

# Public opinion dynamics, preference falsification and social influence

---

**Francisco J. León**

Analytical Sociology and Institutional Design (GSADI)

Universitat de Girona

**Francisco J. Miguel Quesada**

**Jordi Tena-Sánchez**

Analytical Sociology and Institutional Design (GSADI)

Department of Sociology - Universitat Autònoma de Barcelona



## Opinion dynamics and preference falsification

---

- Public opinion: opinion people express in public
- Private opinion: real people's opinion
- Models usually leave out that they can diverge
  - Preference falsification, pluralistic ignorance, surprising and abrupt changes
- Timur Kuran: *Private Truths, Public Lies*
  - Few attempts to develop / build alternatives to Kuran's models
  - No attempts to apply Kuran's models (and the idea of PF) to the field of OD



# Our model

---

- Repeated game played over 300 rounds
- 1.600 agents (40x40)
  - Torus
- In each round, 100 not overlapping 4x4 groups are activated



# Agents' initial attributes

---

- **Status ( $s_i$ )** [0,1]
  - It does not change during the simulation
  
- **Private opinion ( $x_i$ )** [0,1]
  - Initial perfect correlation with  $s$
  - So, **highest  $s$  agents begin thinking 1**
  
- **Public opinion ( $z_i$ )** Binary: 0 or 1
  
- **Threshold to falsify preferences ( $y_i$ ):** [0,1]
  - Heterogeneous agents

# Model dynamic

---

- **We explore all the range of segregation scenarios**
  
- **Step 1. Coherence heuristic:** *match your private opinion with the one you most frequently defend in public*
  - Heterogeneous agents regarding their tolerance for hypocrisy

$$\text{if } \frac{\sum_{t-k}^t |x_i - z_i|}{k_i} \geq 0.5 \rightarrow \begin{cases} x_{i,t} = \begin{cases} [0.5, (1 - x_{i,t-1})] & \text{if } x_{i,t-1} < 0.5 \\ [(1 - x_{i,t-1}), 0.5] & \text{if } x_{i,t-1} \geq 0.5 \end{cases} \\ y_{i,t} = 1 - x_{i,t} \end{cases}$$

$$k_i = [(32x_i^2 - 32x_i + 10), 10]$$

# Model dynamics

---

- **Step 2. Goffman's heuristic:** *(if you are a low status agent) when interacting with somebody of high status ( $s$ ) (and an opinion different from yours), reduce your threshold ( $y$ )*

$$\text{if } \begin{cases} s_i \leq 0.5 \text{ and } x_i \leq 0.5 \text{ and } z_j = 1 \\ \text{or} \\ s_i \leq 0.5 \text{ and } x_i > 0.5 \text{ and } z_j = 0 \end{cases} \rightarrow y_{i,t}^* = x_i + \frac{|y_i - x_i|}{1 + |s_i - s_j|}$$

# Model dynamics

---

- **Step 3. Computing the reference opinion.**

$$go_{t-1} = \frac{\sum z_{t-1}}{N} \quad eo_i = \frac{\sum z_j^*}{16} \quad \forall j \in MN \quad ro_i = p * go_{t-1} + (1-p) * eo_i$$

- **Step 4. Expressing an opinion in public (z):** *falsify your private opinion if the reference opinion is beyond your threshold*

$$z_{i,t} = \begin{cases} 1 & \text{if } ro_i \geq y_{i,t}^* \\ 0 & \text{if } ro_i < y_{i,t}^* \end{cases}$$



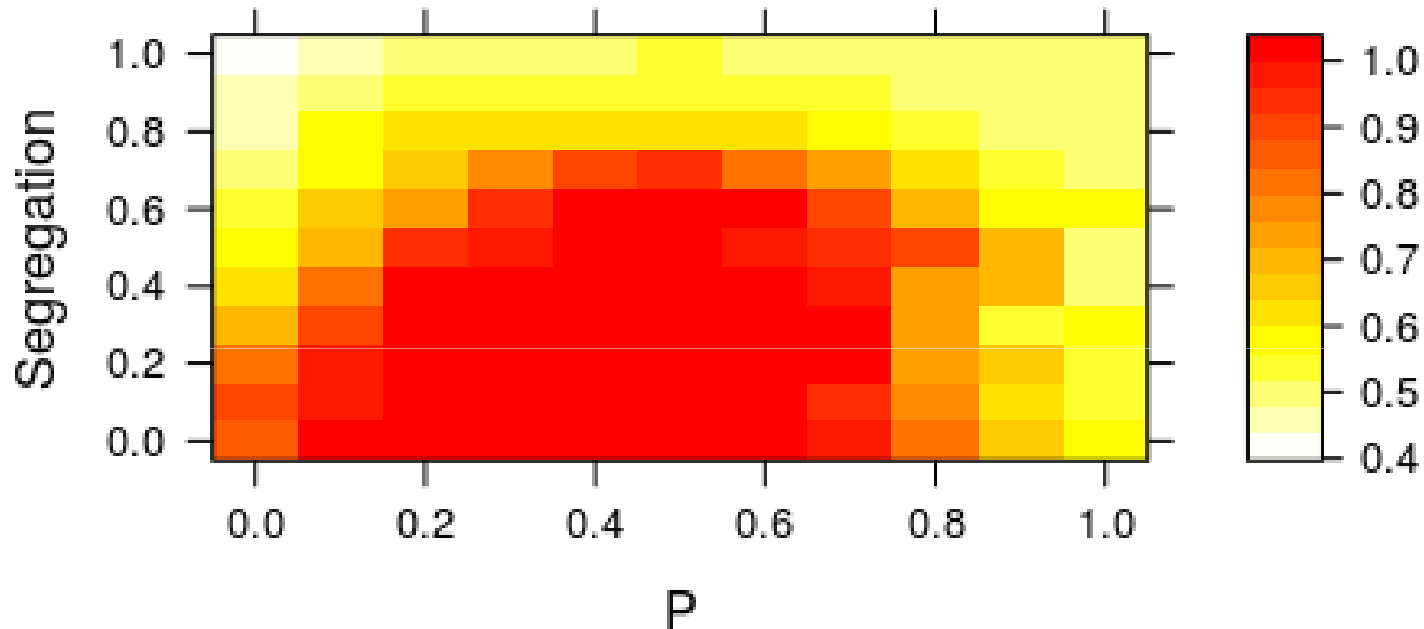
# Analysis

---

- Model behaviour
  - Descriptive phase
    - Exploring parametric space: which equilibria emerge from the different combinations of initial conditions?
  - Explanatory phase
    - Which micro-level processes generate these equilibria?
- Potential abrupt and surprising social changes?
  - Are these equilibria reversible as a consequence of an external shock?



## Public declarations ( $z$ )

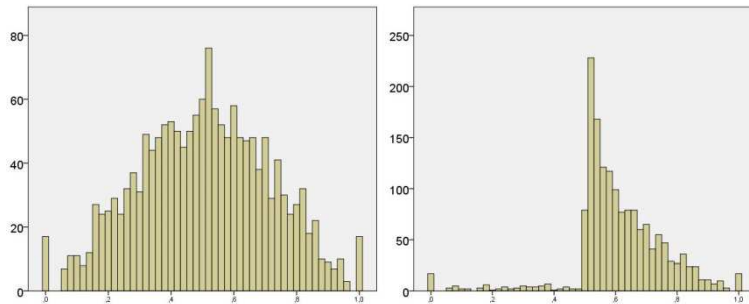


- In most scenarios, the equilibria is 1 (initial high status agents'  $x$ )
  - - segregation = + unanimity
  - Effect mediated by  $P$  (bigger when  $P$  is smaller)

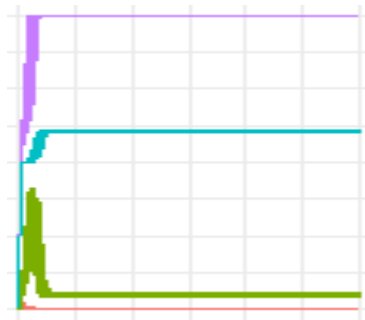
# Unanimity

Low segregation, intermediate levels of  $p$

Initial and final distributions of private opinions ( $x$ )



Evolution of mean values of  $z$  and  $x$ , and proportion of falsifications

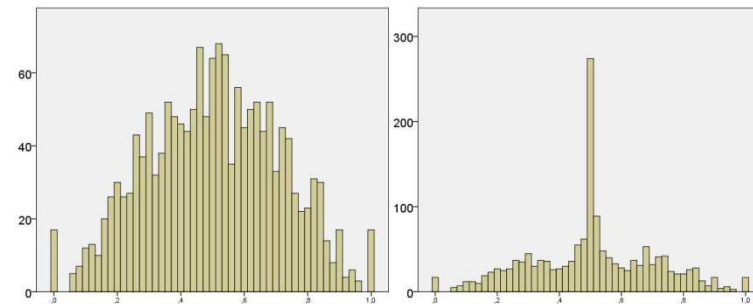


- Private opinions: small change in the mean, dramatic change in distribution
- Falsifications: pattern of raising and falling

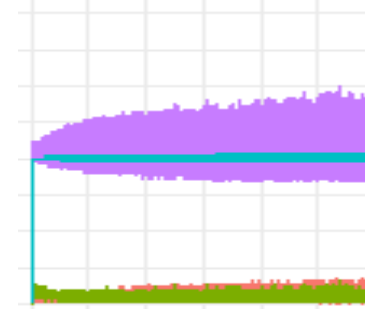
# No unanimity

High segregation, either high or low values of  $p$

Initial and final distributions of private opinions ( $x$ )



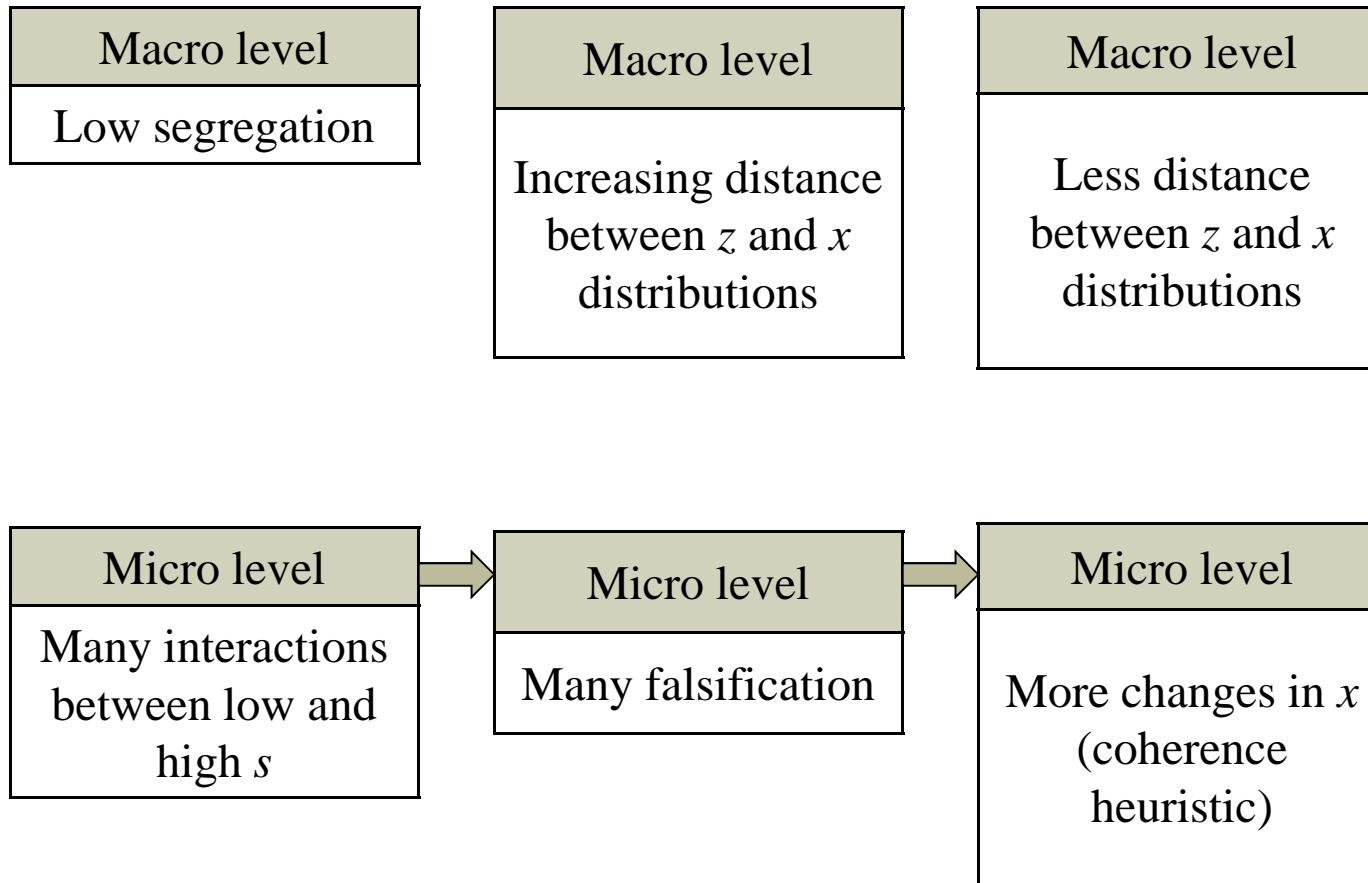
Evolution of mean values of  $z$  and  $x$ , and proportion of falsifications



- Private opinions: peak in mean value
- Falsifications: low and constant frequency

# Why does uniformity emerge?

(low segregation, intermediate levels of  $p$ )





## Some provisional conclusions

---

- Unanimity in public declarations emerge when high and low status agents frequently interact (and agents take into consideration local opinion)
  - This uniformity can lead to a massive change in private opinions
  - Uniformity is grounded in a non-extremist distribution of private opinions (options for abrupt and surprising changes)
- Segregation prevents unanimity
  - Minor changes in private beliefs
  - More balanced distribution of private beliefs (options for a public opinion change)



---

Many thanks for your attention!