A Complex Model of Voter Turnout

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This research was done as part of the "**Social Complexity of Immigration and Diversity**" project (http://cfpm.org/scid) by

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SCID — THE SOCIAL COMPLEXITY OF IMMIGRATION AND DIVERSITY

EPSRC — Engineering and Physical Sciences Research Council

Populism and Civic Engagement

Credits

- **KISS**: Models that are simple enough to understand and check (rigour) are difficult to directly relate to both macro data and micro evidence (*lack of* relevance)

- **KIDS**: Models that capture the critical aspects of social interaction (relevance) will be too complex and slow to understand and thoroughly check (*lack of* rigour)

- But we need ***both*** *rigour* and *relevance*

- Mature science connects empirical fit and explanation from micro-level (explanatory and phenomenological models)

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- To *stage abstraction* with an intermediate, complex model, that is then, *itself*, modelled
- The Data Integration Model (DIM) includes all that is deemed relevant by social scientists
- The simpler models of the DIM are developed by formal scientists but validated against the DIM

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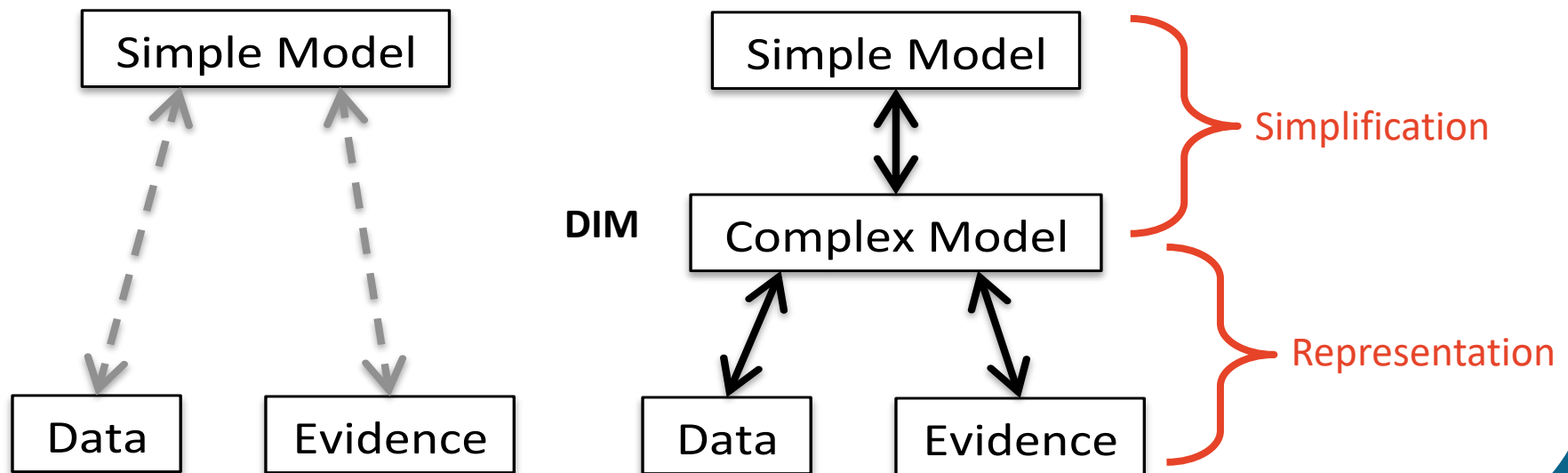
- *Firstly*, as a descriptive model – integrating a variety of pieces of evidence to produce a coherent picture

- *Secondly*, as a counter-example to a commonly held assumption (that mobilisation can cause a cascade of interest in the electorate)

- *Thirdly*, to suggest some reasons why mobilisation was not effective

Purpose of Model

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Edmonds, B., Lessard-Phillips, L. and Fieldhouse, E. (2014). A Complex Model of Voter Turnout. CoMSES Computational Model Library.
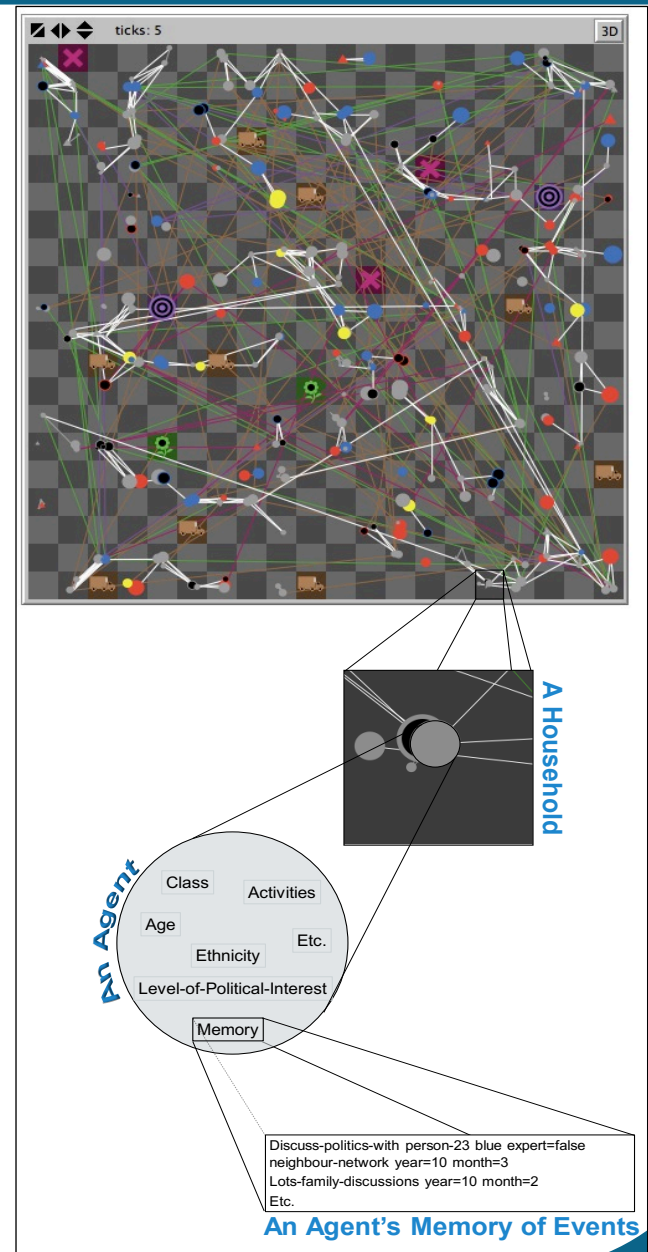
http://www.openabm.org/model/4368

Underlying data about population composition

Demographics of people in households

Social network formation and maintenance (homophily)

Influence via social networks
• Political discussions

Voting Behaviour

A Household

An Agent
Class   Activities
Age   Etc.
Ethnicity
Level-of-Political-Interest
Memory

Discuss-politics-with person-23 blue expert=false
neighbour-network year=10 month=3
Lots-family-discussions year=10 month=2
Etc.

An Agent's Memory of Events

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# A Complex Model of Voter Behaviour

2D grid of locations each of which has either a: household, work place, school, activity 1 centre, activity 2 centre, or empty

People in household going through lifecycle according to the timescale: 1945-2010 (birth, death, migration, partnering, separation, moving out. etc.)

Social network made of: intra-household links, shared activity membership (schools, work, religion, etc.), "friendship" links

Influence occurs over the social network contingent on the state of those involved
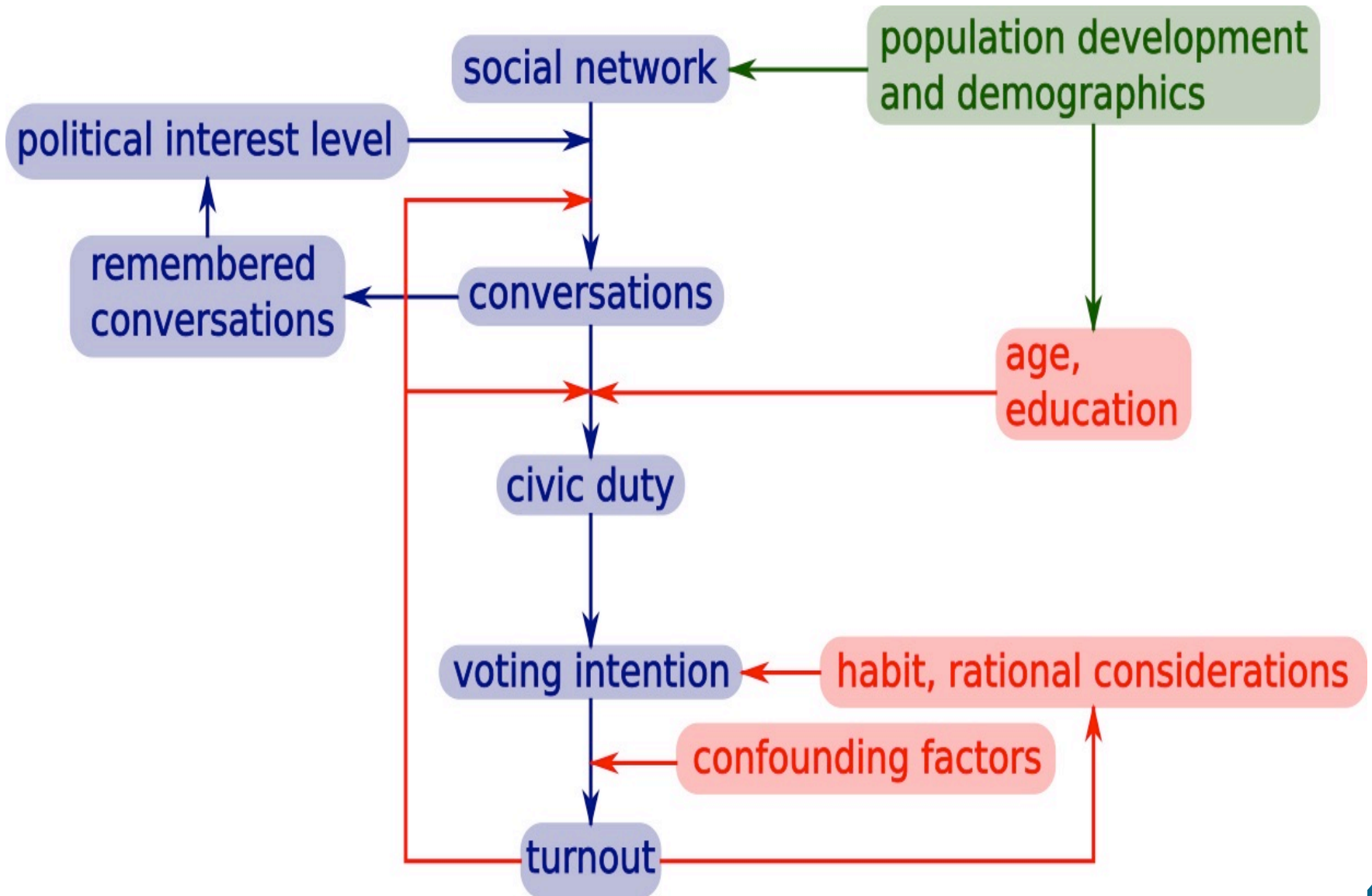
Some of the (micro-level) causation

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A very complex model, so we can only give a flavour of its behaviour here

Each individual run was not deterministic – if you ran the simulation with same parameters again, you could get different results

For some settings you get a bimodal results – the turnout can be stuck in low or higher regimes

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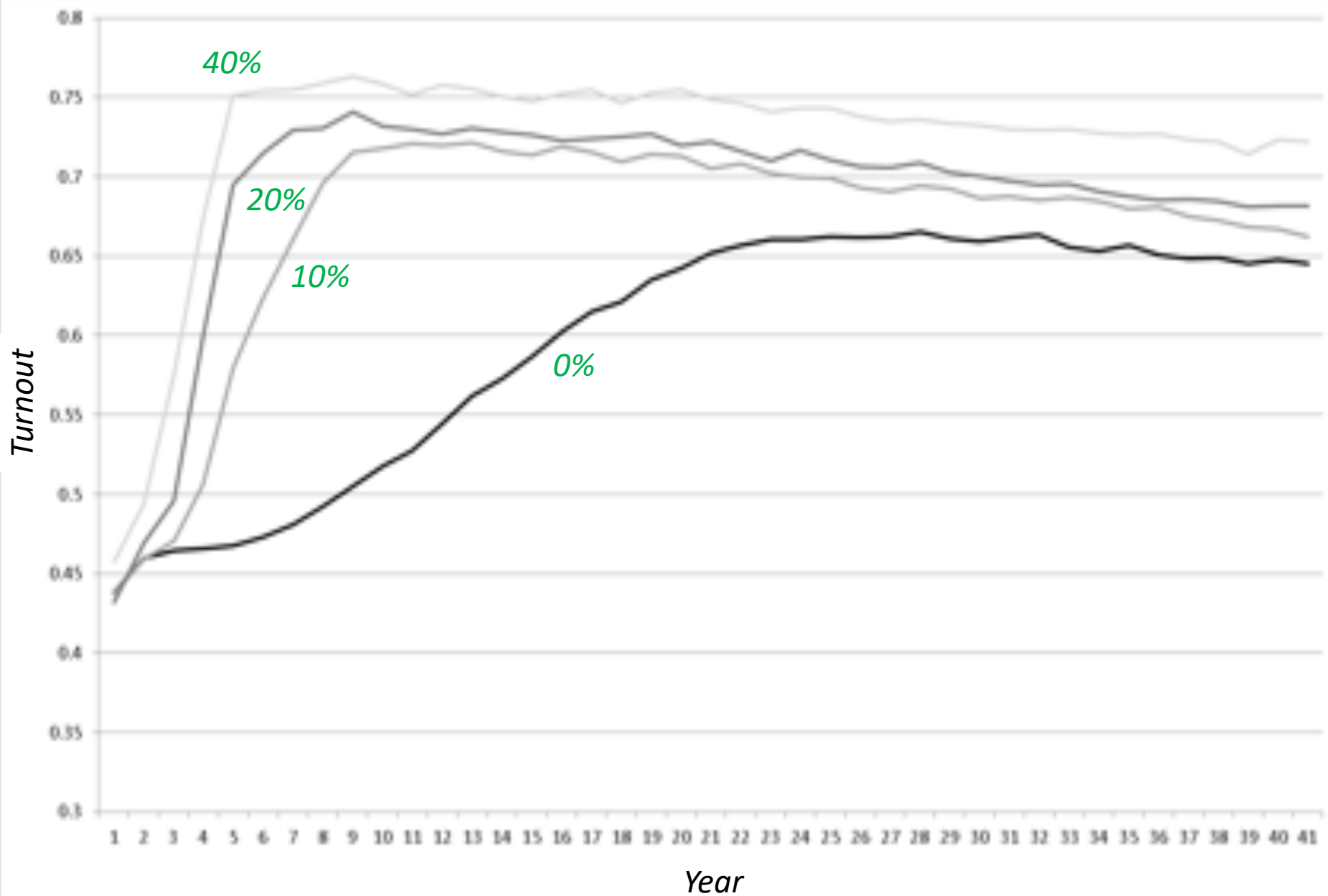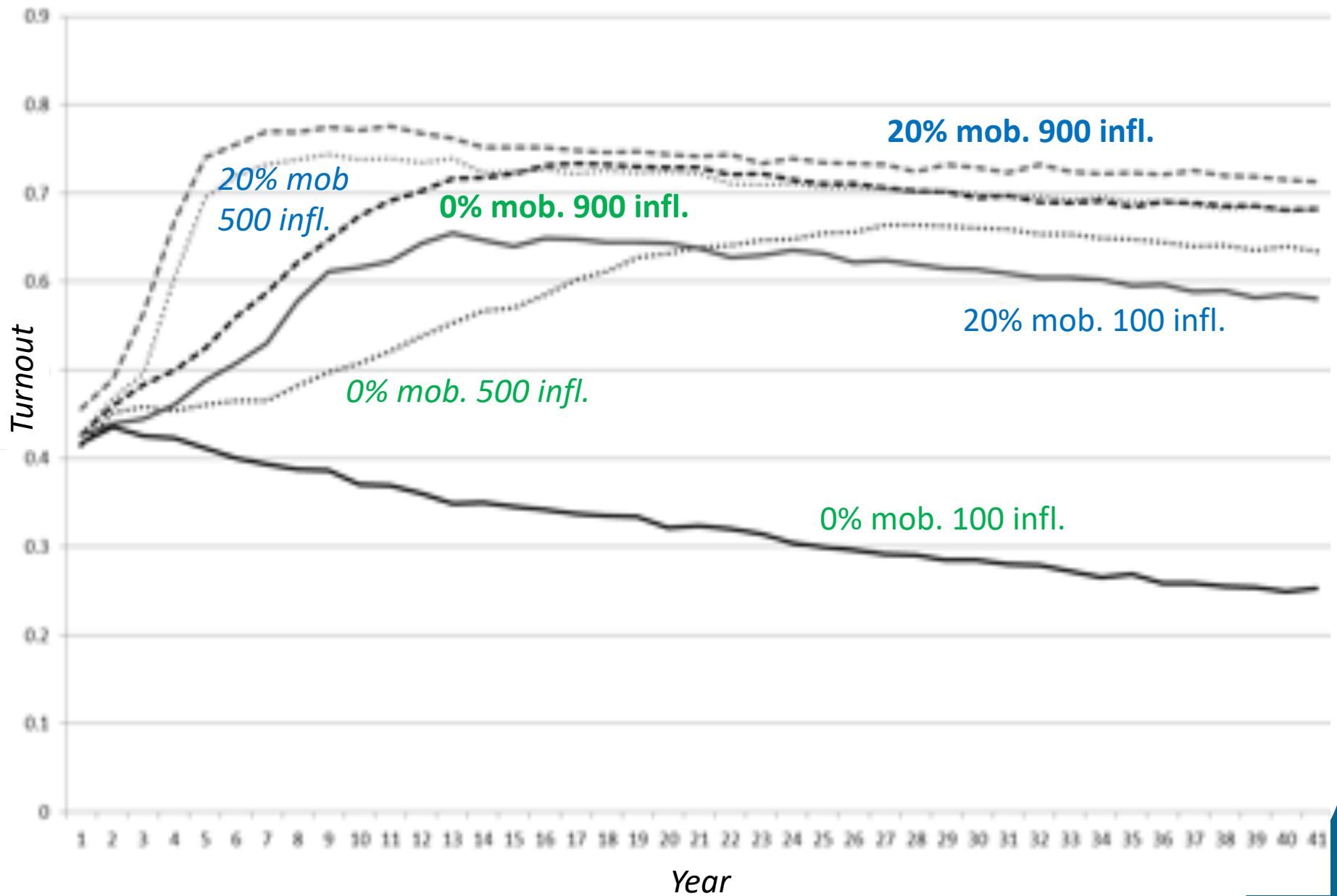Individual runs can be in low or high turnout regimes
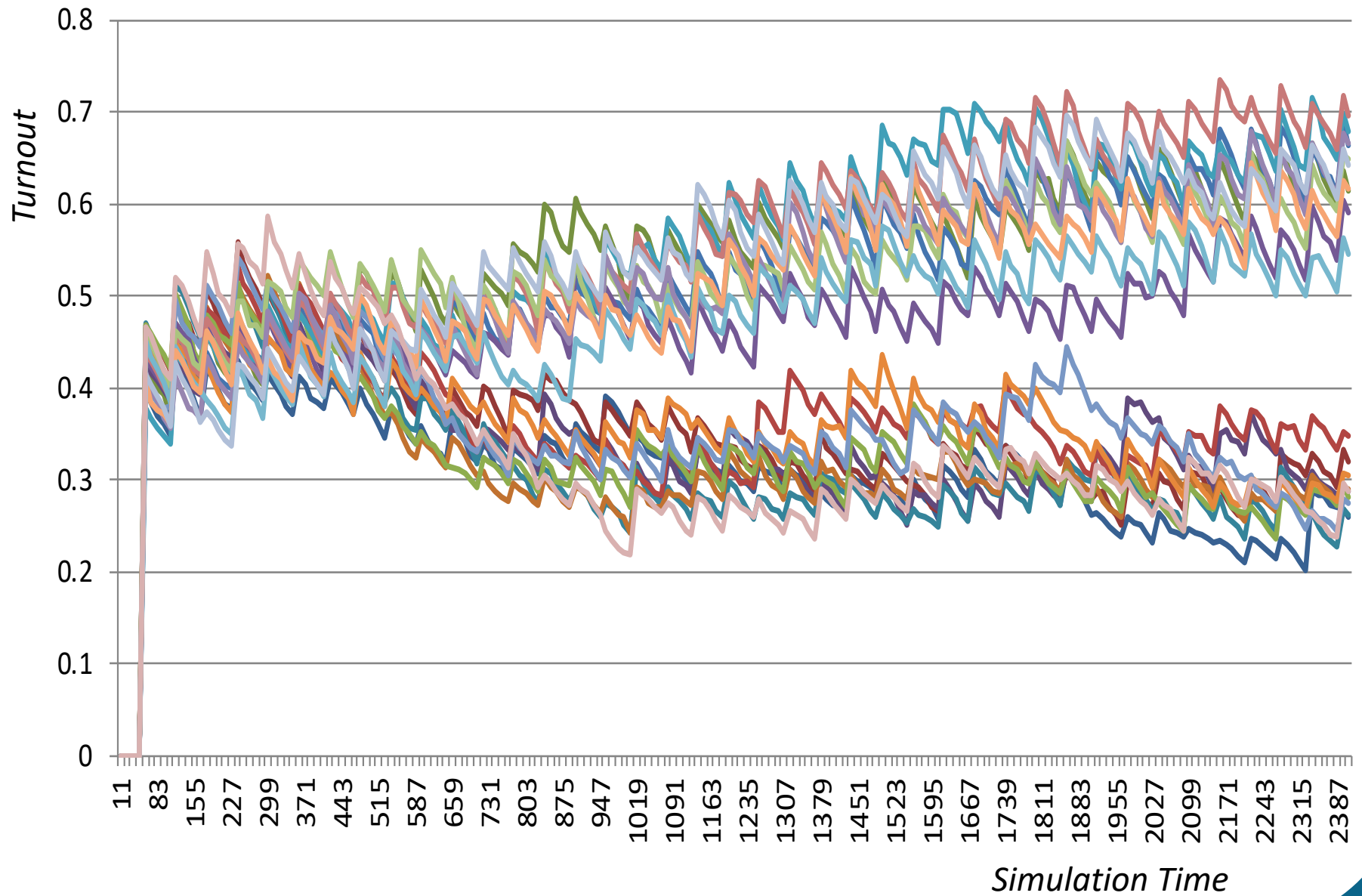
Next results are averages over many runs with the same settings to see overall trends – so they *appear* smooth
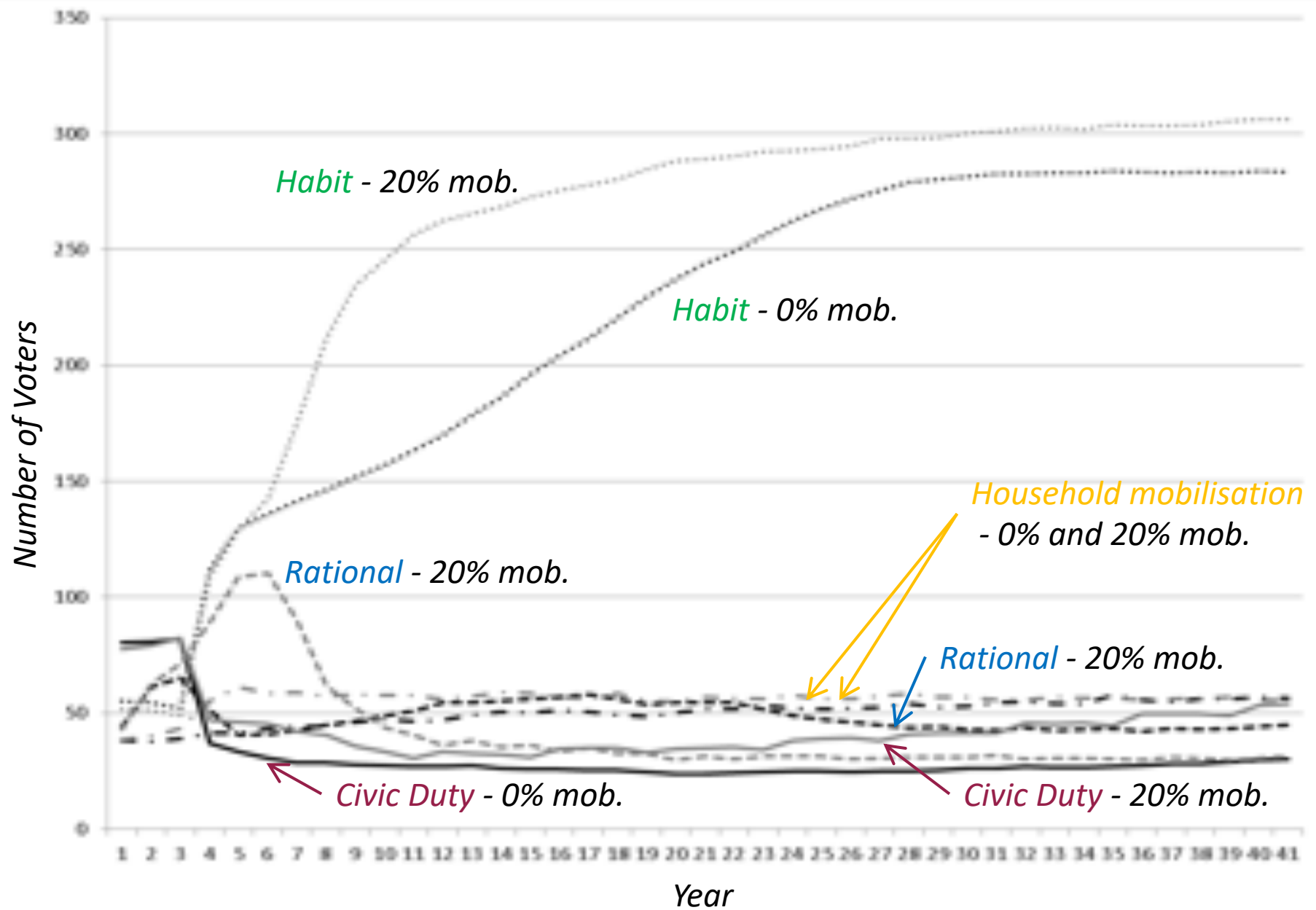
The political scientists were interested in the effect of different levels of mobilisation (parties phoning or visiting voters to try and persuade them to vote)
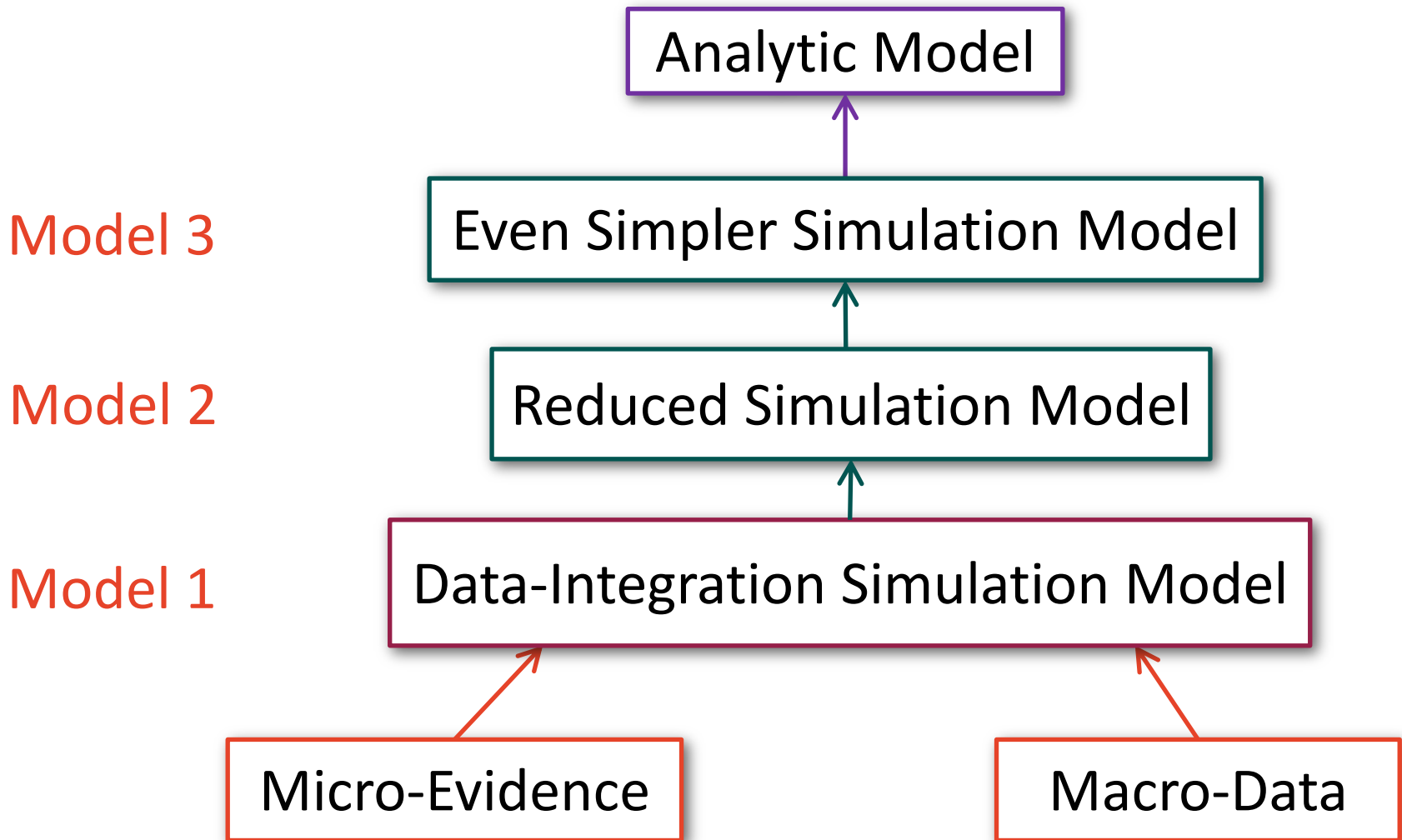
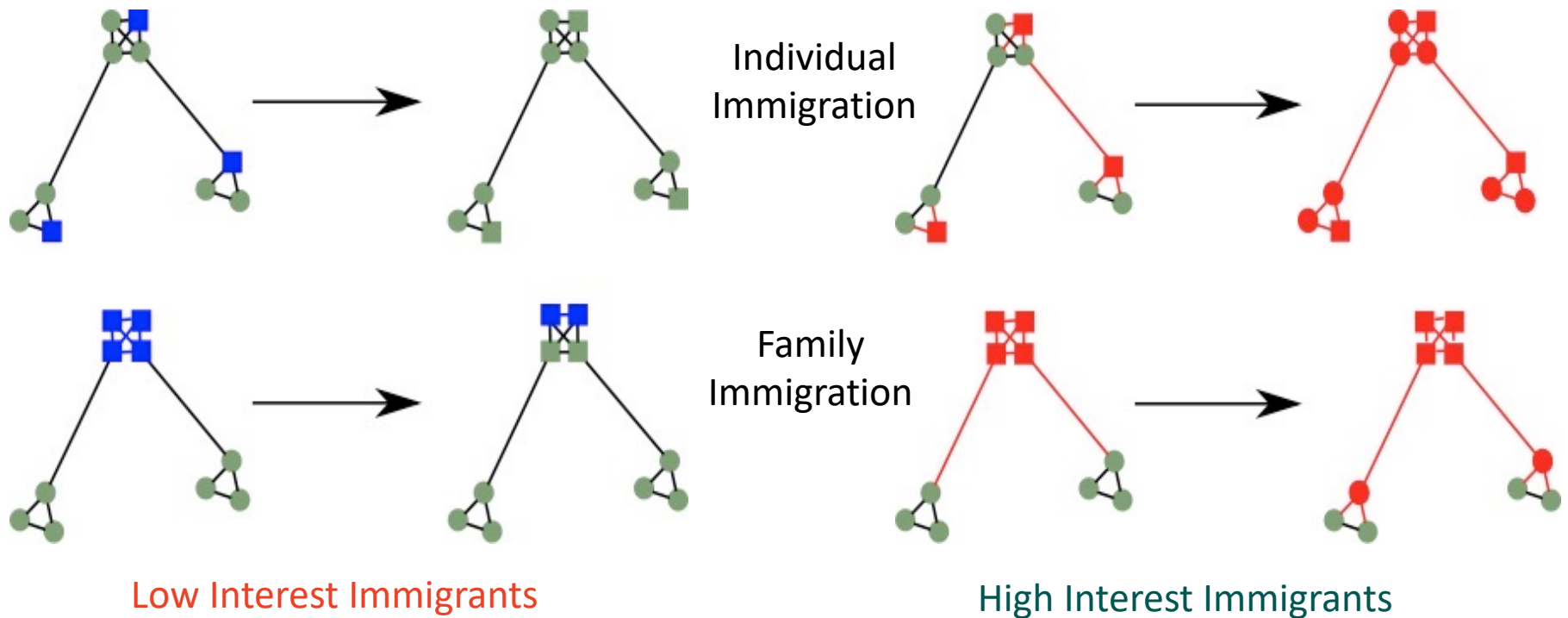Wanted to know the possible impact of this compared to person-person social influence

Average turnout with different levels of party mobilisation

How amount of discussion affects turnout

Explaining the turnout for two levels of party mobilisation

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Analytic Model

Model 3 — Even Simpler Simulation Model

Model 2 — Reduced Simulation Model

Model 1 — Data-Integration Simulation Model

Micro-Evidence

Macro-Data

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More staging of abstraction…

Individual Immigration

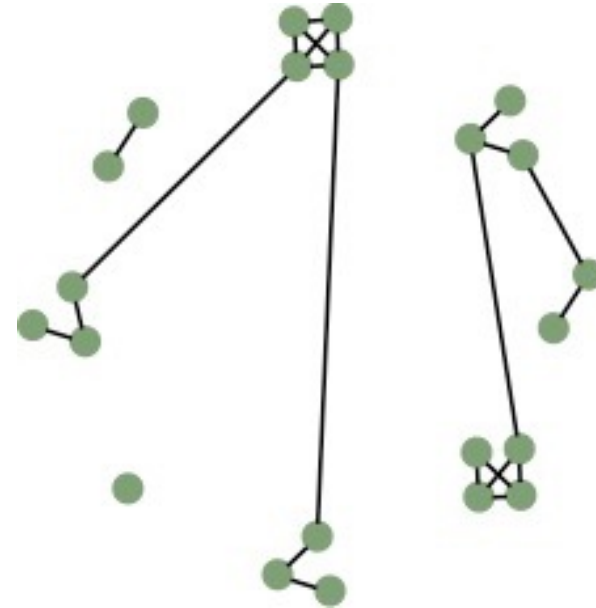Family Immigration

Low Interest Immigrants

High Interest Immigrants

With immigrants of either a lower or higher political interest than natives, individual immigration resulted in higher level of turnout than household immigration, due to asymmetry of influence process

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Individual vs. Household Immigration
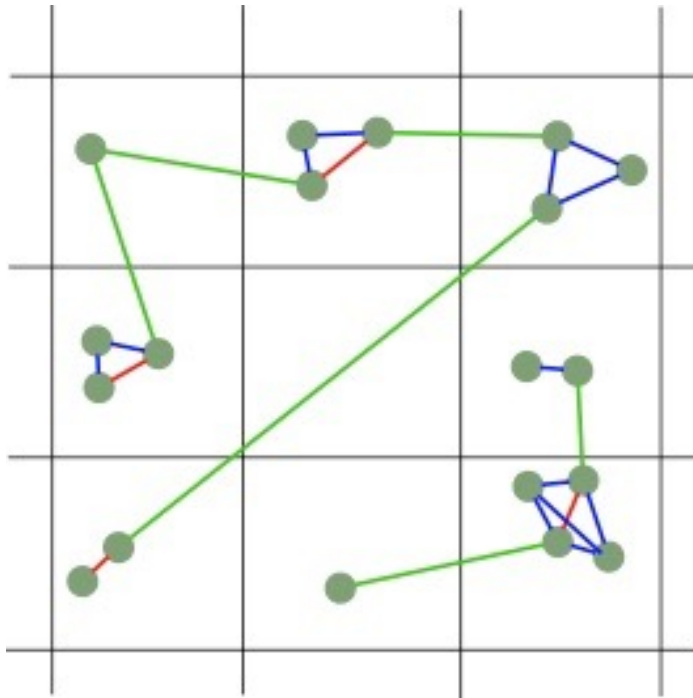
Network in DIM   Synthetic Network

A synthetic network that is composed of small groups with some random inter-group connections resulted in better fit of dynamics

Kinds of Network

Model 1:

Fieldhouse, E., Lessard-Phillips, L. & Edmonds, B. (2016) Cascade or echo chamber? A complex agent-based simulation of voter turnout. *Party Politics*. 22(2):241-256. DOI:10.1177/1354068815605671

Model 1 → 2:

Lafuerza LF, Dyson L, Edmonds B, & McKane AJ (2016) Staged Models for Interdisciplinary Research. *PLoS ONE*, 11(6): e0157261. DOI:10.1371/journal.pone.0157261 (A better formatted version is at: http://arxiv.org/abs/1604.00903)

Model 2 → 3 → Analytic:

Lafuerza, LF, Dyson, L, Edmonds, B & McKane, AJ (2016) Simplification and analysis of a model of social interaction in voting, *European Physical Journal B*, 89:159. DOI:10.1140/epjb/e2016-70062-2

References

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Thank you!

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