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University of Auckland

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- Abstractly, each node has a certain state (colour), and each node updates its colour based on some local rule. Updates can be simultaneous, sequential (fixed order of agents), or asynchronous (anyone can move).
- Can be thought of as a form of dynamic voting.

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- Key ingredients:
  - Micro properties: how nodes influence their neighbours (transition rules).
  - Topology: how nodes are connected in a network.
  - Macro properties: distribution of colours among nodes.

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- There are many models! The best one for a given situation may depend on exogenous factors (such as degree of common knowledge).
- We focus on threshold models, where a node deterministically changes state depending on the number or fraction of its neighbours of various colours.
- This is opposed to epidemic-type models of a probabilistic nature.

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- (wisdom of crowds) Do beliefs converge to the correct belief? if not, does the "correct" belief win a plurality vote?

Progress so far

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- Analysis of a specific 3-colour model (Girard, Seligman, Liu).
- Laboratory experiment (today's talk).
- We aim to generate hypotheses about beliefs that can be experimentally validated, and conjectures about the model that can be proved.

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- Directors F. Beltran, A. Chaudhuri, V. Pavlov.

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- We also wanted to look at the role of information on the macro behaviour.
- We chose an extreme topology intended to bring out large effects. This necessitated a directed network which makes it even less realistic.
- We need to look for large effects, given the small number of participants.

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- Subjects are given a question with an objectively correct answer, and choose one of 3 options.
- There are 3 answers given: the correct one, an incorrect one, and "I don't know".
- At each iteration, each node receives information on the fraction of its feeds choosing each option. They can change their answer if desired.

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- Equipment failures.
- Unanticipated problems occurring in real time.

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- We hope this will induce sincere behaviour. How to check this after the fact?

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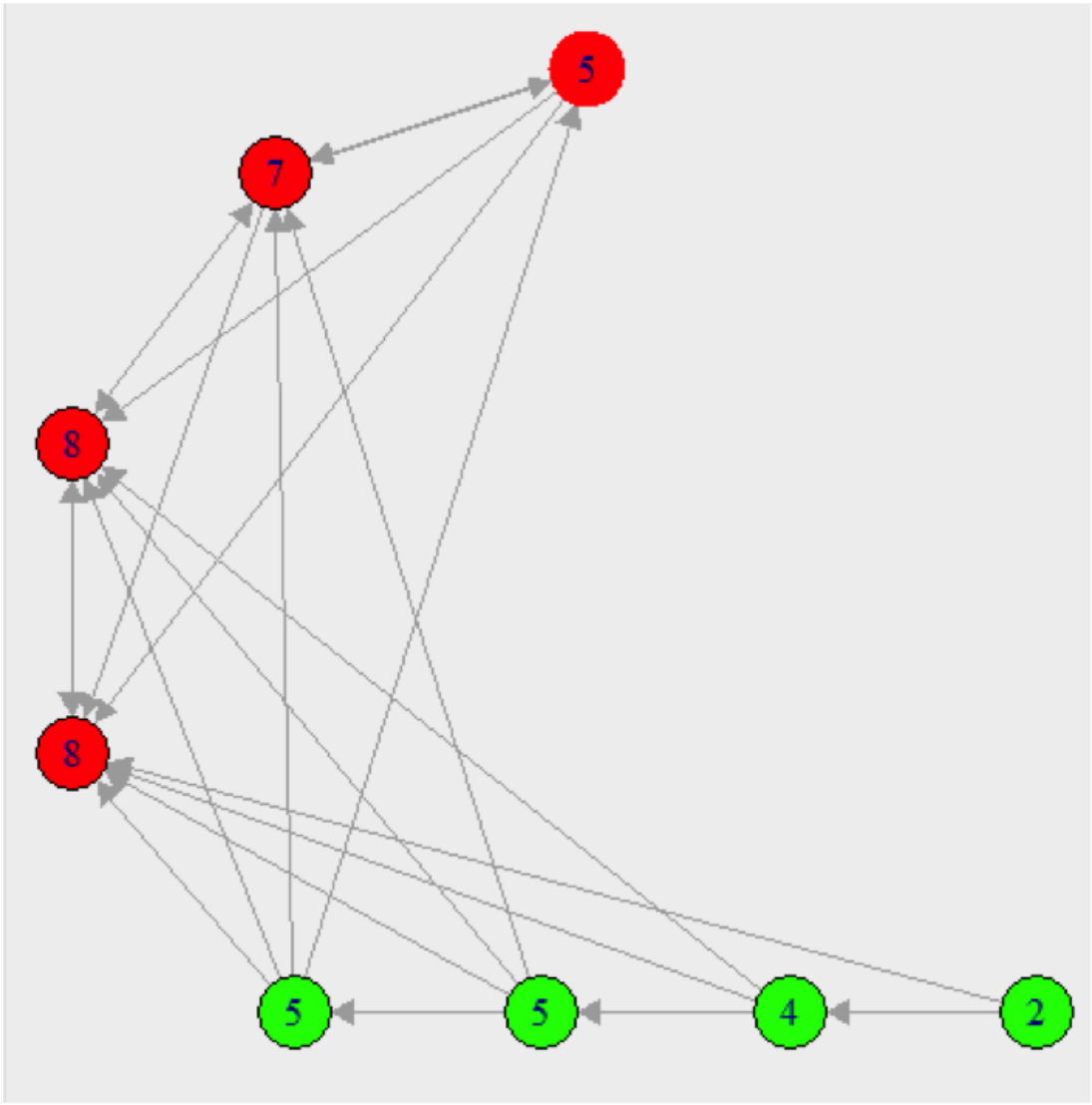
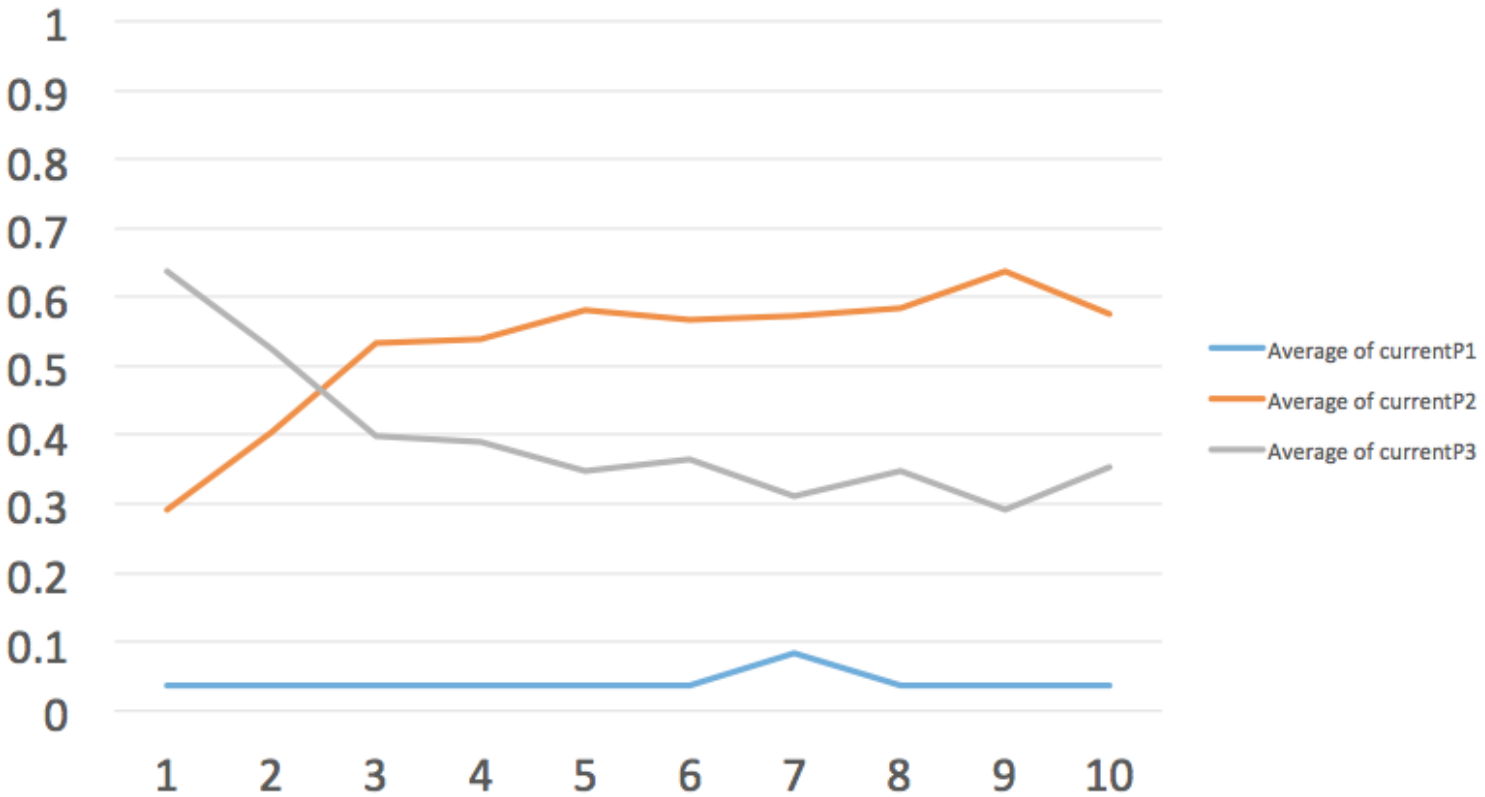
- What is the first name of the character played by Paul Walker in the Fast and Furious movies?
- Note that some are experience-based and others reasoning-based. Also we expect the beliefs about the knowledge of others to vary between questions.

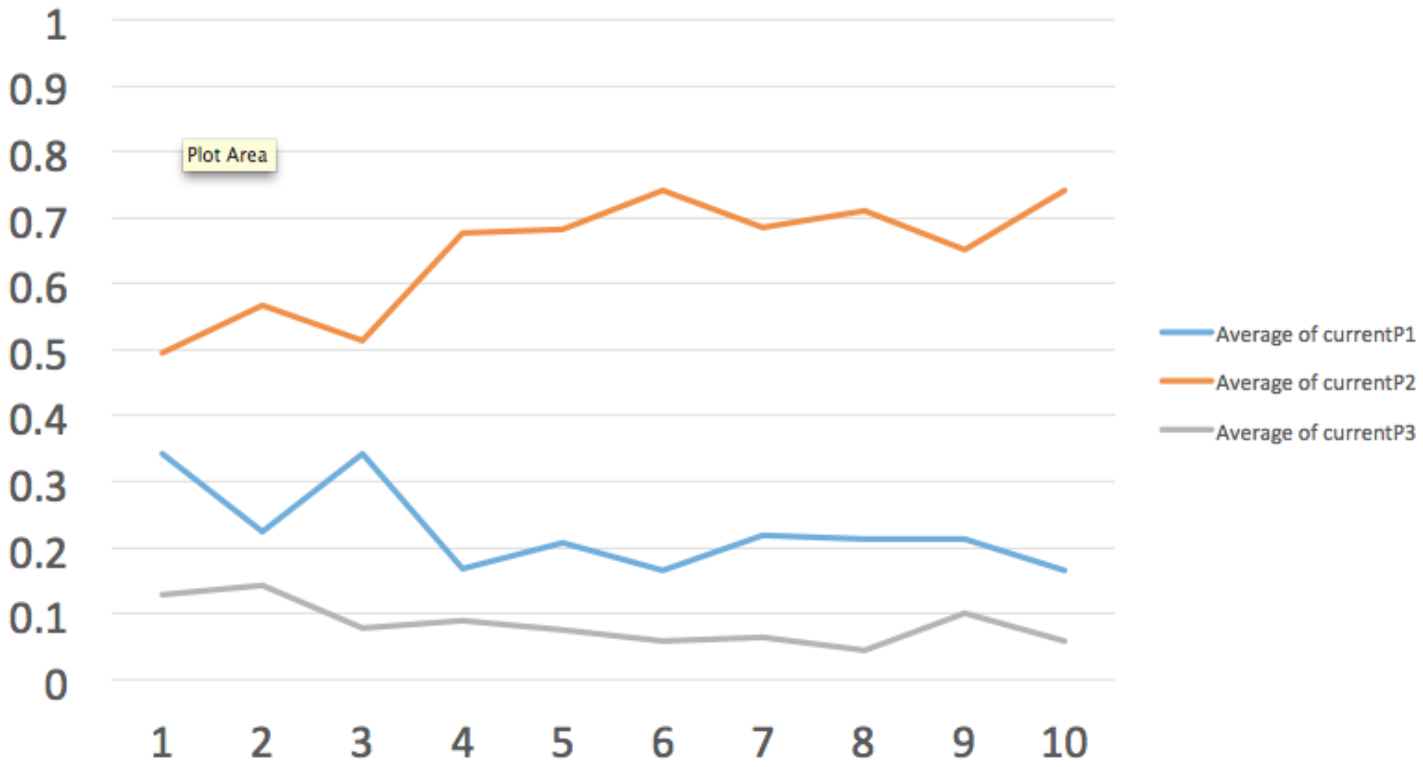
The topology we used



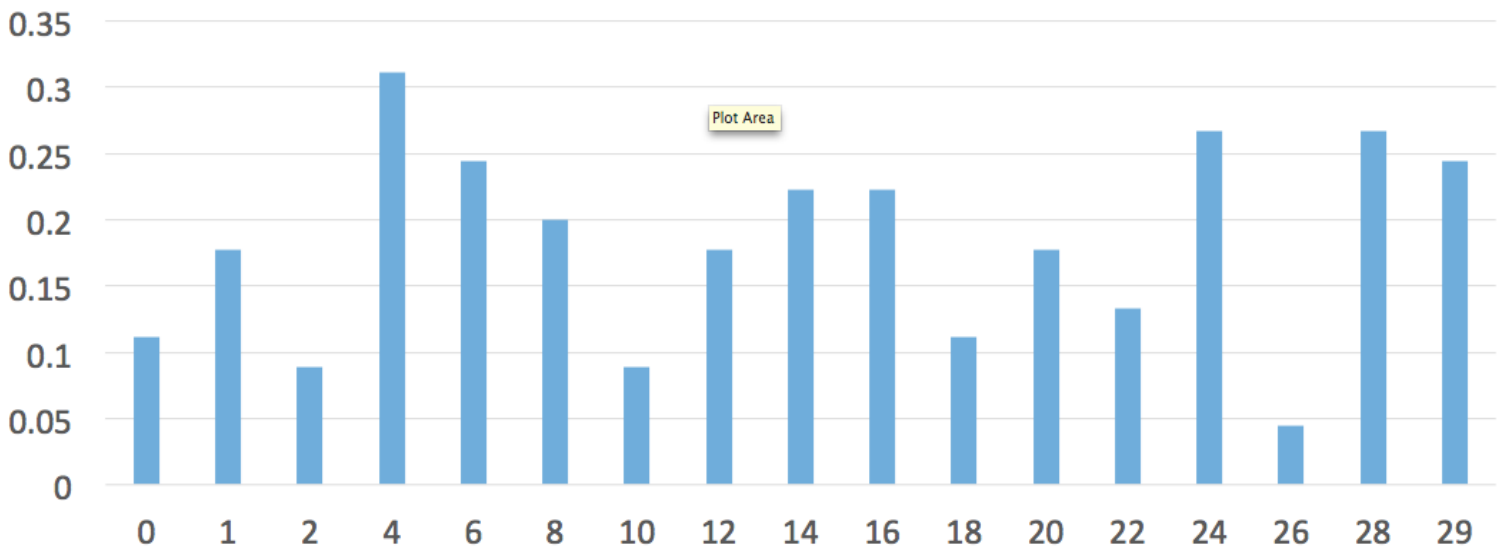
Convergence to truth



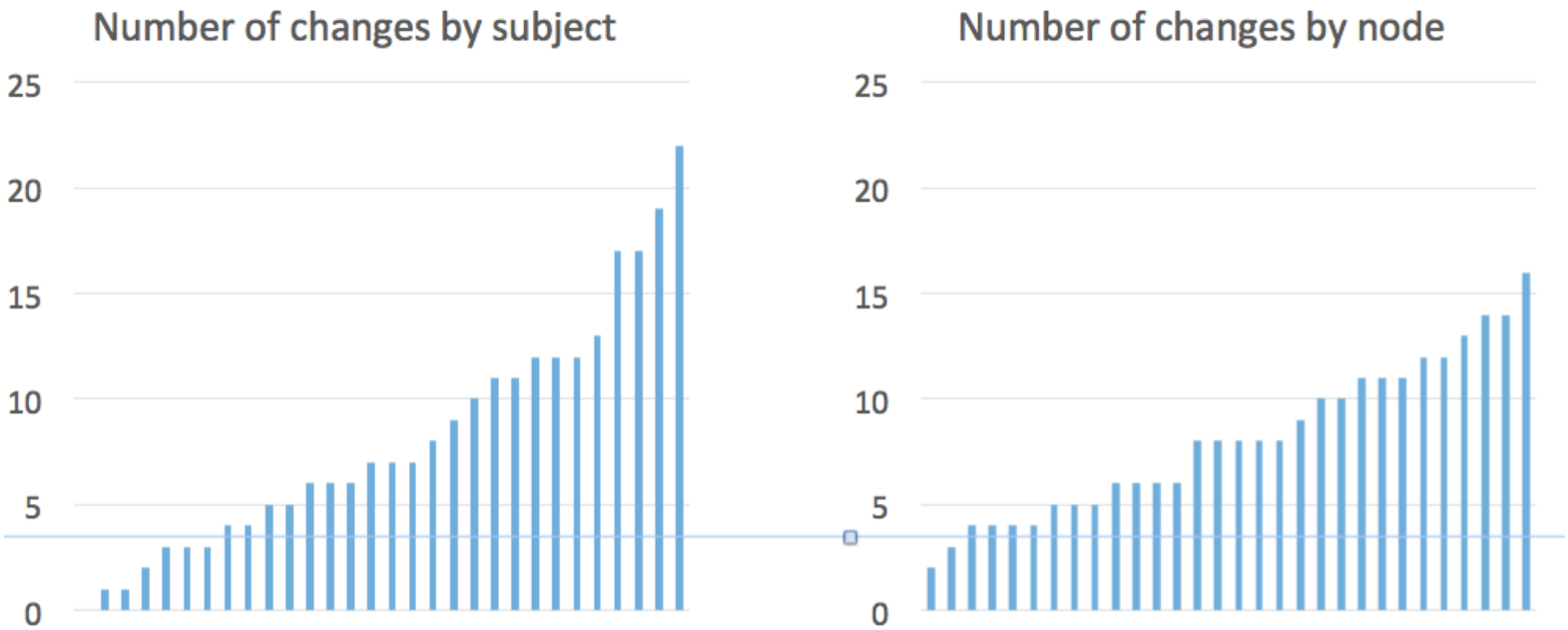
Convergence to falsehood



Degrees do not matter much



Unclear what this means



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- Your ideas?