

A (Very Short) Guide to ABM (and Qualitative Data)

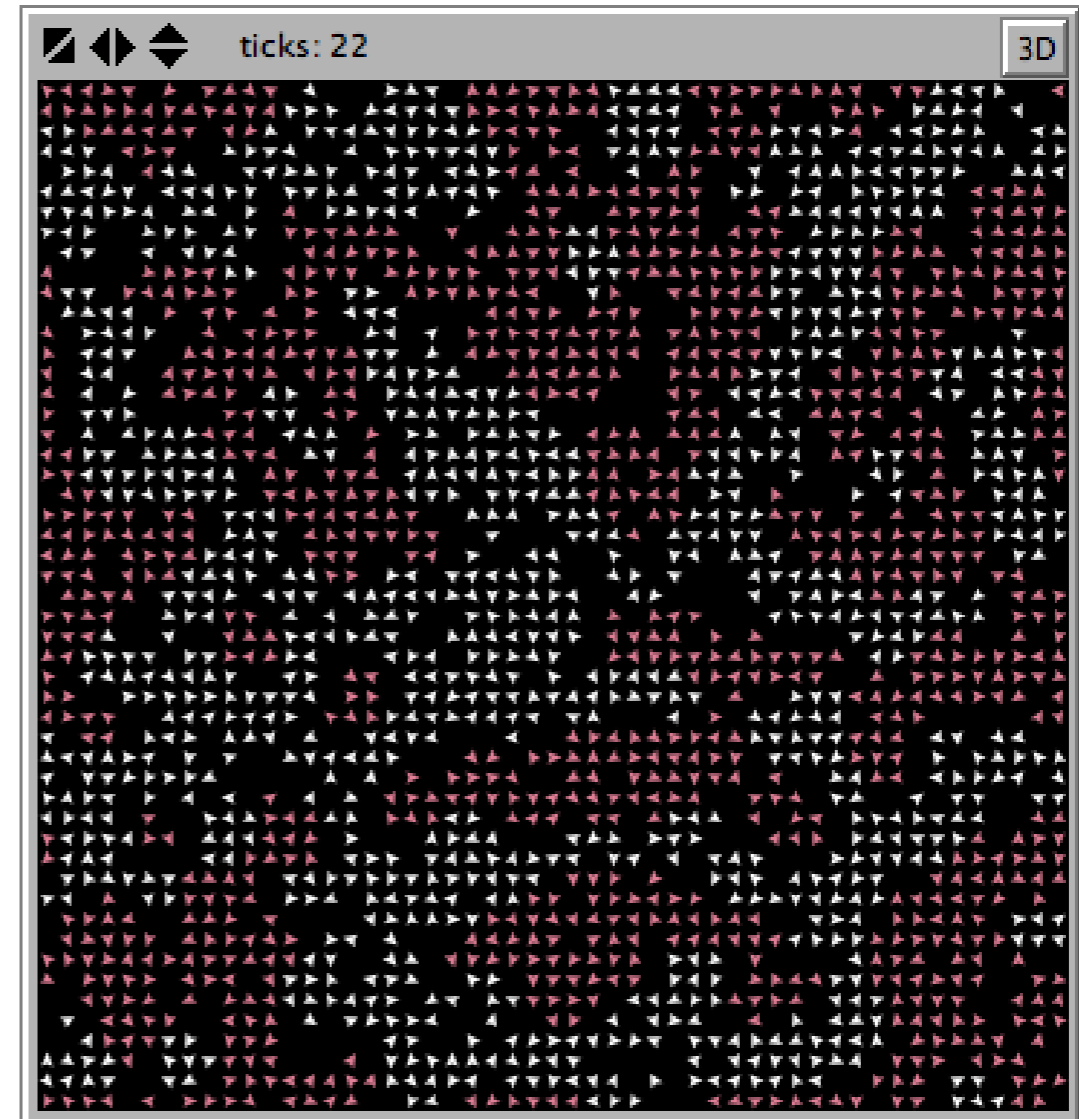
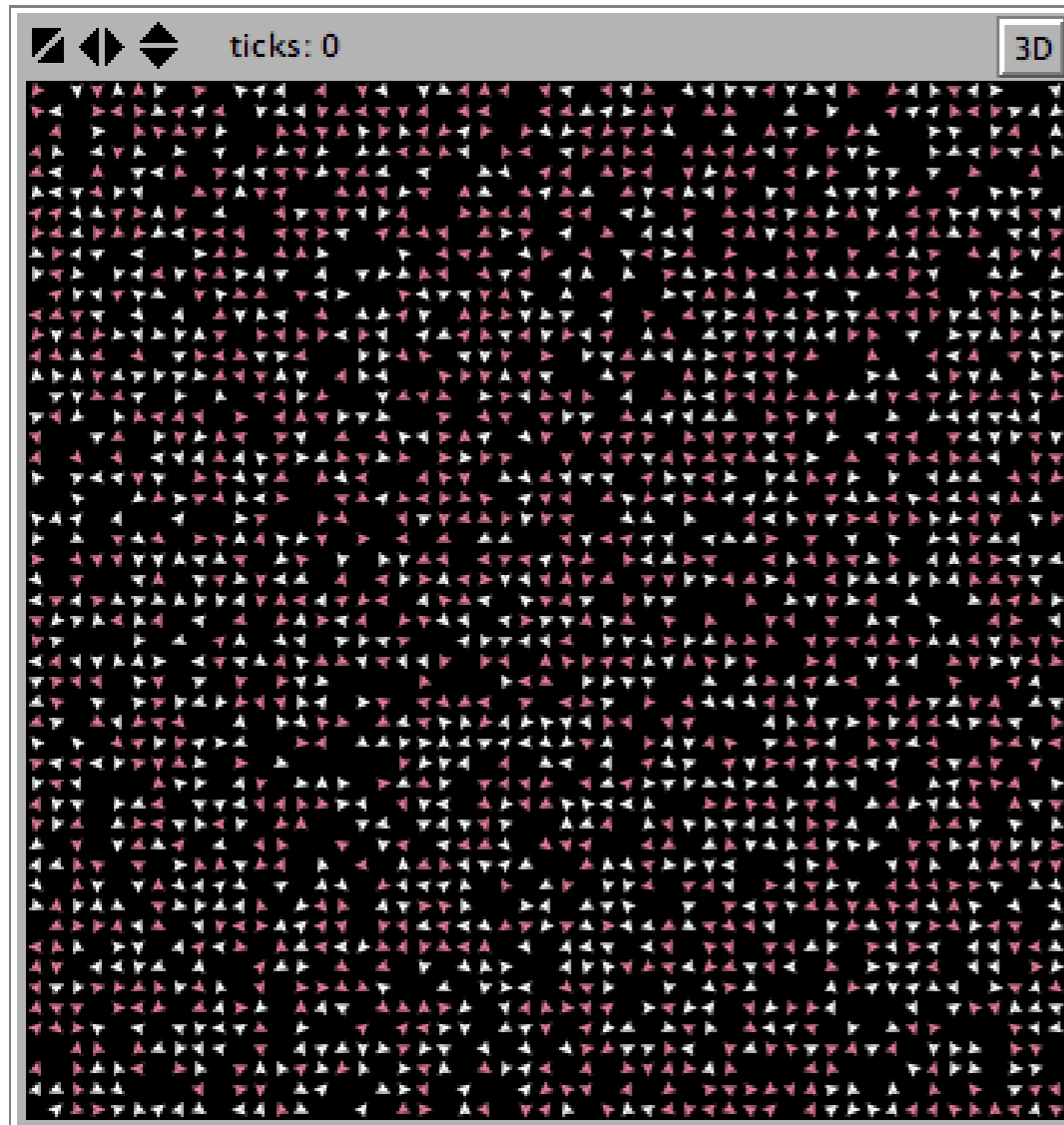
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A microcosm: The Schelling model

- I'm **not** presenting this because it represents social reality but it is easy to explain and gives good access to important issues.
- “Agents” live on a square grid so each has maximum 8 neighbours.
- There are two “types” of agents (pink and white) and some grid spaces are vacant. Initially agents/vacancies are distributed randomly.
- All agents decide what to do in the **same very simple** way.
- Each agent has a preferred proportion (PP) of neighbours of its own kind (0.5 PP means you want at least half your neighbours to be your own kind - but you would accept all of them i. e. PP is *minimum*.) Vacant grid spaces “don't count” which is why the PP is a fraction not a number.
- If an agent is in a position that satisfies its PP then it does nothing otherwise it moves to a vacancy chosen at random.

In other words ... not!



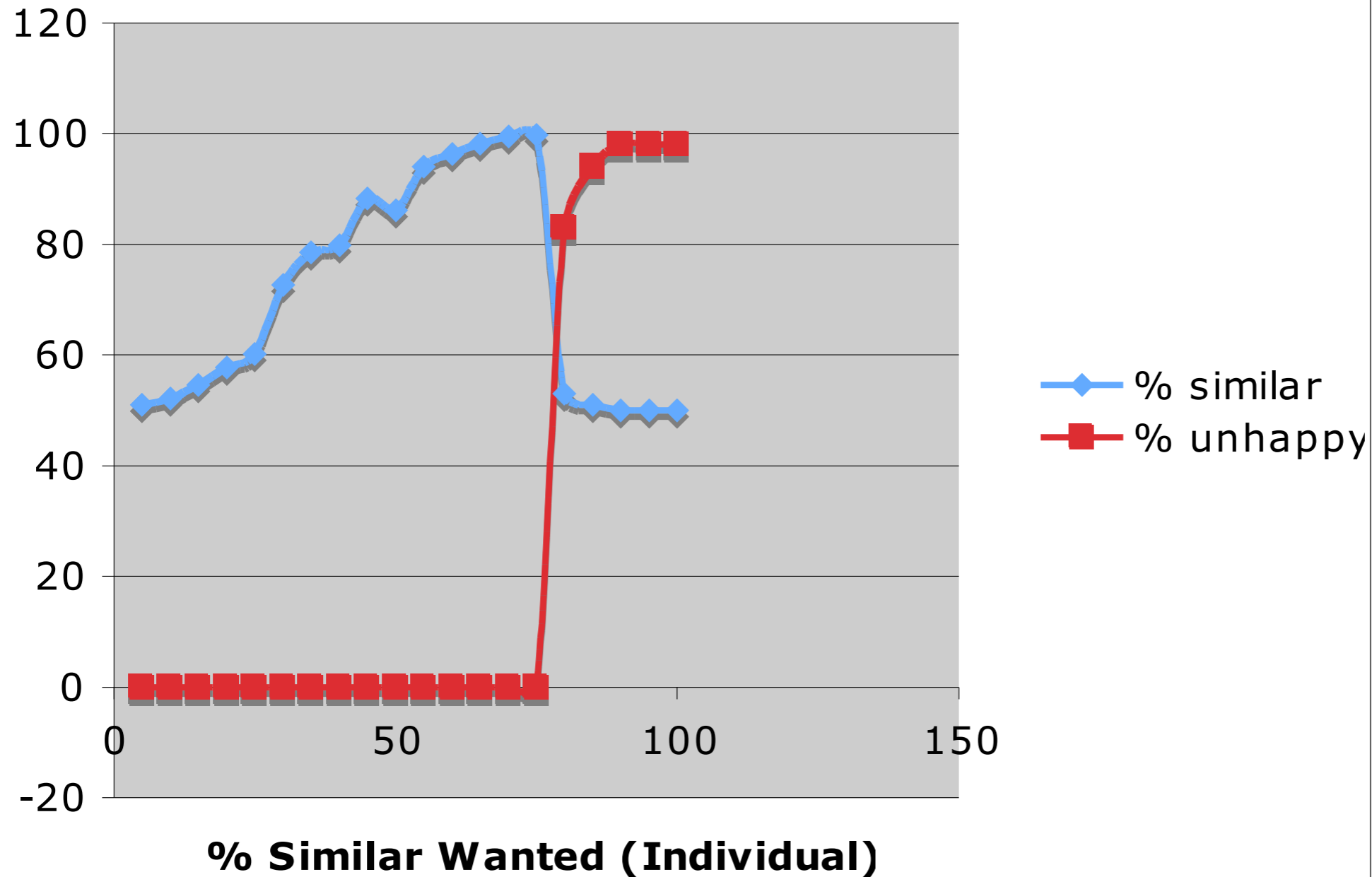
NetLogo: Free, cross platform, comes with a models library (including this) that will “click and go”.

So what?

- What is the lowest PP that will produce clusters?
- What happens when $PP=1$?
- If it hard to see what a model this simple does, imagine trying to do it with one that is “realistically” complicated.

Non-linear systems

Individual Desires and Collective Outcomes

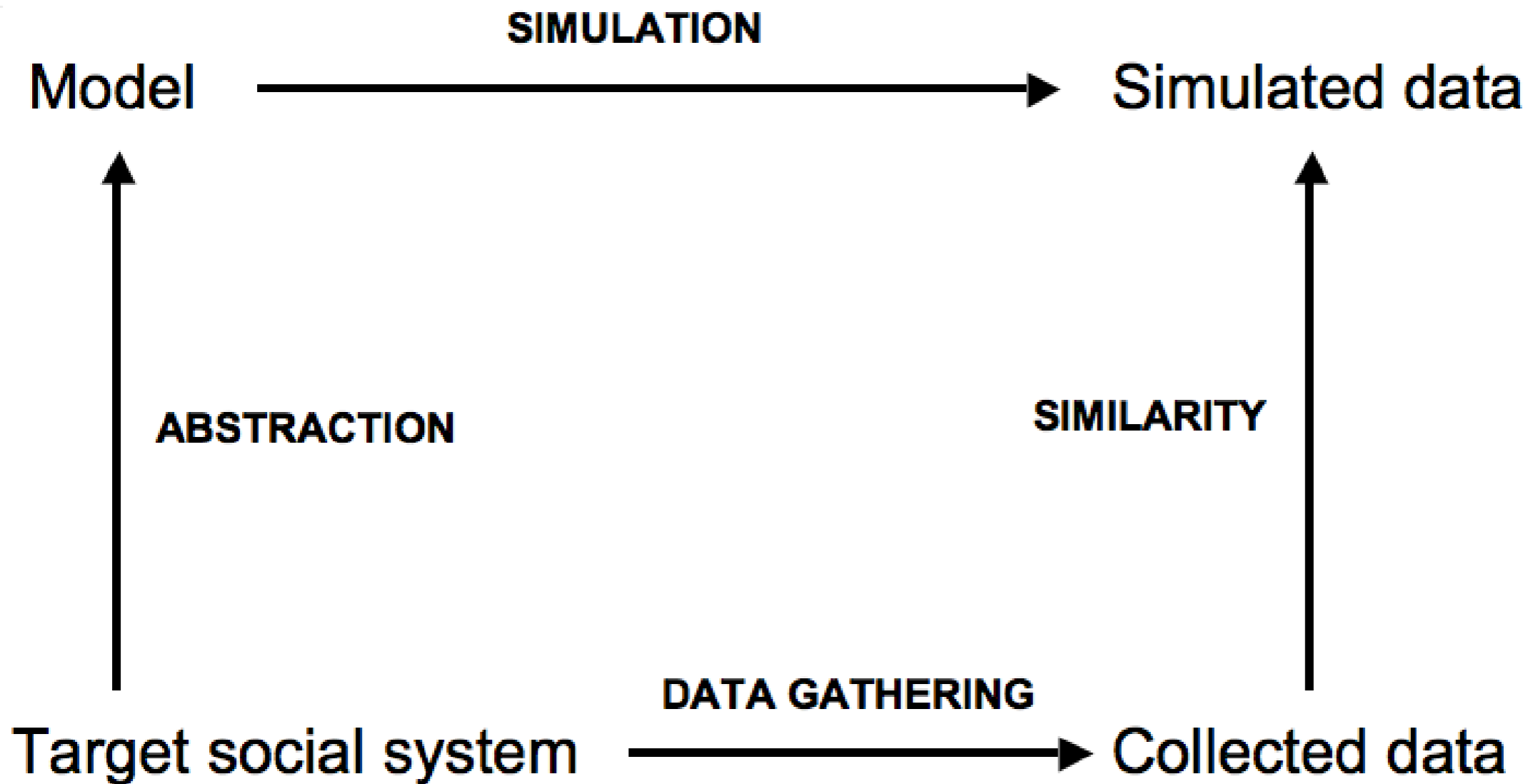


In other words, linear quantitative research reductionism is hazardous. So is qualitative research generalisation : Consider driver decisions and traffic jams.

Let's back up

- How would we find out how agents make moving decisions?
- How would we compare simulated and residential segregation?
- Imagine if we could get qualitative and quantitative data into the same model.

The “Gilbert and Troitzsch box”



Qualitative challenges

- Has qualitative research lost its taste for theory building? What is theory? Communication generally.
- When to ask? (Drive rounds, firefighter cameras, flight simulators, recording paired decision.)
- Framework risks: Is decision mostly habitual, mostly learned, mostly rational and have we *really* proved this? TAYDRYAMATOTWDYI! When you ASS U ME ...
- How do we “observe” environments? (Subjective route maps, counterfactual questions.)
- Can we do anything useful with the *evolution* of decision processes?

ABM Challenges [Ask?]

- Lots of technical problems but we are working on them.
- If you can't define the boundaries of a system you can't model it: TOE (“theory of everything”) problem and exogeneity (rain).
- You have to abstract (a map as big as the world is no use) but this can be done well or badly.
- Systems with very simple are not suitable for ABM: The “best” way to model a straight line is a regression model.
- Unless you have *independent* evidence for micro process an ABM is just the world's least convincing (because least parsimonious) statistical model. Not model fitting.
- You have to assess similarity in a way that distinguishes competing theories. The more complicated your model the more (and more kinds) of data you need to disprove it.
- Problem of novelty: How to make use of existing knowledge.
- Cultural issues.

Conclusions

- This is a distinctive approach to building theories in social science.
- Like any other approach, it has to be “done right” to deliver its benefits.
- It seems particularly appropriate to “problem centred” research which wants to incorporate the expertise of very different kinds of scientists.
- It is now possible to understand this method much more easily than in the past.
- We can see the (new) road ahead but we haven’t got far down it yet.

Now what?

- NetLogo: <<http://ccl.northwestern.edu/netlogo/>>.
- *Simulation for the Social Scientist*, 2nd edition, 2005, Gilbert/Troitzsch. [Don't get first edition, not in NL!]
- *Agent-Based Models*, 2007, Gilbert.
- Journal of Artificial Societies and Social Simulation (JASSS): <<http://jasss.soc.surrey.ac.uk/JASSS.html>>. [Free online, interdisciplinary and peer reviewed.]
- simsoc (email discussion group for the social simulation community): <<https://www.jiscmail.ac.uk/cgi-bin/webadmin?A0=SIMSOC>>.