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DEPARTMENT OF SOCIOLOGY

Un Drôle De Type: The Schelling Model, Calibration, Specification, Validation and Using Relevant Data

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1. Introduction

- Reculer pour mieux sauter?
- Conceptual clarification: “Specification”.
- Conceptual clarification: Agent heterogeneity.
- A connection to qualitative data/analysis.

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2. This may not help but …

- I am not saying that all ABM should be empirical (at least not **here** … snigger).
- I am not saying that the Schelling model is (or should be) empirical (at all).
- The Schelling model is one we all know and is **very** simple so we can't get confused.

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3. Concepts and labels

- The concepts I want to talk about are very simple (and almost certainly not original).
- But the confusion of **labels** has, I believe, obscured the importance of a concept that we really need.
- What counts here is what we do in our modelling and not arguing about definitions.

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4. Calibration, validation and …

- Empirical ABM are basically about “mapping” real and simulated data.
- **Calibration**: What value of PP should we put in the Schelling model? (Armor, Farley). If we use the “wrong” value then validation may fail.
- **Validation**: Is some clustering measure of the real city similar to that generated by Schelling? If not at all then probably model problems. If yes …

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5. The missing ingredient

- Why do Schelling agents make decisions “like that?” (Note: I am not requiring a specific kind of answer only that modellers attempt one.)
- Once that is decided, calibration needs are (almost) banal. Are we like the drunk under the lamp post?
- Why do all agents make decisions the same way?
- The way they make decisions “incidentally” causes the environment to “disappear”: If house prices doesn’t matter to individuals then the housing market doesn’t matter to the model.

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6. A slide to itself

- What “elements” a model contains: Should I have social networks in my Schelling model? Why?
- I propose **specification** as a name for this aspect of mapping a model onto reality (but I am happy with any term **that we will all agree on**!)
- Dublin revisited: If moving an element “in” and “out” of your ABM makes a significant difference to its behaviour then you can’t afford to specify arbitrarily.
- Specifying the environment: Somewhat neglected. Do I need the right schools or just the right *distribution* of schools?

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7. I'm not making this up …

- Barnes *et al*. (2017) "The Impact of Reducing Antibiotics on the Transmission of Multidrug-Resistant Organisms", *Infection Control and Hospital Epidemiology*, **38**(6).
- Carefully justifies the hand hygiene compliance rate of nurses and doctors using previous research (calibration).
- Doesn't justify at all that HCW can't transmit infections to each other (specification) and that patients in the ICU can't die!
- A kind of trap door function: If you can get a sensible number for a parameter then it is at least possible that the specification makes sense. But the fact you can't or don't get a sensible number absolutely doesn't mean you can forget the corresponding model element.

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8. What I did … and why

- Work in progress: No decent qualitative research on house moving decisions. (Interesting in itself?)
- Very good study (almost entirely ignored by later research and by Schelling). Rossi: “Why People Move” (1955).
- Reasons for moving: Kind of people around here (13%), amount of closet space (33%).
- “Pseudo qualitative” data: Five major “decision types”. Schelling (for comparison), “place seekers” (proximity to arbitrary place), “people seekers” (ditto arbitrary person), “random” (unmodelled features), “property attribute seekers” (not yet implemented).

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9. How it turned out

- Results less interesting than I expected but for reasons I now think I understand better: Small proportions of agents seeking a random (uncorrelated) place don't impose enough "goal conflict" on the system. But note that place seekers can settle down while people seekers can't necessarily. Randomness isn't really a "type" but it *is* interesting.
- But "types" and type proportions do make measurable quantitative differences to the system and also generate qualitatively different "regimes" (everyone can be satisfied/can't be satisfied).

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10. So why am I qual2rule?

- Qualitative interviews induce “themes” (“nice neighbourhood”) systematically.
- Themes are the “largest matters” in a particular domain (moving dwelling) according to “participants”.
- How do people *actually* decide to move house: The same way with different parameters? In systematically different ways? (“Aspirers” versus “reacters”.)
- ABM supports this kind of heterogeneity nicely if we let it (but we may still need “proportion” surveys).

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11. Conclusions

- We need to be clear about the **concept** of specification even if we decide not to call it that.
- How do we justify what “sorts of things” we put in our models/environments?
- These decisions can be shown to “matter” (by analogy with sensitivity analysis perhaps) and therefore they must be made in a principled way.
- Qualitative research (not necessarily as qual2rule) has an important role in specification. Does my simulated ICU “ring true” with a real ICU in terms of its “entities” and “processes?”

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