

# Disobedience as a Mechanism of Change

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12th IEEE SASO, 3-7 Sep 2018, Trento Italy

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## Introduction

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*The social concept of **disobedience** can be used as a mechanism for **adaptive and exploratory learning** in norm-governed multi-agent systems.*

# Disobedience in Society

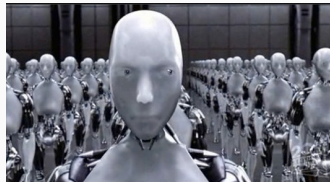
- **Disobedience** has been used historically as a form of resistance and call for change in unfair regimes.
- Among the factors that motivate widespread disobedience are:
  - **The iron law of oligarchy** - the tendency for a small group to emerge and run complex organisations for its own benefit, rather than the collective interest
  - **Principled violation of policy** - law enforcement relaxation, with selective common-sense non-application of sanctions



Figure 1: Suffragette's in UK

# Disobedience as Learning Mechanism

- Can these notions be applied to **norm-governed MAS**?
- How to deal with systems with **disfunctional norms**?
- Can disobedience be a form of **collective learning**, enabling **adaptive systems**?



## Base Premises and Operationalisation

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- **Base Premises**
  - **P1** - A norm is in place
  - **P2** - Compliance is an individual decision
  - **P3** - Existence of monitoring and sanctioning mechanisms

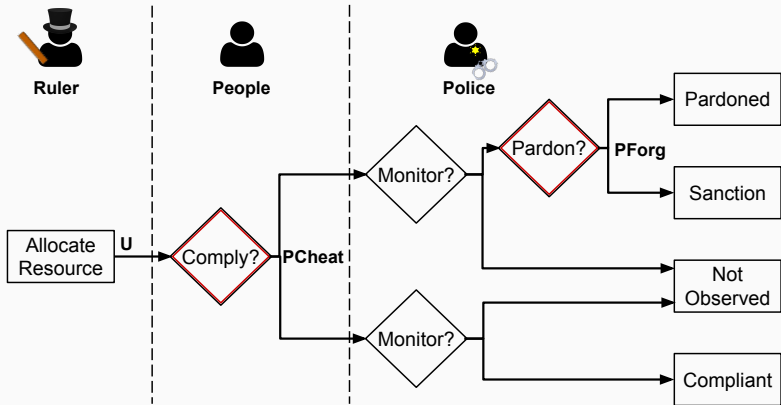
- **Base Premises**
  - P1 - A norm is in place
  - P2 - Compliance is an individual decision
  - P3 - Existence of monitoring and sanctioning mechanisms
- **Disobedience Premises**
  - P4 - Fairness decays over time (corruption)
  - P5 - Possibility of pardon by law enforcers
- **Transformation Premises**
  - P6 - Prescribed ruler destitution and new government formation





- Resource allocation scenario
- Players and its roles:
  - **Rulers** - Resource allocation policy
  - **People** - Appropriation of resource
  - **Police** - Check if appropriation = allocation

# Disobedience levels



# Learnable variables

Rulers:

**U** - Corruption of allocation policy

$$U = f(time)$$

Police:

**P<sub>forg</sub>** - Probability of sanction pardon as function of perceived fairness

$$P_{forg} = f(fairness) \quad fairness \sim Gini(Satisf)$$

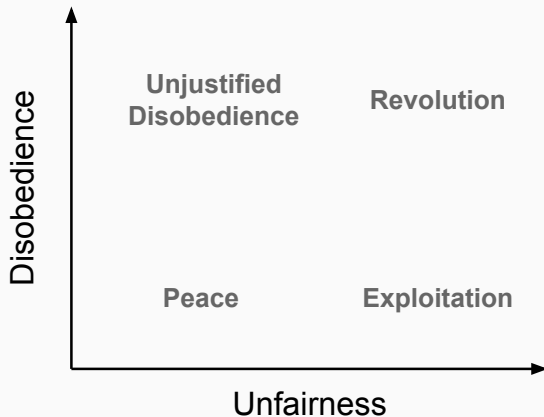
People:

**P<sub>Cheat</sub>** - Decision of compliance as reaction of system's feedback

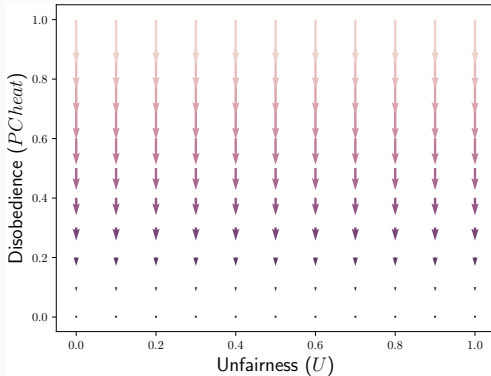
$$P_{Cheat} = f(fairness_i) \quad \left\{ \begin{array}{l} \uparrow \text{ if sanctioned } \wedge \text{ unfair} \\ \downarrow \text{ if sanctioned } \wedge \text{ fair} \\ = \text{ if forgiven} \\ \uparrow \text{ if not caught} \\ \downarrow \text{ if compliant} \end{array} \right.$$

## Experimental Results

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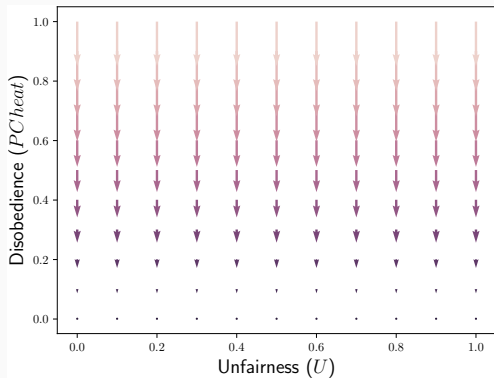


## Base Game

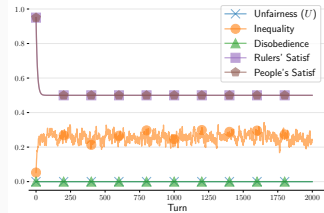


Without pardoning or reformation, People stay at the mercy of rulers, not having another rational choice than to obey, no matter how unfair is the current policy.

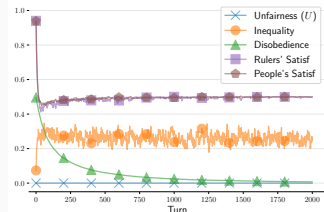
# Base Game



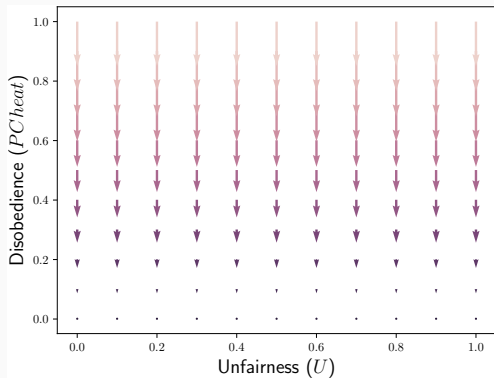
## Peace:



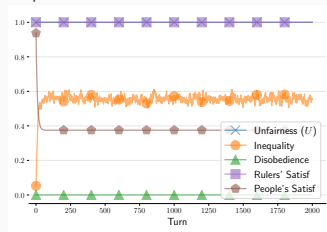
## Unjustified Disobedience:



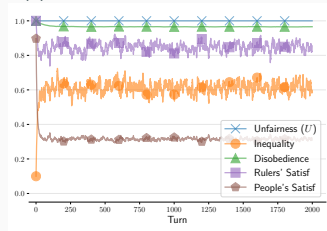
# Base Game



## Exploitation:

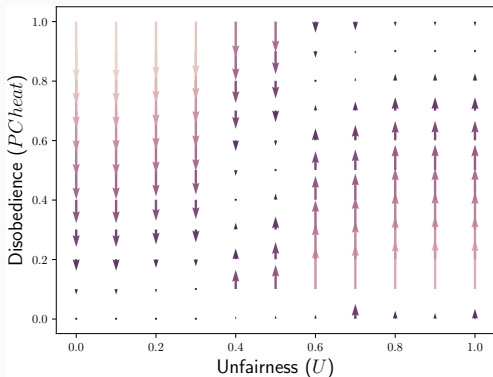


## Oppression:





## First Extension - Pardoning

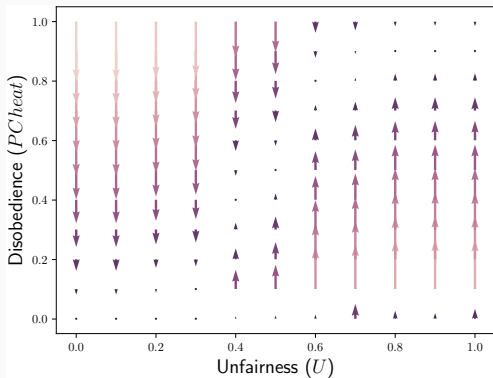


Obedience is conditioned to unfairness level:

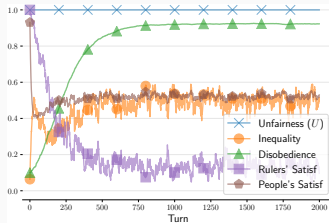
If fair, agents obey; if unfair, tendency to non-compliance

Police validates justified norms disobedience, pardoning transgressions

# First Extension - Pardoning

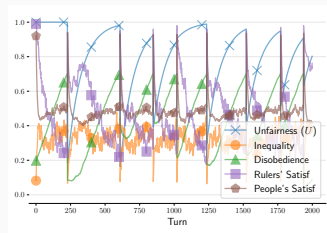
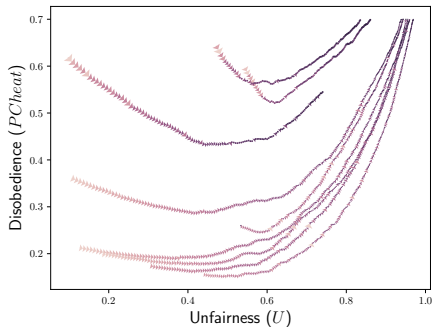


Revolution:



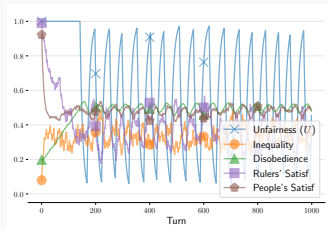
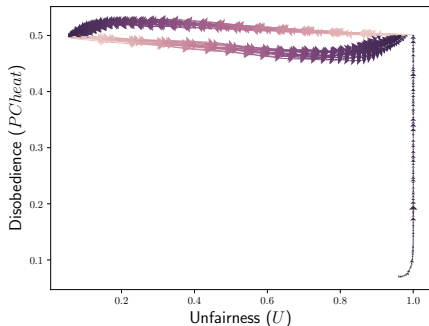


## Second Extension - Reformation - Reformation Cycles



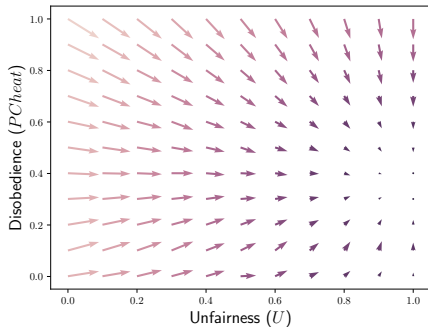
- Perpetual cycle of power change
- Alternation of power and higher overall satisfaction.
- Points out the need for post-revolution reconstruction.

## Second Extension - Reformation - Popular Control



Knowing the Reformation Threshold  $\mathcal{T}$ , unfairness is manipulated so Rulers please People with just enough resources so their disobedience remains in controlled levels.

## Second Extension - Reformation - Pragmatic Revolution



People disobey just enough to guarantee that satisfaction (and resource) is the same for all agents.

## Conclusion

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- **Disobedience** as a tool for adaptive learning in norm-governed MAS
  - Usual systems try to guarantee **obedience**, but not **governance fairness**
  - **pardoning mechanisms** justify **disobedience** as a revolutionary behaviour for justice restoration
  - Formal **reformation mechanisms** give power to non-Rulers and enables **cycles of change**
- Open questions / Future work:
  - Can subjective terms as *fairness, obedience, unjustified, revolution* be defined in different ways?
  - What are the effects of limited or subjective knowledge of events? How interpersonal factors such as *social influence, trust and misinformation* could affect the system?
  - How to escape from simple system reformation and move towards **post-revolution reconstruction**?



- National Council for Scientific and Technological Development (CNPq), Brazil;
- Diverse collaborators.



Thank you!