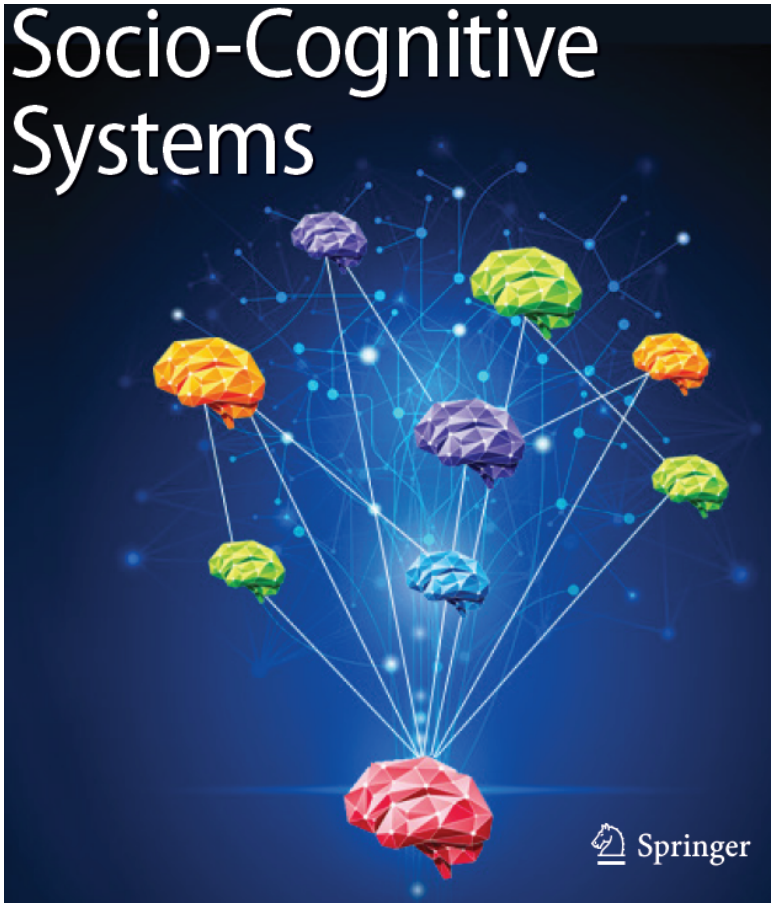
SOCIO-COGNITIVE SYSTEMS

BRUCE EDMONDS
FRANK DIGNUM



When	What	Who	Title
8:00-8:30		*registration*	
8:30-8:50	Introduction	Frank Dignum	
8:50-9:10	Introduction	Bruce Edmonds	
9:10-10:00	**Invited Talk**	Milind Tambe	Algorithmic Intervention Science: Towards AI decision aids for social work and public health
10:00-10:30		*coffee break*	
10:30-11:10	Paper	Tim Miller, Virginia Dignum and Frank Dignum	Planning for Human-Agent collaboration using Social Practices
11:10-11:50	Paper	Rijk Mercuur, John Bruntse Larsen and Virginia Dignum	Modelling the Social Practices of an Emergency Room to Ensure Staff and Patient Wellbeing
11:50-12:30	Paper	Antoni Perello-Moragues, Pablo Noriega, Julian Padget and Harko Verhagen	Value-driven policy-making as a socio-cognitive technical system
12:30-14:00		*lunch break*	
14:10-14:50	Paper	Prashan Madumal, Tim Miller, Frank Vetere and Liz Sonenberg	Towards a Grounded Dialog Model for Explainable Artificial Intelligence
14:50-15:30	Paper	Stevan Tomic, Federico Pecora and Alessandro Saffiotti	What normative framework for mixed human-robot societies?
15:30-16:00		*coffee break*	
16:00-16:40	Paper	Diogo Rato, Rui Prada and Samuel Mascarenha	Cognitive Social Frames: The role of Social Context in agents cognition
16:40-17:30	Discussion		

Agenda

- Intelligent Social Behaviour
- Norms, Social Practices,…
- Socio-Cognitive Systems
- Research directions?

Umuntu Ngumuntu Ngabantu

A PERSON IS A PERSON THROUGH OTHER PERSONS

AI: from tool to partner

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?

AI in a SOCIAL context

- Optimal decision → Accepted decision
- Black box decision → Explanable decision
- One shot decision → Repeated decisions
- Action → Interaction
- Direct effect → Long term social effect
- ...

predict and adapt intelligently to social behaviour

incorporate Social Reality in AI 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:

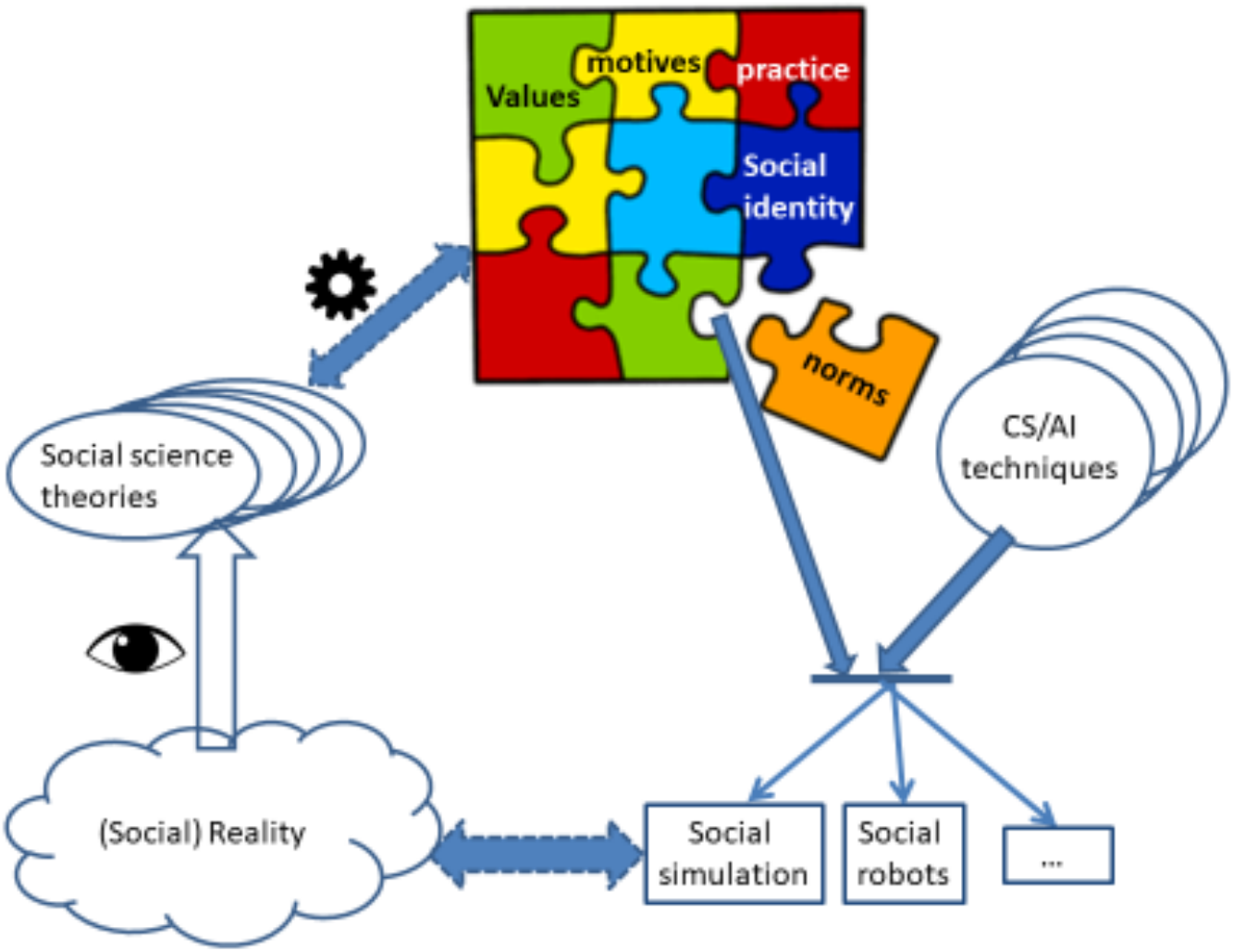
- Roles
- Social Practices
- Conventions
- Norms
- Values
- Culture
- …

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

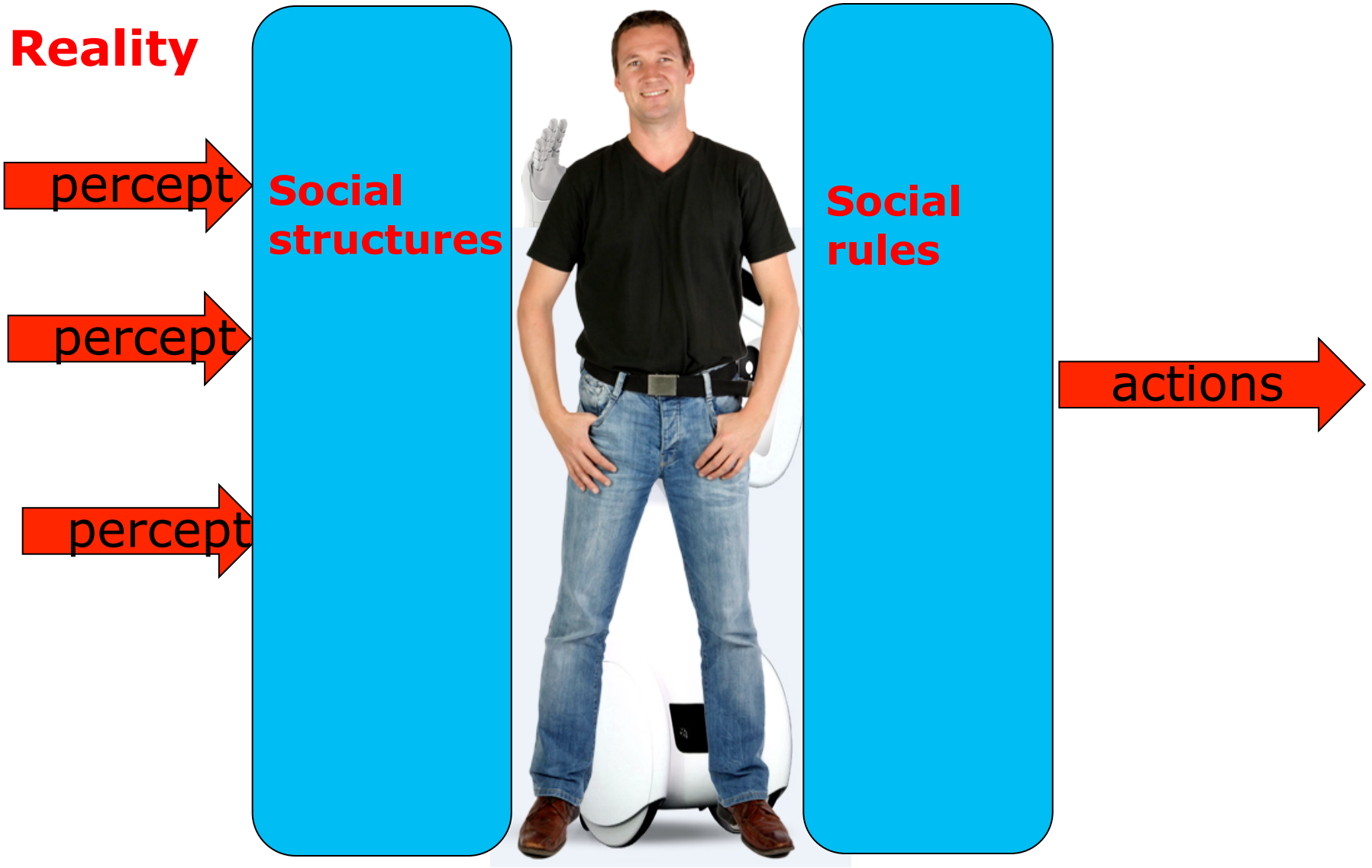


Open issues:

1. **Modularity and compositionality of social and cognitive models**

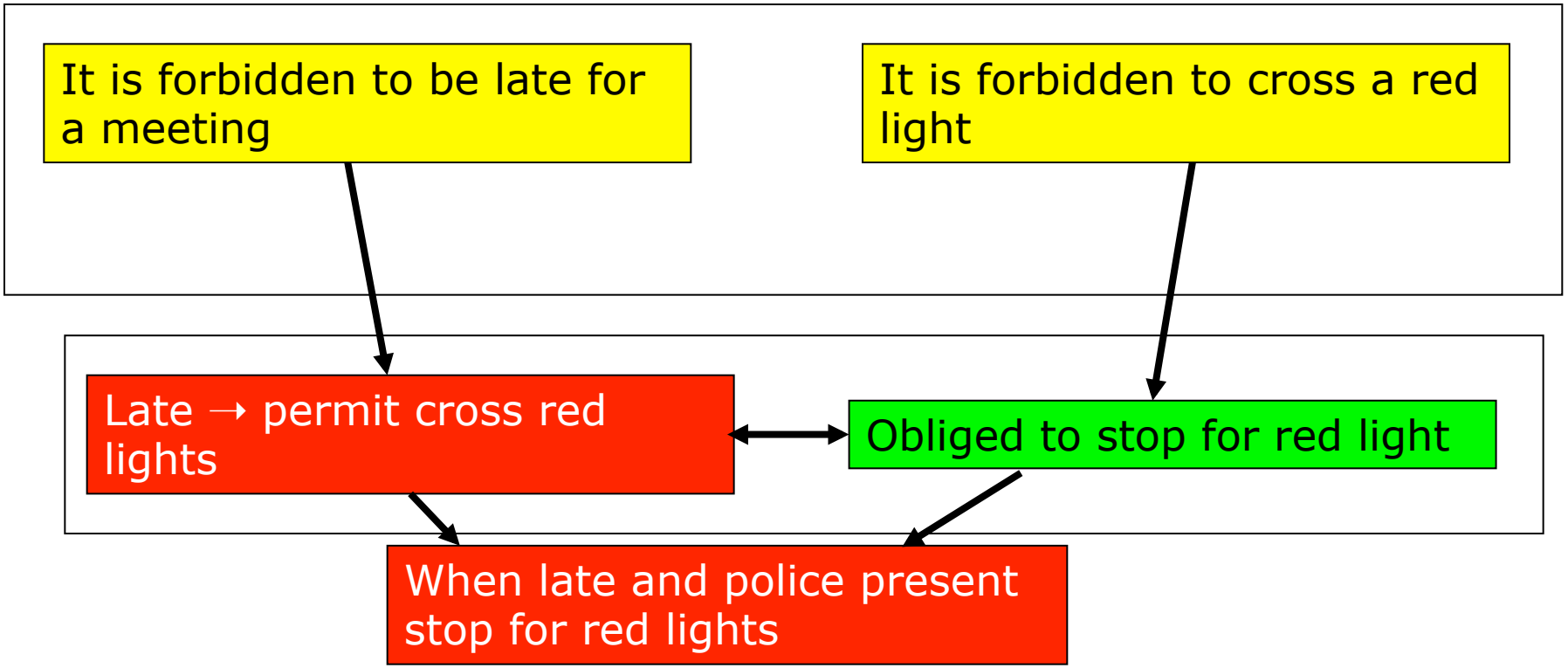
2. **Dynamicity of social reality**

Add social modules to the AI system?



Are the norms specified consistent and/or complete?

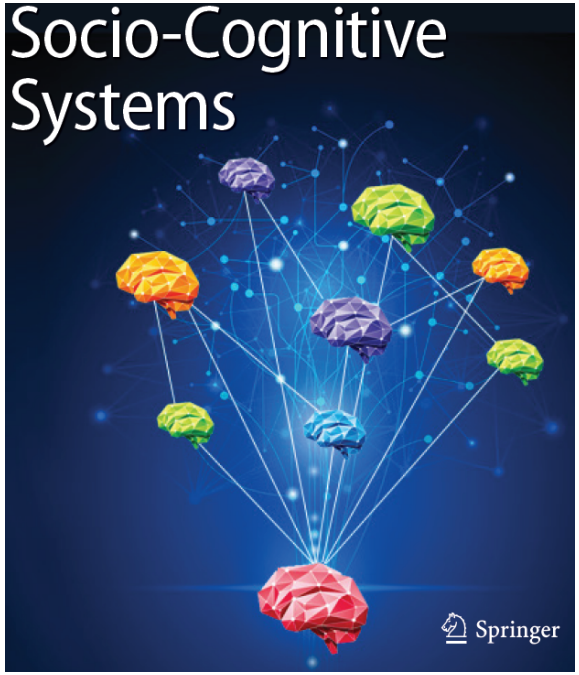
- Assumption: Check consistency in norms module
- Problem: connection with planning



State of the art

Social and cognitive aspects of AI systems have to be developed in synchronization.

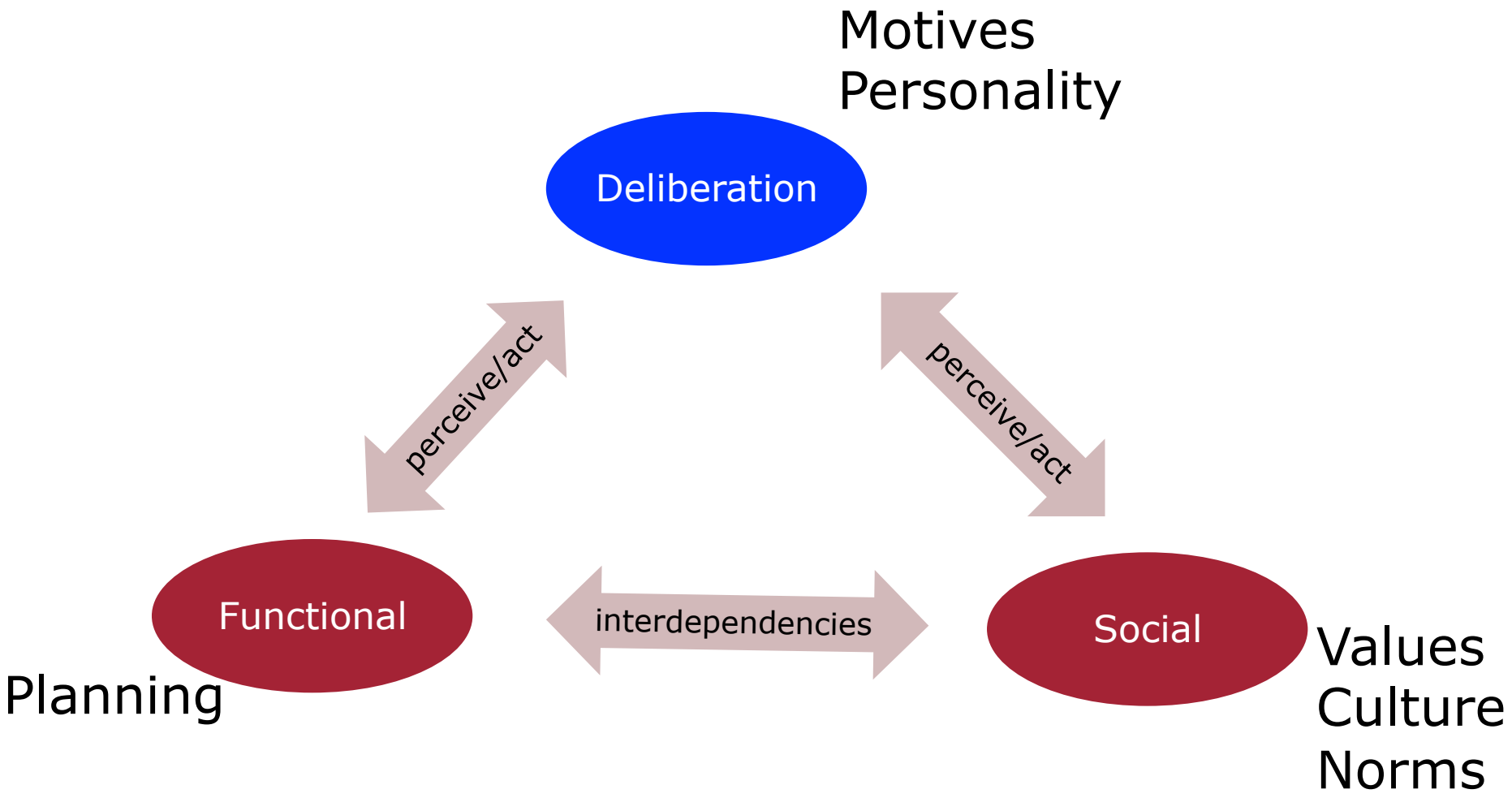
Start of the Springer journal on
Socio-Cognitive Systems
Computational and formal approaches
Editors in chief: F. Dignum and B. Edmonds
(first issue: Jan. 2019)



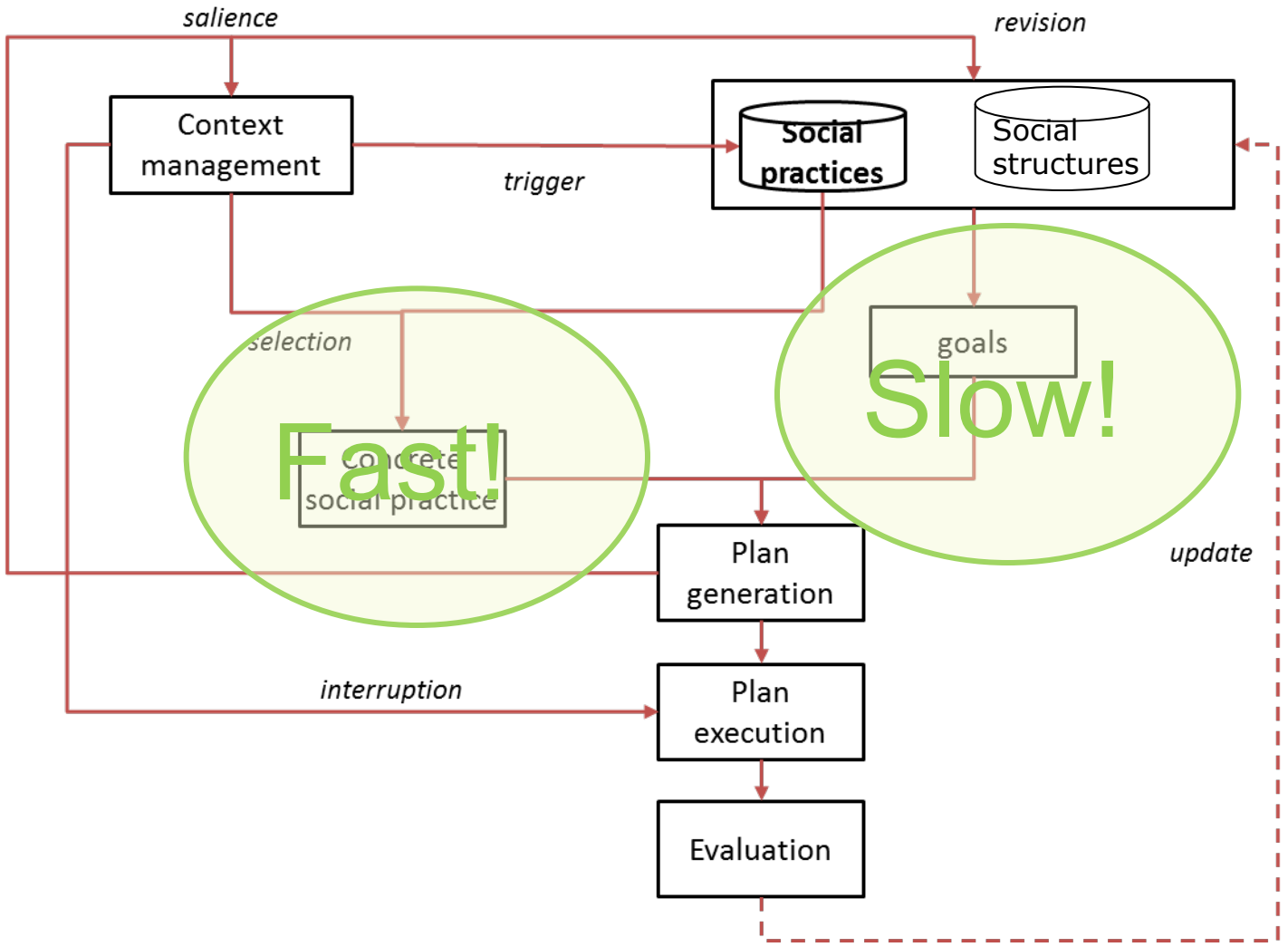
Dynamics:
Social structures motivate, emerge, adapt,…

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

Social deliberation



Sketch of a social AI system



How to use theory on social intelligent behaviour?

1. During design of interactive systems
2. For designing socially intelligent systems
3. For designing social simulations
4. For designing MAS supported socio-technical systems

Designing applications in a social context

Social practices
Norms
Motives

Cardiomyopathy

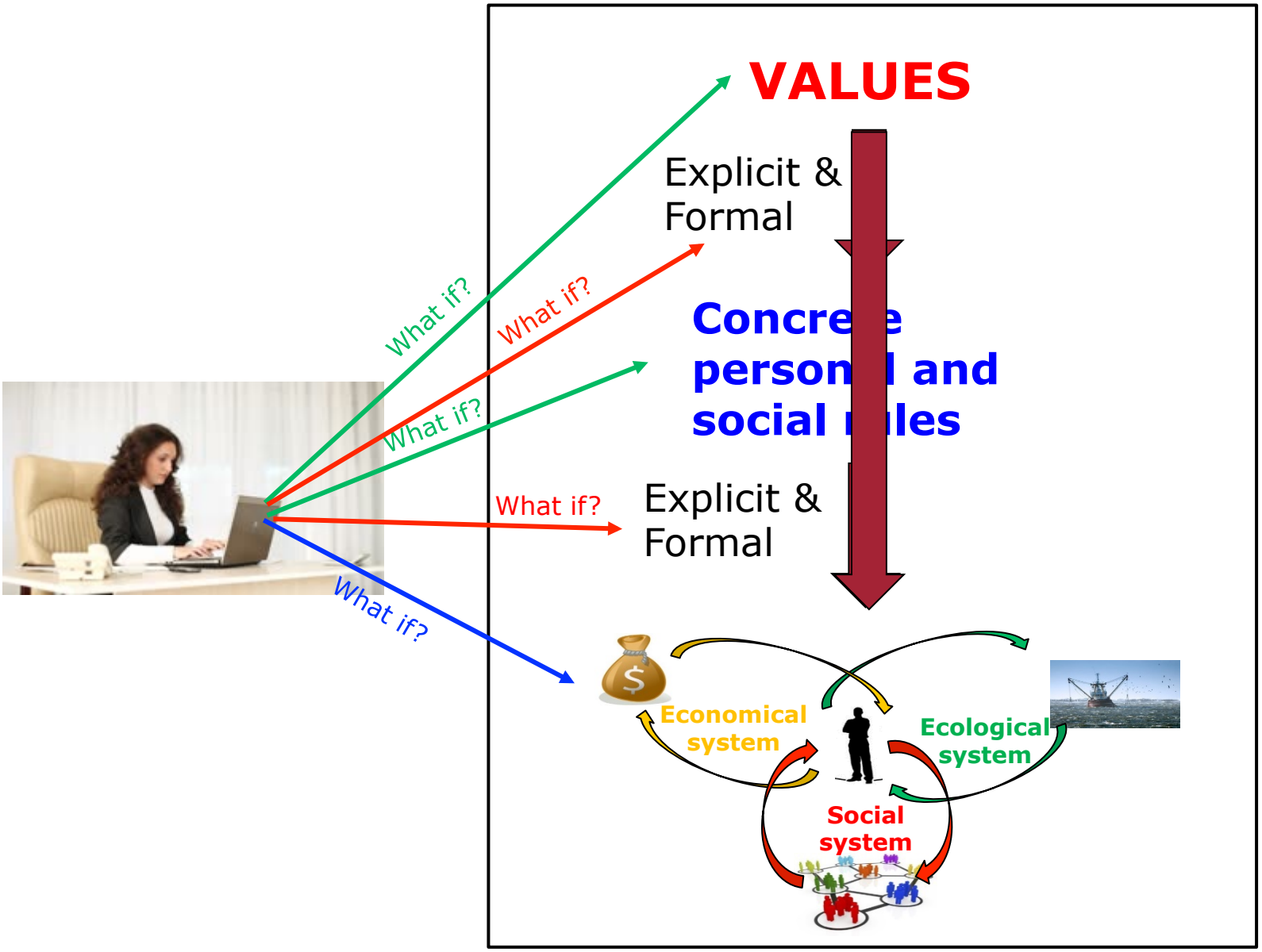
Social practices
Norms and values
Social status

Child power

Design socially intelligent systems

Social practices
Norms
Roles

Design of social simulations

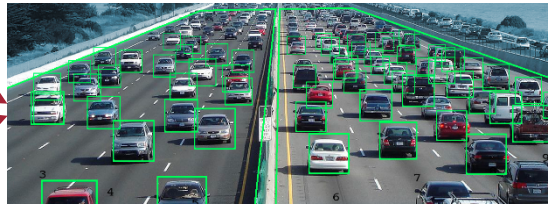


Designing MAS supported socio-technical systems

Sensor data

Actions

Mixed simulation
Social driver models



Self driving cars
mix with
Human driven cars

Conclusions

1. Start of exciting new field
2. Possibly huge impact
3. Possibly too early and big failure
4. It is all up to us
5. Possibly some intermediary conclusions in 10 years (I am 57 now ☺)