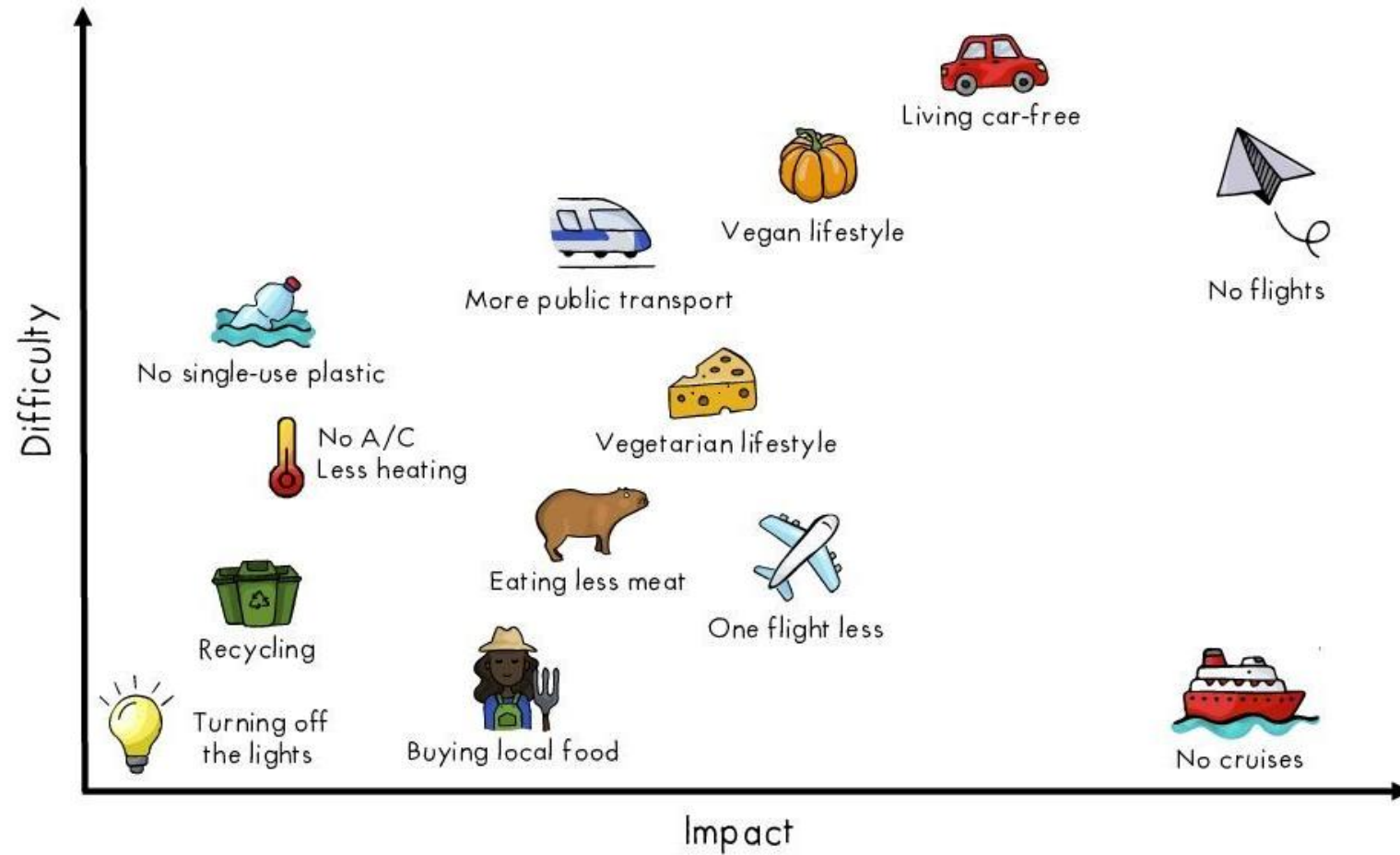


Representing behavioural complexity in models

Dr. Geeske Scholz



Difficulty and impact of climate-friendly decisions



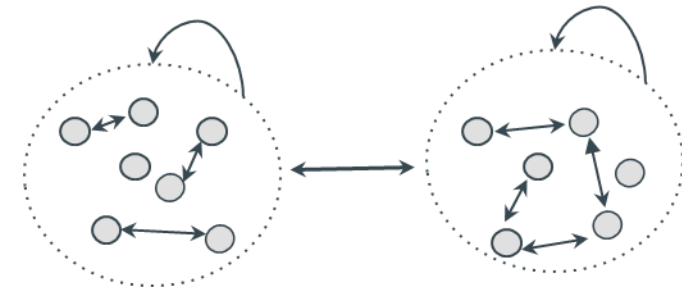
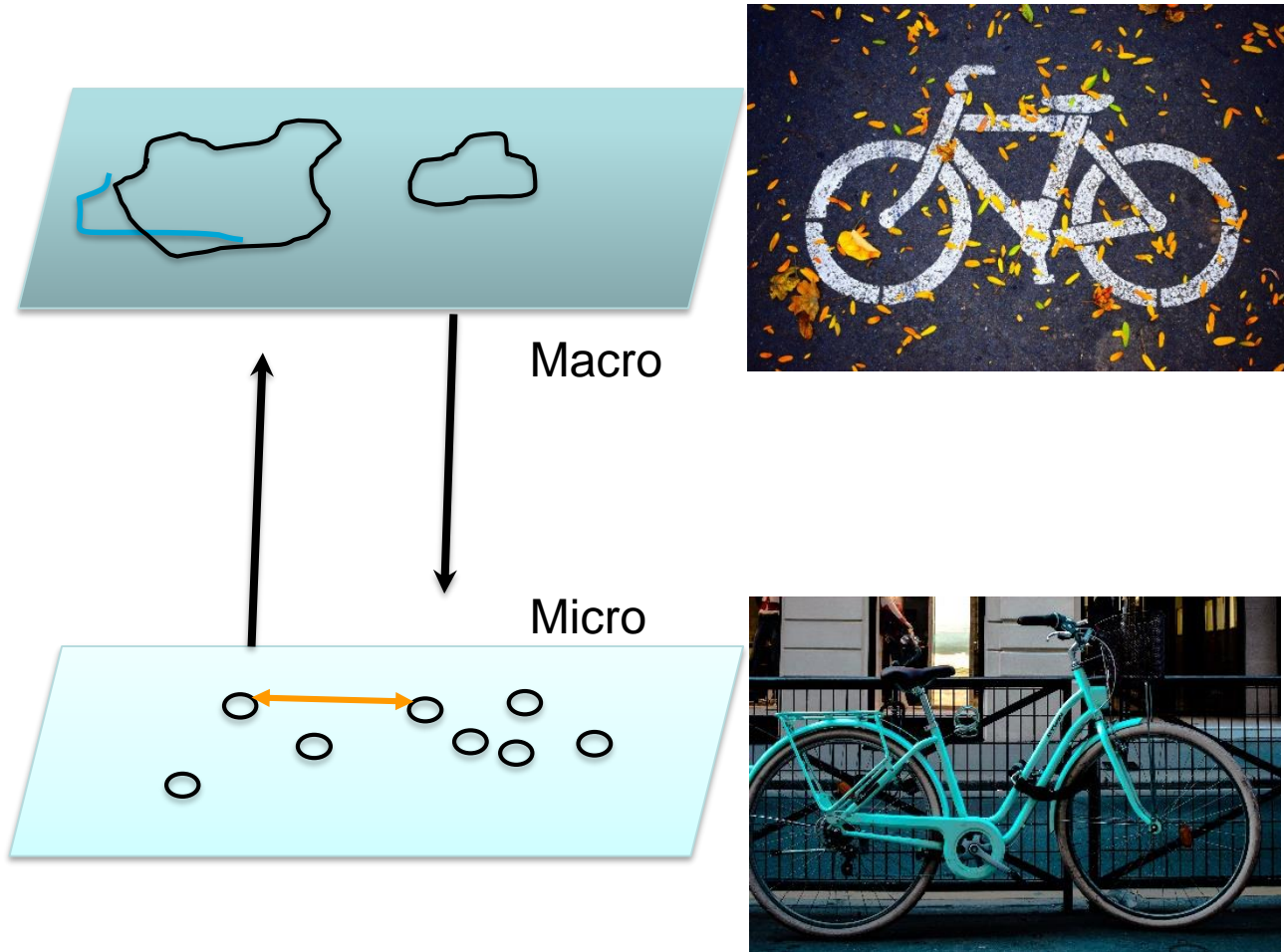
Context matters: example crisis



- Accepted measures
- Behavioural changes

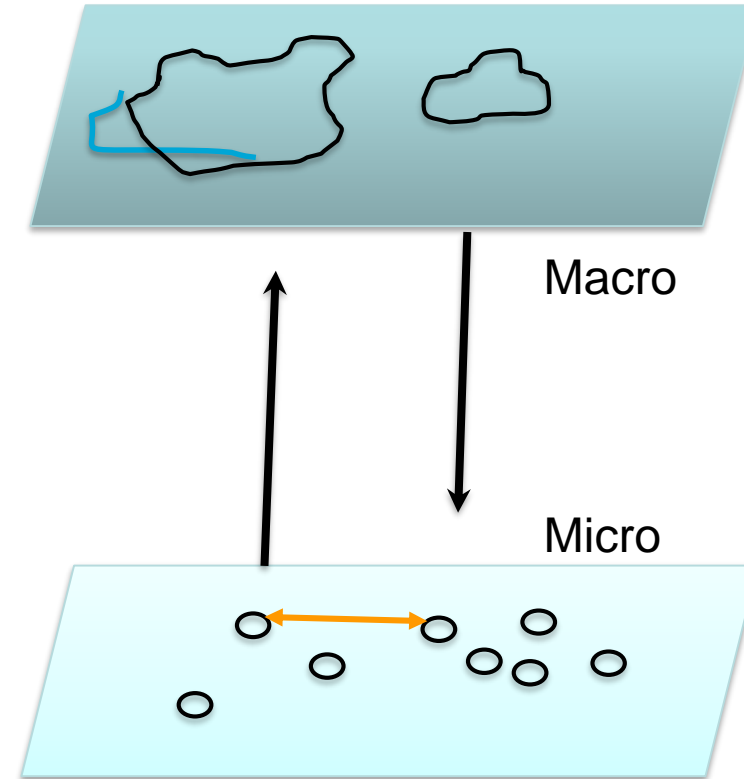


Micro, Meso and Macro level

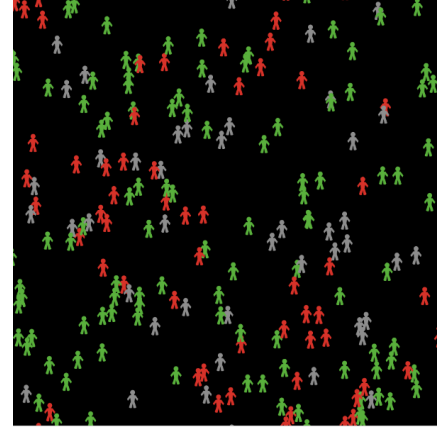


Modelling

HUMAN BEHAVIOUR & SOCIAL COMPLEXITY



Human behaviour in Agent-based models



Theory

- Rational actor
- Heuristics
- Social-psychological models
- ...

formalization

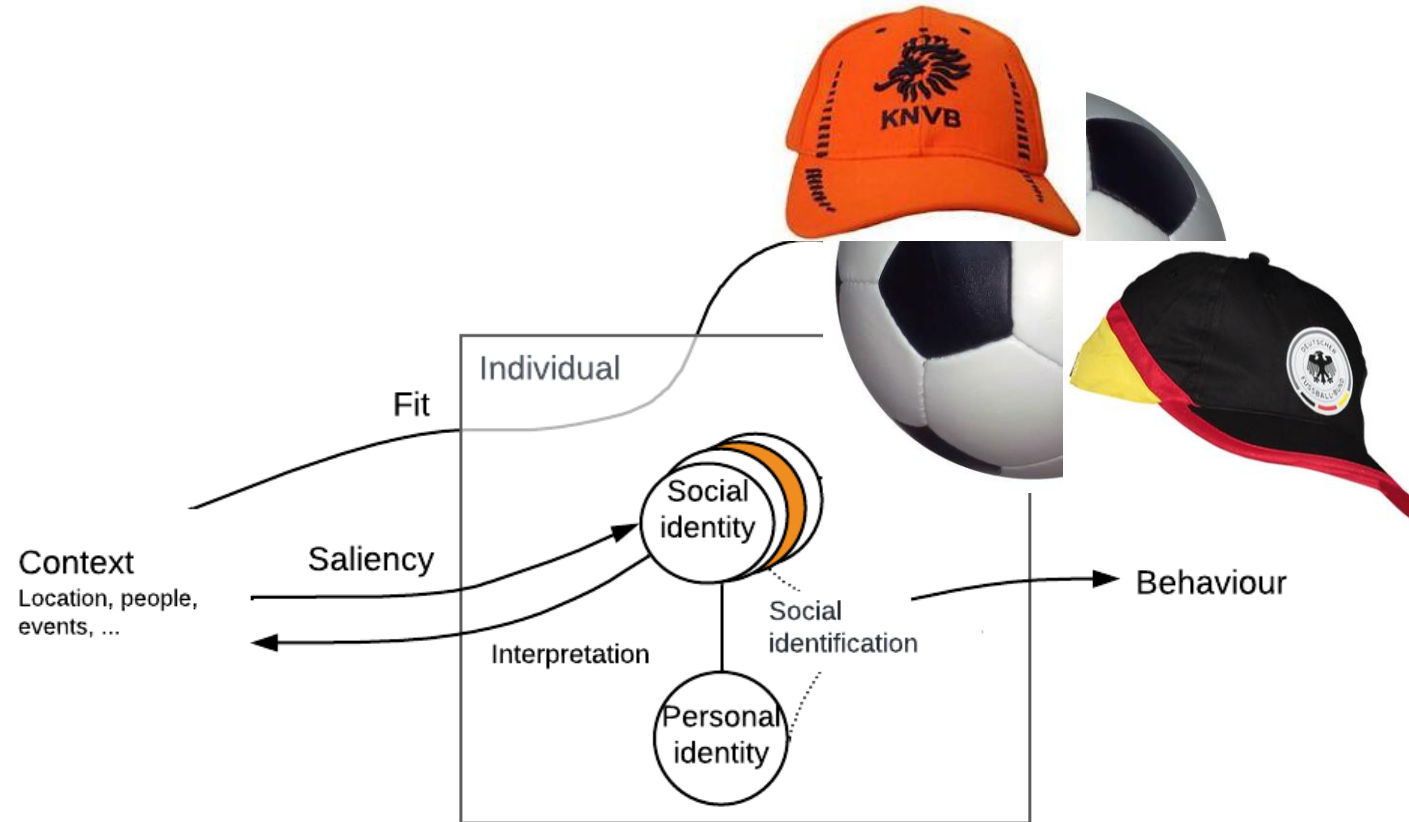
- “Embodied theory”
- Mix & match possible and common

Data driven approach:
qualitative data to inspire
decision rules

Quantitative data

- Assumptions/hypothesis
- Calibrate/set parameters

Situated behaviour: Social Identity approach (SIA)



Tajfel et al. (1979)

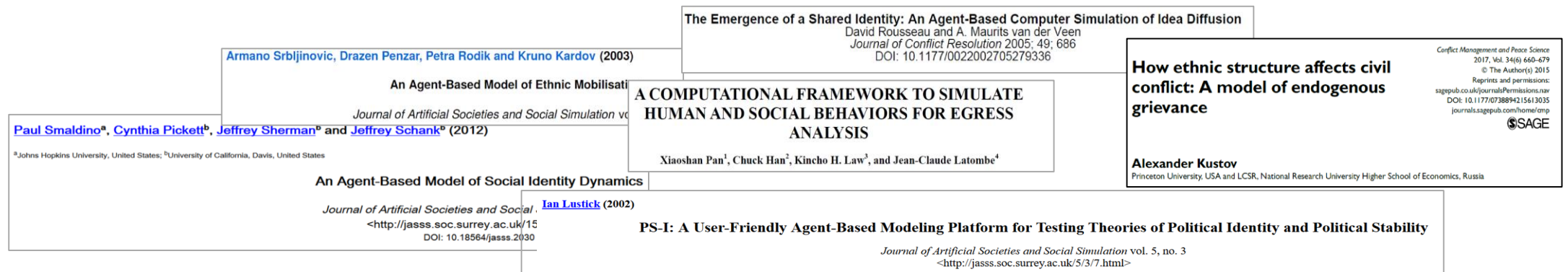
Figure: adapted from Wijermans & Scholz. Social Simulation Week (2020)

Social Identity in Agent-based Models: A Systematic Review

Geeske Scholz, Nanda Wijermans, Rocco Paolillo, Torsten Masson, Martin Neumann, Émile Chappin, Anne Templeton, Geo Kocheril

- Level of formalization not as far as we expected, no default formalisations
- Conceptual ambiguity in SIA which can be observed in the different interpretations
- The nitty gritty is hard to understand

If you didn't formalize, you didn't theorize



Ways forward

CO-MODELLING

IMPROVING THEORY SELECTION AND FORMALIZATION

Co-Modelling

- Modelling as social science method (participatory modelling, companion modelling, group model building)
- Avoid working in silos
- Team science
- Provide space and resources for discomfort and continuous discussion

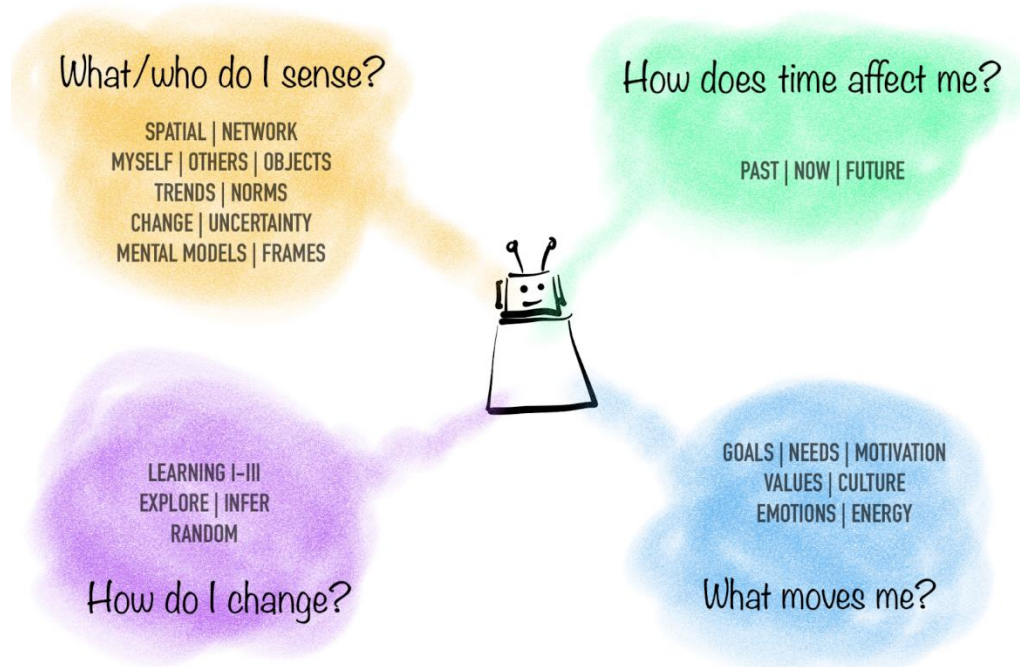
Improve modelling standards

- Theory in models
 - Selecting theories: learning from psychology
 - Formalizing theories: on the way to building blocks
 - Modelling: application cases, *inverse modelling*
- *Identifying relevant behaviour, intervention options, policy advice*

1. How to find and select a theory?

- Agent demand side

- Supply side: social science theories



- Collaboration with Dr. Marie Kogler: taking stock of theories used in social simulation
- How do we decide on theory? Workshop and focus groups

Wijermans et al. (in preparation). „Cognition in the Agent: the Elephant in the Room”

2. Formalizing social science theory

SIAM network: Contribute towards formalizing the social identity approach for the use in agent-based models

- Systematic review
- Special issue in JASSS
- Team science:

Wijermans, N., Scholz, G., Paolillo, R., Schröder, T., Chappin, E., Craig, T., & Templeton, A. Models in Social Psychology and Agent-Based Social simulation—an interdisciplinary conversation on similarities and differences.



SIAM-SIG: Special interest group of the European Social Simulation Association

- Open to everybody

<https://www.siam-network.online/>

3. Model

- Justify rule base (theory choice & formalization)
- Test structural validity
- IGSS: inverse generative social science

To sum up: *long way to go, better go together*

- 4 PhD positions starting on behaviour in models within the next 6 months



Thank you for your attention

G.Scholz@TUDelft.nl