

Some Difficulties with Causation

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Why talk about causation

- Ideas of causation or causal description lie behind both ABM and QCA
- However, they have different versions:
 - In ABM it is programmed in and you see/analyse the effects of these
 - In QCA you get a logical description of the outcome in terms of the conditions
- Usually a standard version of what is meant by causation *is assumed*, it “comes with” the tool
- Here I look at the idea of causation and some of the variants/difficulties with it



A Causal Explanation is a Model

- When we talk about “causation” we talk about properties of our model of reality
- ...it is **not** directly about reality itself
- Though, *in some circumstances*, the model is **so** good it is safe to conflate the two
- Here I look at some of the differences
- Thus there are different versions of causation, and so different (causal) models of your model (of reality)

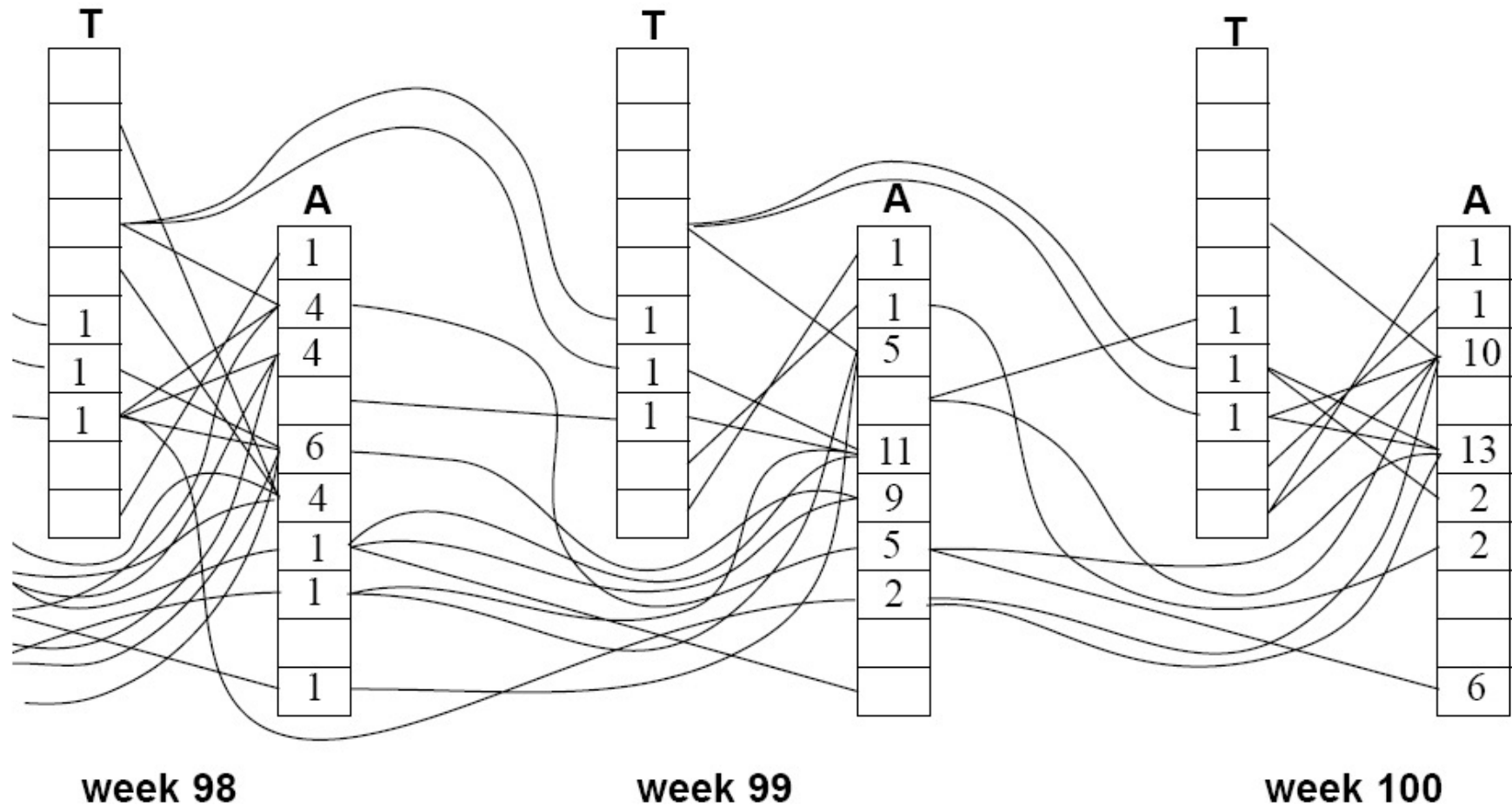


Why did Fred break his leg?

- He was distracted and so tripped
- He caught his foot on an uneven pavement
- His bones were brittle due to a vitamin-D deficiency
- Fred was clumsy due to stage of life
- It was dark
- Fred was not familiar with this route, because he was going to a job interview
- Fred was short-sighted due to his genes
- Etc. etc.



Causal Complexity in an ABM



Lines indicate causal link in behaviour over time, each box an agent's talk or action decision (Edmonds 1999)

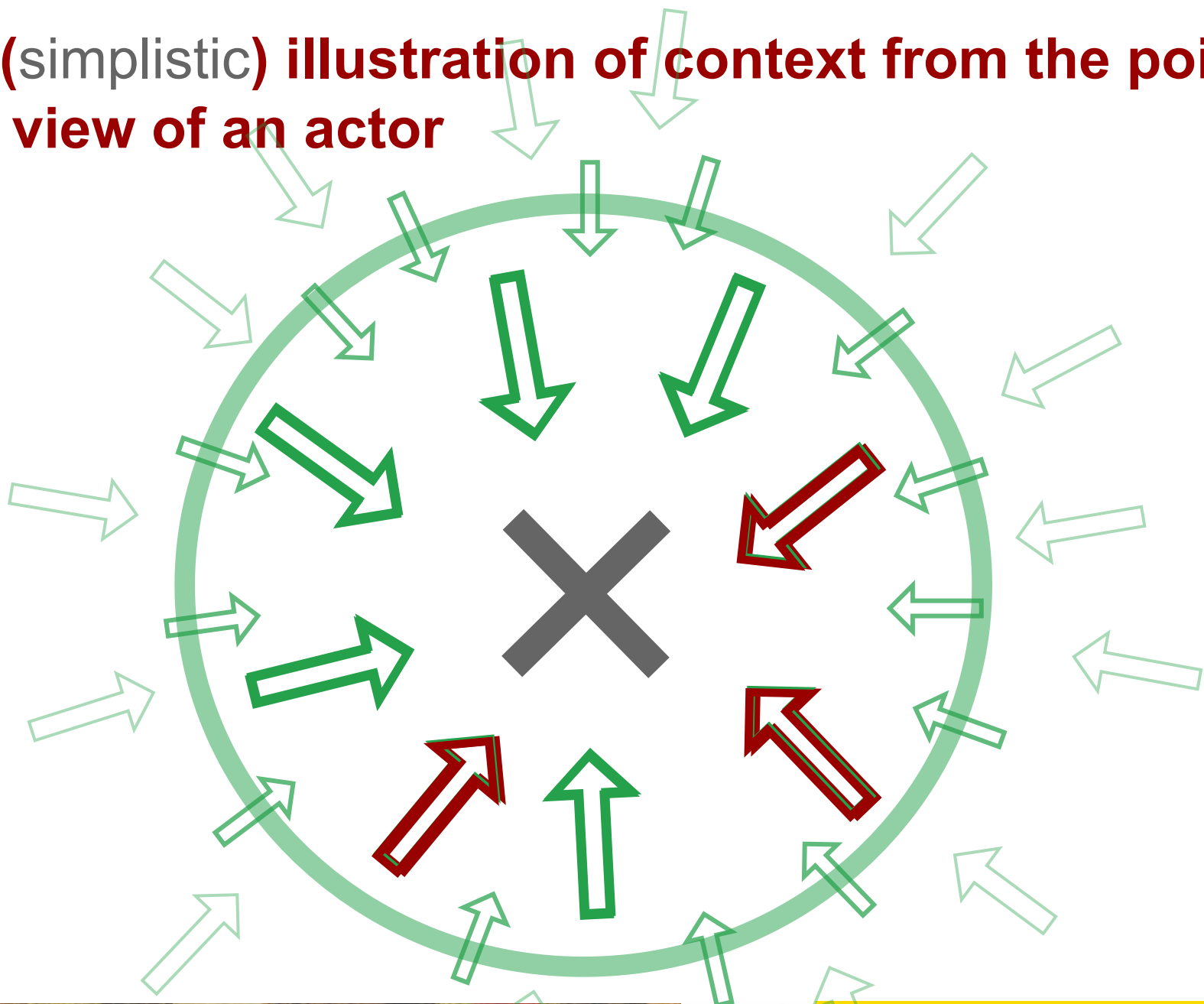


Causal Spread

- Causal Spread (or “wild disjunction”) when there are an indefinite number of causal paths when you trace back from any event
- Such a situation goes against the assumptions of most causal inference techniques, *because they start with a finite number of possibilities*
- So what can one do?



A (simplistic) illustration of context from the point of view of an actor



The Context *Heuristic*

- Divide the world into different sorts of situation (hereafter called a *context*)
- Learn/recognise these contexts in a rich and “fuzzy” manner
- “Crisp” knowledge is “packaged” “within” such contexts for reasoning, update etc.
- Makes within-context reasoning, models, update etc. more feasible
- Whilst each model has limited scope, together they might cover more ground, albeit in a more “patchy” manner



Context and Causality

- In almost all situations (and *all* social situations) there are an unlimited number of things that ***could*** be attributed as a cause
- Without a limitation as to the scope ***causation makes no sense***
- However given a context there are many factors that can be assumed to be insignificantly relevant and/or constant – it reduces scope (but implicitly)
- Causality makes sense ***given a context***, since the context excludes most factors



In ABM

- One can only indirectly infer about causation (because this is what you put in)
- Some implicit assumptions (due to context) become apparent during its construction
- But contextual assumptions may limit comparison of results and data
- Can explicitly trace ‘the cause’ of any event inside a simulation, but then this needs to be edited for relevance and comprehension
- Understanding emergent causal pathways in simulation runs can be hard



In QCA

- Directly infers a causal set description from reduced data
- But framing (context) and interpretation needs care around the technique
- Might miss an important condition in data which can make results misleading
- Inference is clear and checkable
- Resultant causal descriptions are essentially static



Both are based on classical logic...

- ...in Boolean or fuzzy variants
- These logics are very abstract in terms of inference (\rightarrow) or negation (\neg)
- Too strong to capture notions of Belief, Evidence, Knowledge, Proof etc. well
- There are other formal logics/inference systems that do these better
- This may effect what 'causes' are inferred or traced



Challenges from Context and Complexity

How can we actively combine/use tools such as ABM & QCA to...

1. To explore/map out/better document contextual limitations? (e.g. of data, assumptions, etc.)
2. How do we deal with complex systems with causal spread, without 'hairball' models (everything effects everything a bit in an undistinguished way)?



Othering and Polarisation

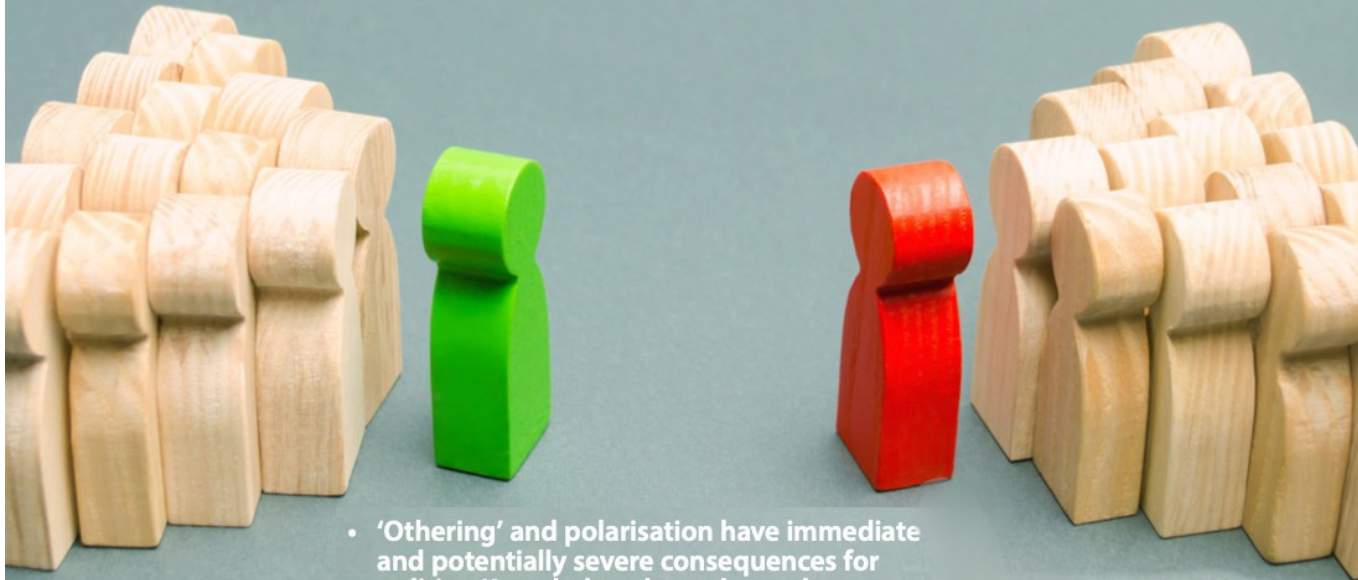
Workshop @Snellius

15 - 19 August 2022, Leiden, the Netherlands

Scientific Organizers

- Bruce Edmonds, Manchester Metropolitan University
- Julia Eberlen, Université libre de Bruxelles
- Geeske Scholz, Universität Osnabrück
- Wander Jager, University of Groningen
- Rocco Paolillo, University of Bremen

**Expressions of
Interest by
15th May!**



- 'Othering' and polarisation have immediate and potentially severe consequences for politics. Knowledge about these phenomena are splintered across many disciplines. This workshop will start to bring together researchers from many disciplines in order to build up a more complete and nuanced understanding.