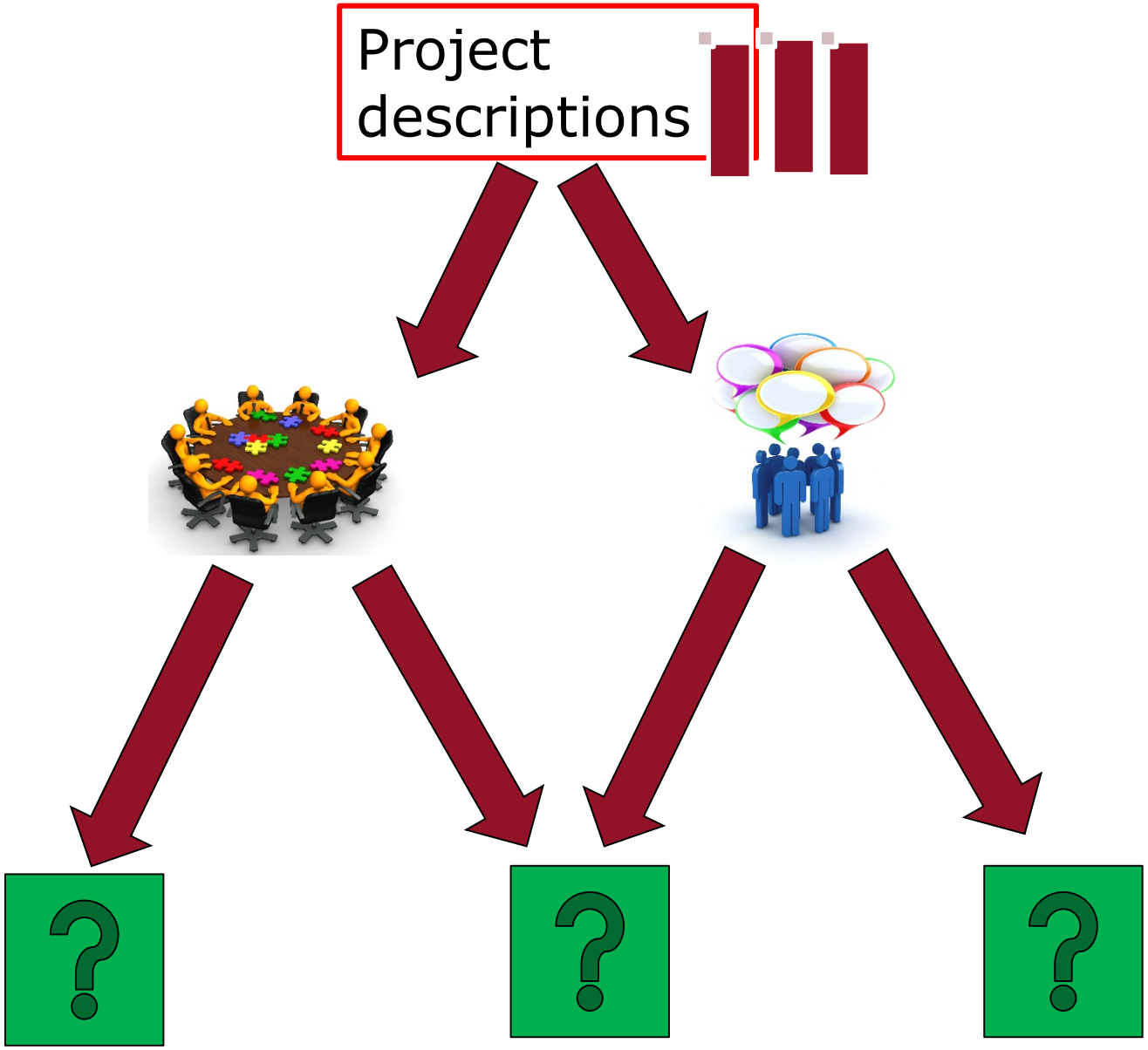
Agenda

Week	Date	Time	Subject
17	Tuesday, April 23	9.00 – 11.00	Introduction
	Thursday,April 25	15.15 – 17.00	Agent Based Social Simulation and NetLogo
18	Tuesday, April 30	9.00 – 11:00	Computer Science and Social Simulation
	Thursday, May 2	15.15 – 17.00	Social Simulation and Social Science
19	Tuesday, May 7	9.00 – 11.00	Methodology and ODD
	Thursday, May 9	15.15 – 17.00	Methodology for your projects, Social simulation for crowd behavior
20	Tuesday, May 14	9.00 – 11.00	Social simulation in practice (Police (drugs trafficking) and EU policies)
	Thursday, May 16	15.15 – 17.00	Social simulation in practice (Policy support Dutch government and Police (radicalization))
21	Tuesday, May 21	9.00 – 11.00	Social concepts in simulations
	Thursday, May 23	15.15 – 17.00	Combining theories and models
22	Tuesday, May 28	9:00-11:00	Socially behaving agents and scalability
	Thursday, May 30	15.15 – 17.00	**Ascension day, NO CLASS**
23	Tuesday, June 4	9.00 – 11.00	Purposes of social simulation
	Thursday, June 6	15.15 – 17.00	When did you fail or succeed with a social simulation?
24	Tuesday, June 11	9.00 – 11.00	Qualititative and quantitative approaches (simulations and data)
	Thursday, June 13	15.15 – 17.00	Verification and validation of simulations
25	Friday, June 28	13:00-17:00	Presentations results programming assignment (room) 13:00-14:00 - group 14:00-14:15 – break 14:15-15:15 – group 15:15-15:30 - break 15:30-16:30 – group
26			
	June 29	17:00	**Deadline submitting project**

The course work

- Small assignment based on Schelling's segregation model (deadline May 2)
- Make groups of 4 students (deadline May 1)
- Choose your project
- Submit project plan (according to the specifications) (deadline May 7)
- Submit a one page reflection report (per group) every week (format will be distributed)
- First running simulation (deadline May 30)
- Presentation plus report (deadline June 28)

Part of empirical study?



Social simulation

- YOU are responsible for your course and what you learn
- NOT a course on programming NetLogo or Repast
- Slides are supporting classes, they might not contain all material!
- Read the books, read the articles, look for more if needed
- START working now, time is short
- Important info on the course on: http://www.cs.uu.nl/docs/vakken/msosi/

WHY social simulation in an AI master?

1. AI according to Russell and Norvig:
   a. Problem solving
   b. Knowledge and reasoning
   c. Uncertain knowledge and reasoning
   d. Learning
   e. Communicating, perceiving and acting
2. Set of techniques and quite autistic intelligence
3. Human Intelligence is Social
4. What does "**social**" mean?
   - "interaction between the individual and the group" (Mirriam Webster)
5. Decisions for actions are based on both individual utility as well as benefits for the group

Umuntu Ngumuntu Ngabantu

A PERSON IS A PERSON THROUGH OTHER PERSONS

Sociality according to Social Science

1. **Individualists** (Weber, beginning 1900's):
   individuals only, social arises from individual behaviors
2. **Socialists** (Durkheim, 1910's):
   "natural" norms/roles determine individual behavior
3. **Textualists** (Habermas, 1960's):
   conceptualization and language determine our social reality
4. **Social Practice** (Latour/Reckwitz, 1990's): social reality is shaped by practices, the process is central
5. **Social Persons** (John Mbiti, 1975):
   I am because we are, and since we are, therefore I am; Persons are shaped through their interactions with other persons

Sociality according to Agents Community

Individualists: AAMAS, Game Theory
Socialists: COIN, Social Simulation
Culturalists: Agent Communication
Social Practice: Social Simulation
Social Persons:

Socio-Cognitive Systems?

Social structures and rules

- Formal social structures:
  - Institutions, Organizations, Nations,…
- Informal social structures:
  - Teams, Groups, Families, Friends,…

Social rules are described in terms of:

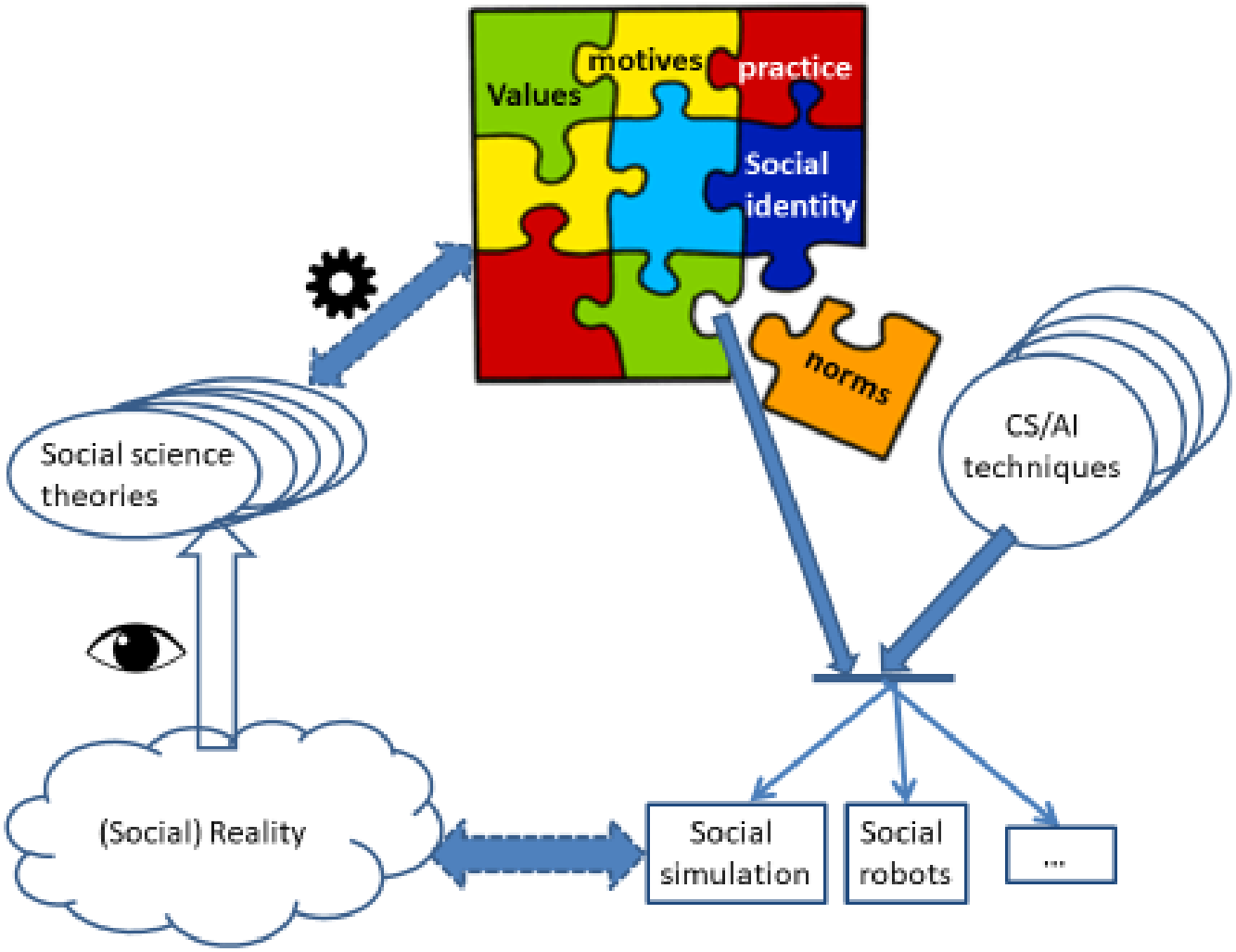
- Roles
- Social Practices
- Conventions
- Norms
- Values
- Culture
- …

The danger of computer science

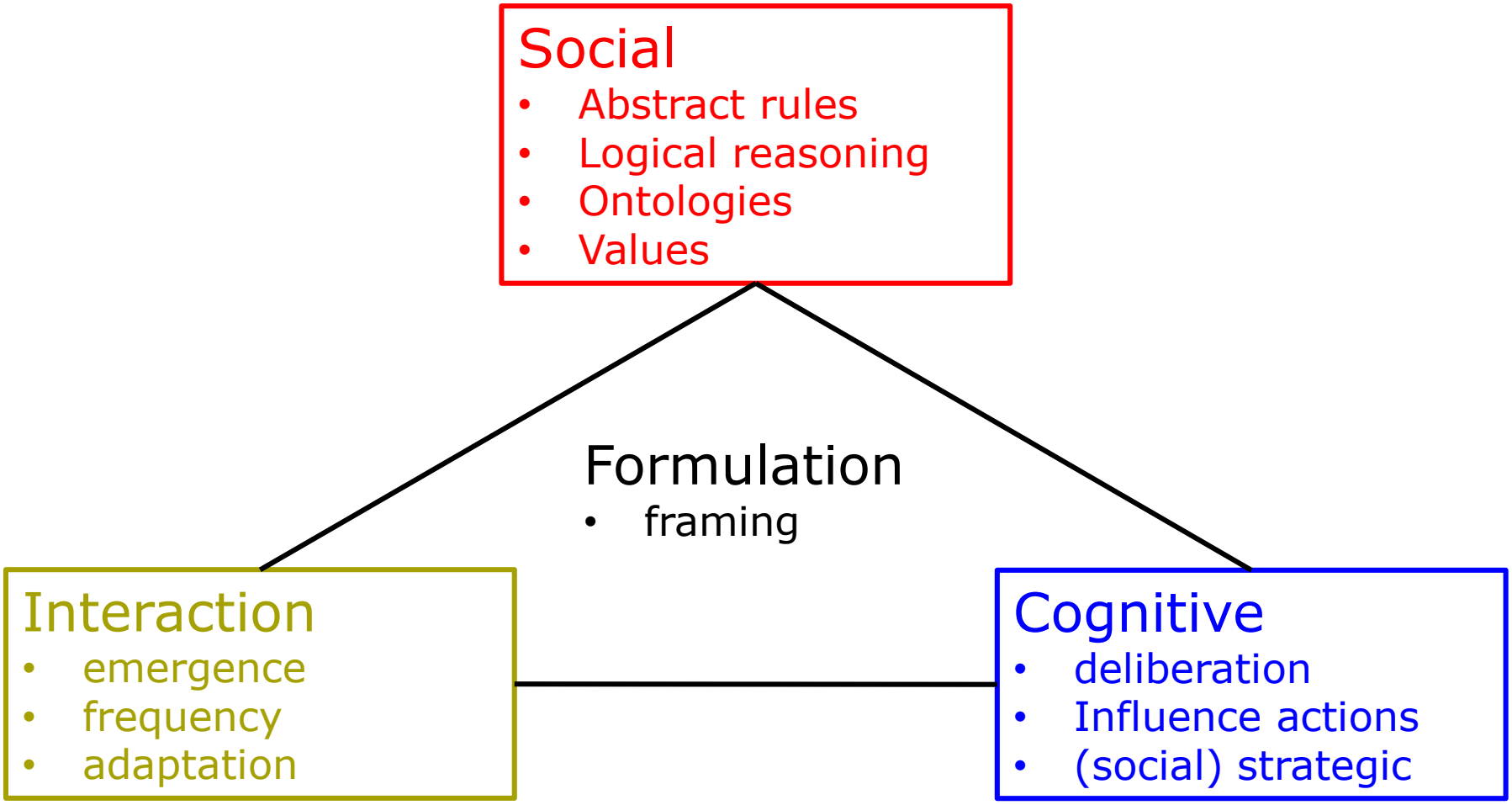
- Start with a technique
- Explain a phenomenon in terms of that technique
- **It fits**,
- because everything is simplified until it fits!

- Logic → Axioms, consistency,…
- Game theory → Utility, strategy,…
- Petri-Nets → Lifeness, deadlock,…
- Bayesian Networks → Priors, influence, probability,…
- Neural Networks → classification,…
- Social simulations → emergence,…
- Complex systems → networks, feedback loops,…
- Linear programming → optimal solution,…
- …

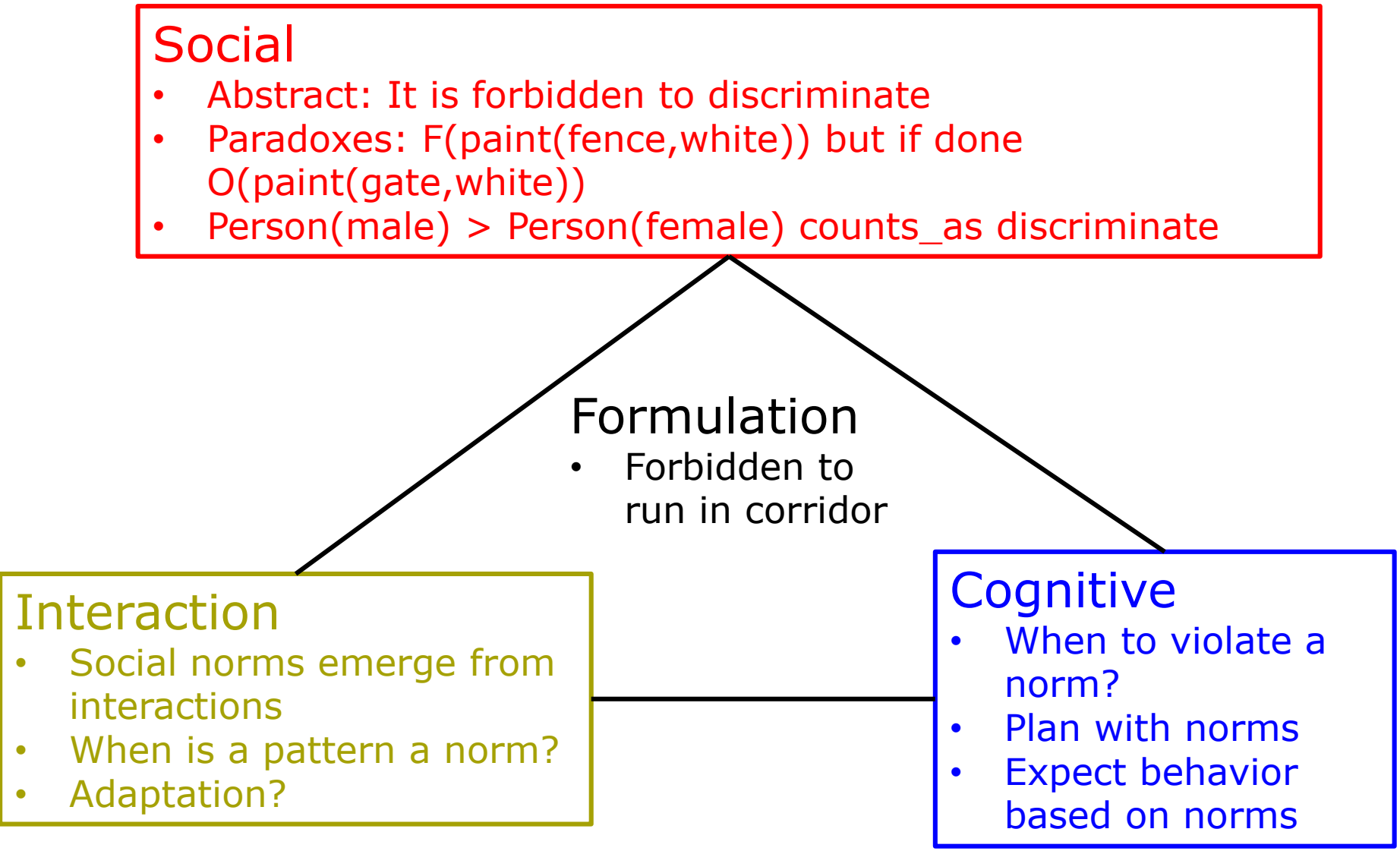
Attempt with socio-cognitive systems



Social concepts have three perspectives



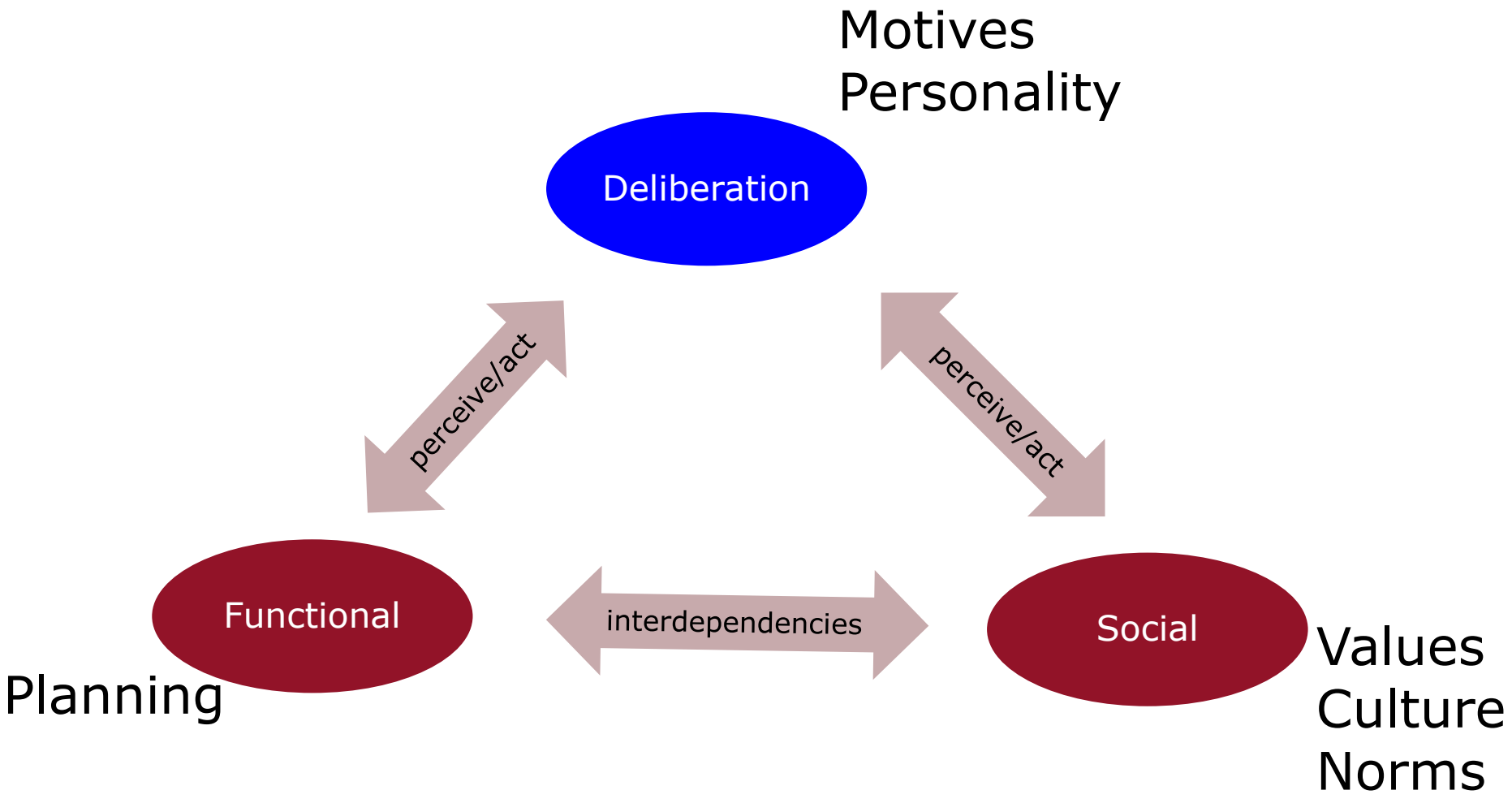
Example: norms



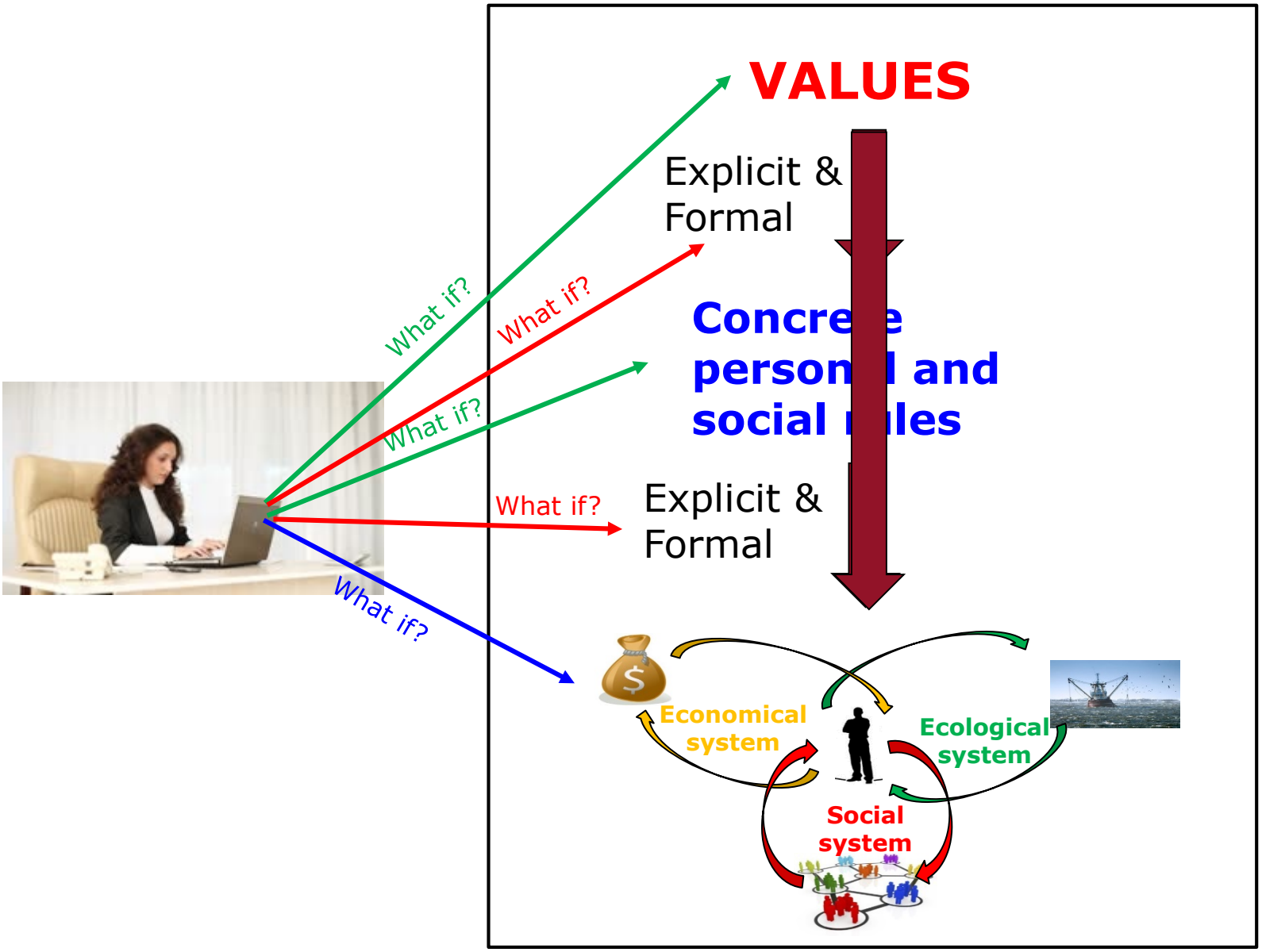
Dynamics:
Social structures motivate, emerge, adapt,…

- Persons influence each other through social structures, using social structures and because of social structures

Social deliberation



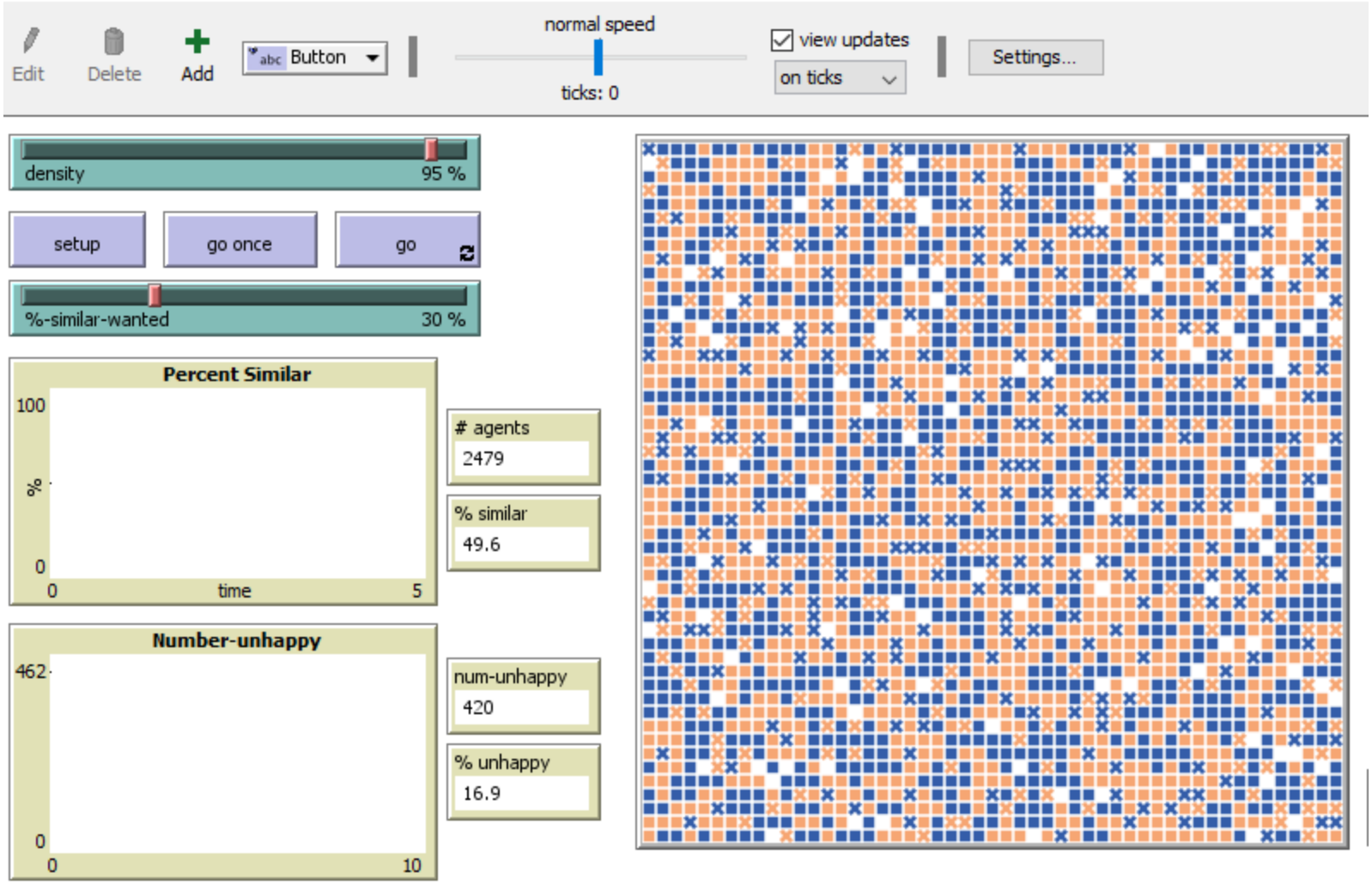
Design of social simulations



Schelling's segregation model

This project models the behavior of two types of agents in a neighborhood. The orange agents and blue agents get along with one another. But each agent wants to make sure that it lives near some of "its own." That is, each orange agent wants to live near at least some orange agents, and each blue agent wants to live near at least some blue agents. The simulation shows how these individual preferences ripple through the neighborhood, leading to large-scale patterns.

Running the model



Individual assignment

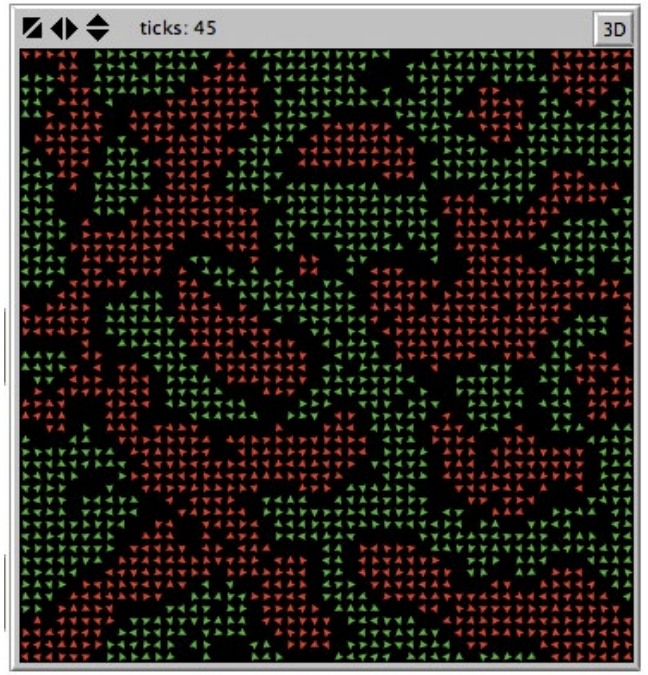
1. The find-new-spot procedure has the agents move locally till they find a spot. Rewrite this procedure so the agents move directly to an appropriate new spot. How does this affect the simulation?

2. Incorporate social networks into this model. I.e. unhappy agents decide on a new location based on information about what a neighborhood is like from other agents in their network. Their network can consist of 8, 16 or 32 other agents that can just tell the number of agents of a certain color around them. The network keeps the same throughout the simulation. How does this change the segregation?

3. In the standard model all agents have the same similarity preference. Change this to a uniform distribution over the global preference. What is the effect on the segregation?

Realistic?

- **I do not believe this!**
- How are real moving decisions made? (Interviews, **maybe** experiments.)
- How "closely" does the simulated city match a real city? (Need measures.)
- What is missing? "Common sense" (and previous research): Housing market, migration, demography, "sites" (i. e. jobs, schools, parks, churches).
- Will an "adequate" sample of qualitative interviews "exhaust" the features of the city we need to understand? Example of "realtors". Political haggles about "zoning?"



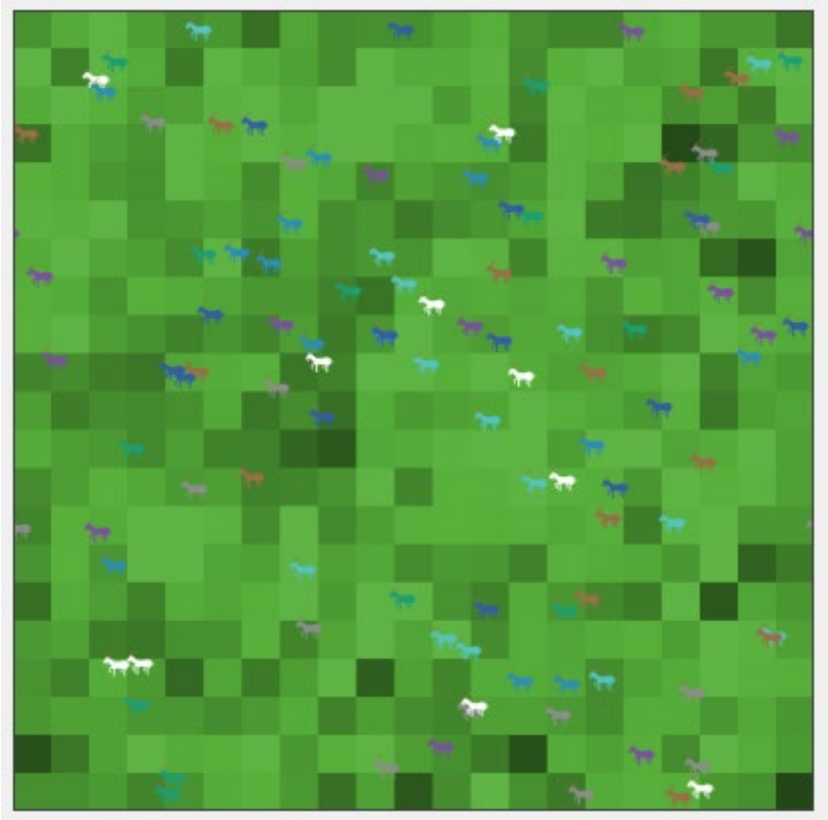
Avoiding "piles" of arbitrary Schelling variants.

4. An aside on an aside: Sorry

- How bad are ABMers? Dataphobia?
- Rossi book (1955): *Why People Move*.
- **Amount of closet space (33%)**, open space about the house (28%), street noise (23%), amount of room (22%), heating equipment (16%), rent (15%), nearness to friends or relatives (15%), amount of air and sunlight (14%), **kind of people around here (13%)**, amount of privacy (12%), **nearness to church (9%)**, travel to work (8%), kind of schools around here (6%), shopping facilities (6%).
- Research design challenge 1: What data do we use to begin with and "in what order?" What do we "hold back?"

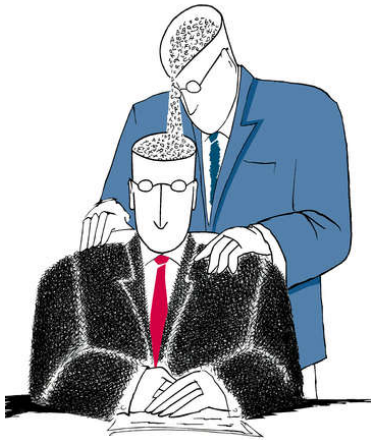
Tragedy of the commons

This model simulates the utilization of a common resource by multiple users. In this example, the common resource is represented by the common grazing area, used by goat farmers to feed their goats. Depending on the actions of the participants, the outcome may demonstrate a phenomenon called the “tragedy of the commons”, where a common good or resource is over-utilized.



Social simulation

- Interesting? It all depends on you!



- Involves programming, but also thinking about social rules
- It is about real AI
- It actually becomes popular!
- When data science and big data finish, social simulation starts.