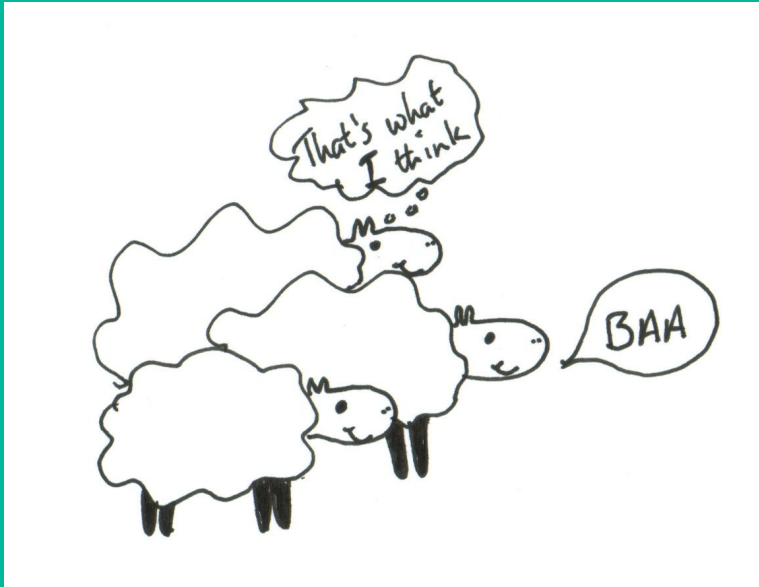


# THE SZNAJD MODEL

2 dimensional model for opinion  
evolution in a closed community

# Social validation



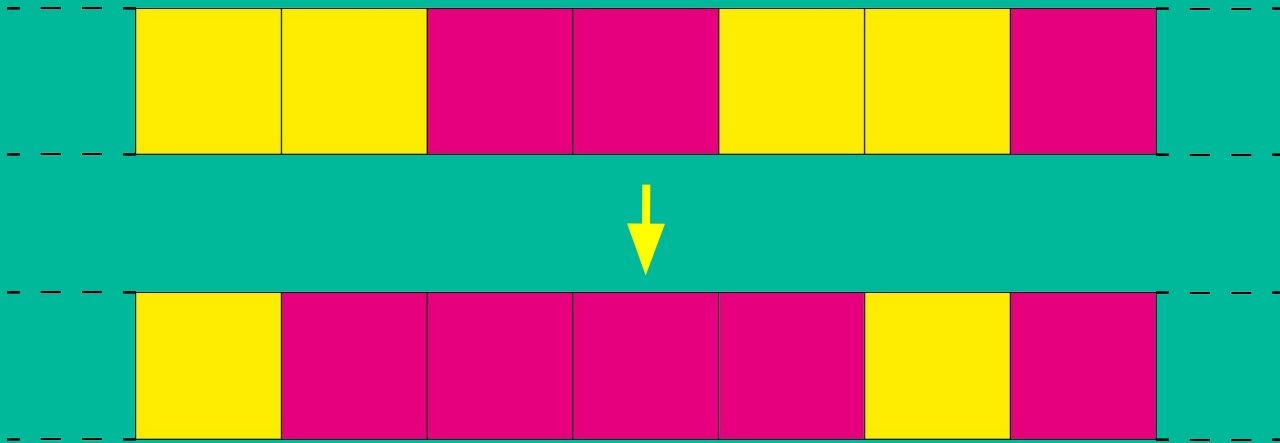
*"When we are uncertain about what to do we will look to other people to guide us. And we do this automatically and unconsciously."*

Sociologists say that our natural behaviour is to match the opinion of our “neighbours”.

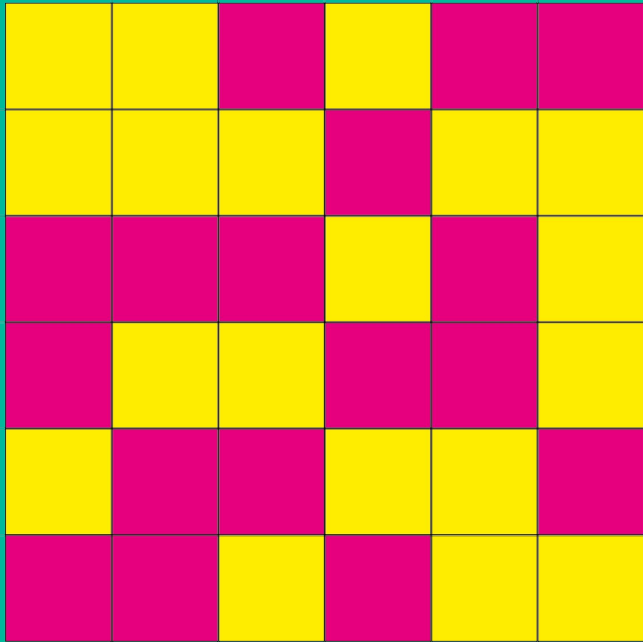
# ***The Sznajd model***

In this model every person “sits” in a lattice site, and influences his neighbours. Every lattice site can have only one value, corresponding to an opinion.

In the original 1-D model 2 neighbours influence their other 2 neighbours.

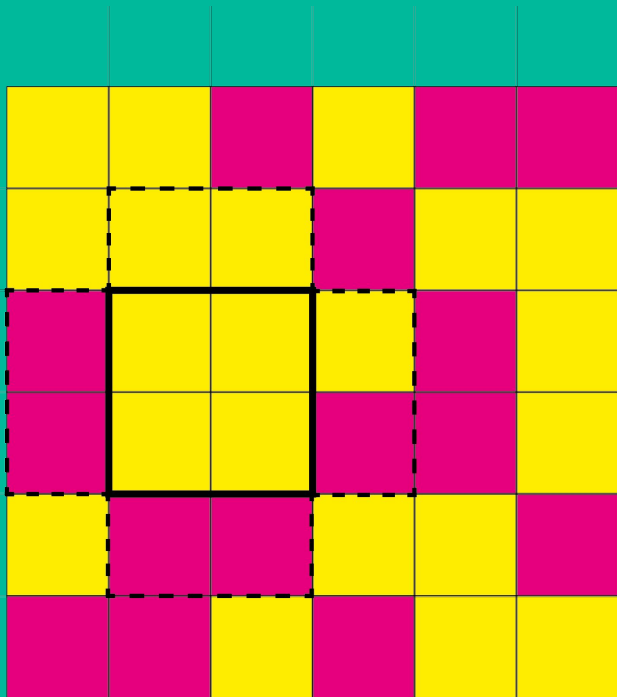


## ***The model***

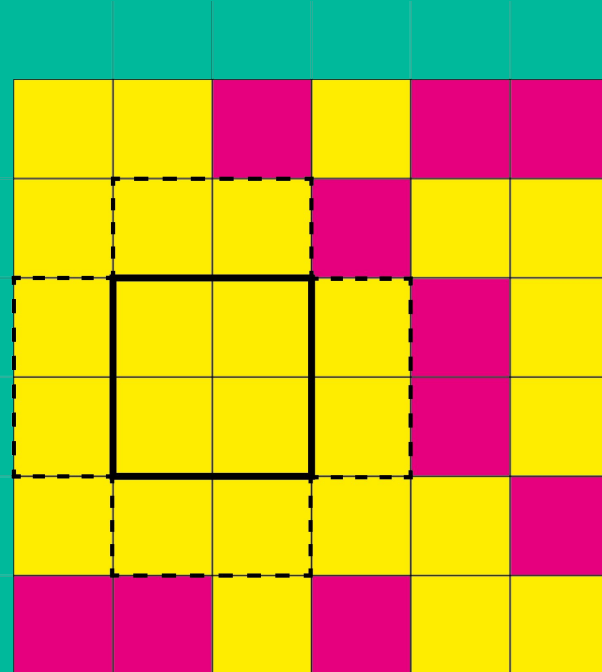
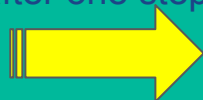


1.  $N \times N$  sites in a lattice.
2. Every site has 4 nearest neighbors.
3. Every site at a given time take the value 1 or -1.

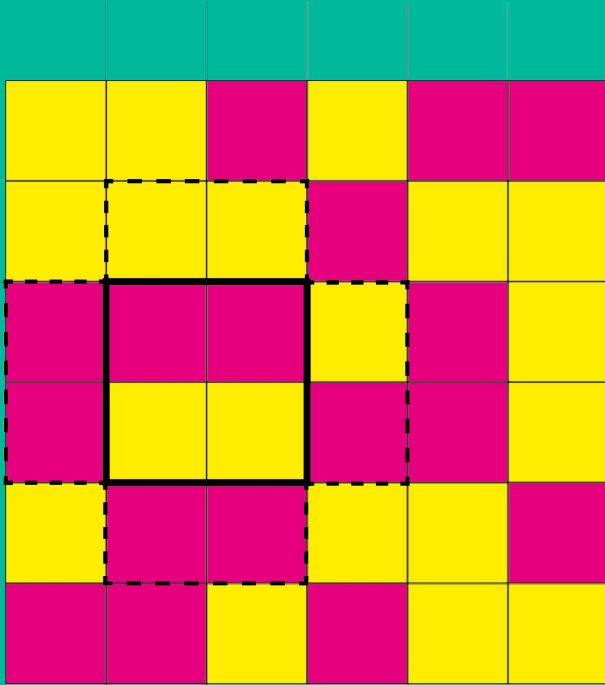
## *The dynamic*



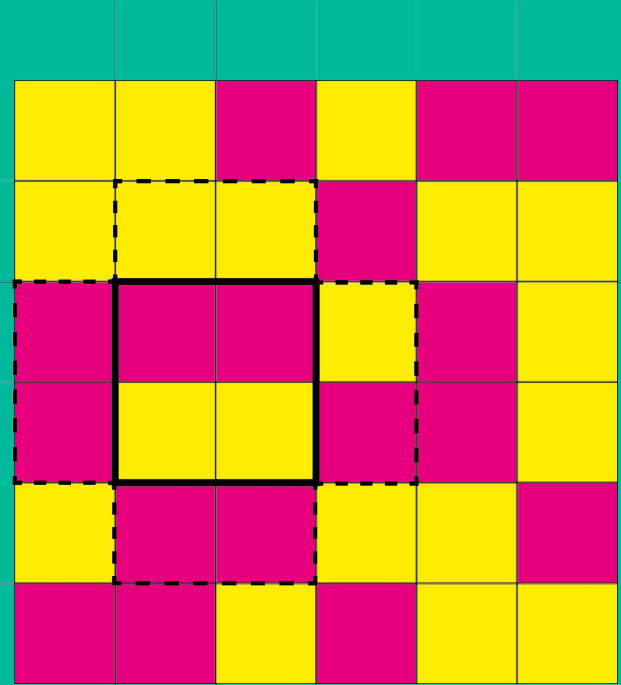
after one step



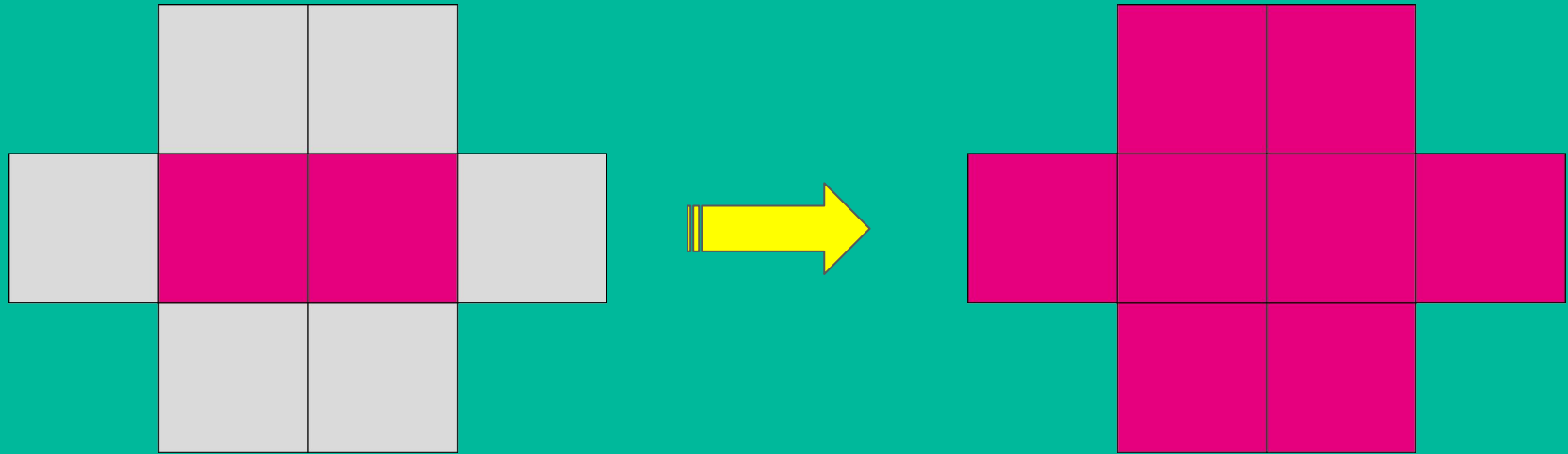
## *The dynamic*



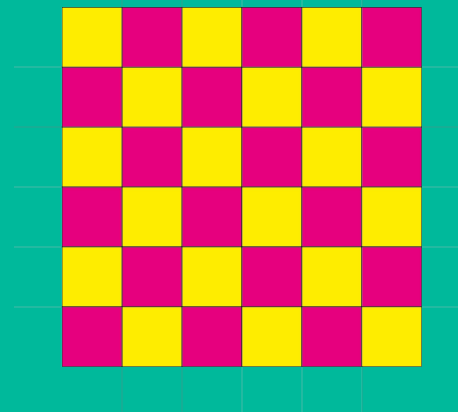
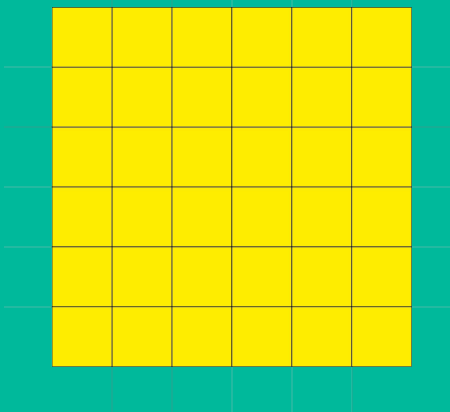
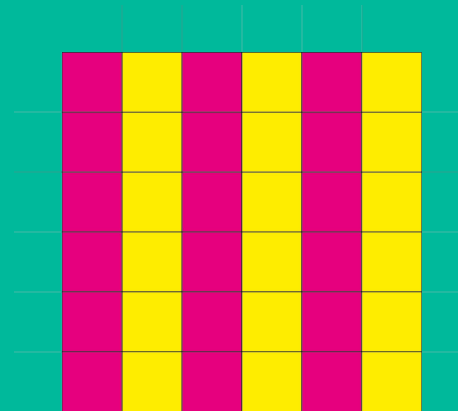
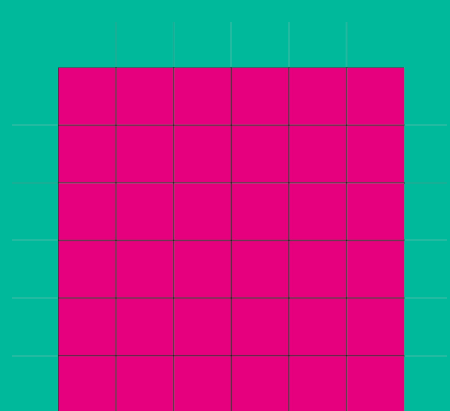
after one step



## ***Another possible rule for interaction***

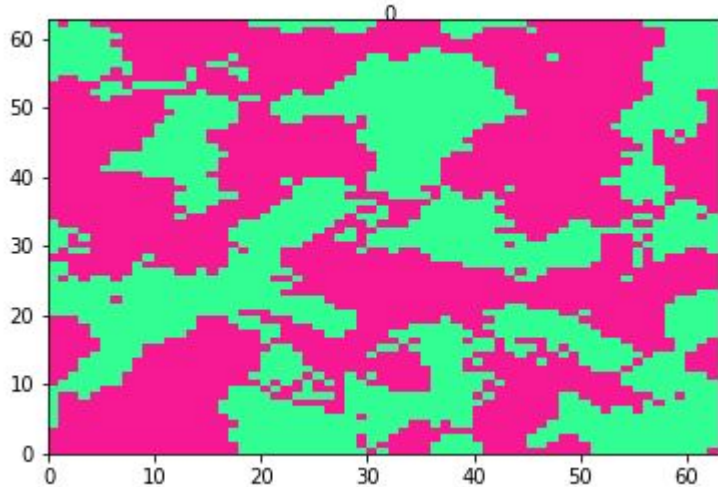


# ***Absorption states***





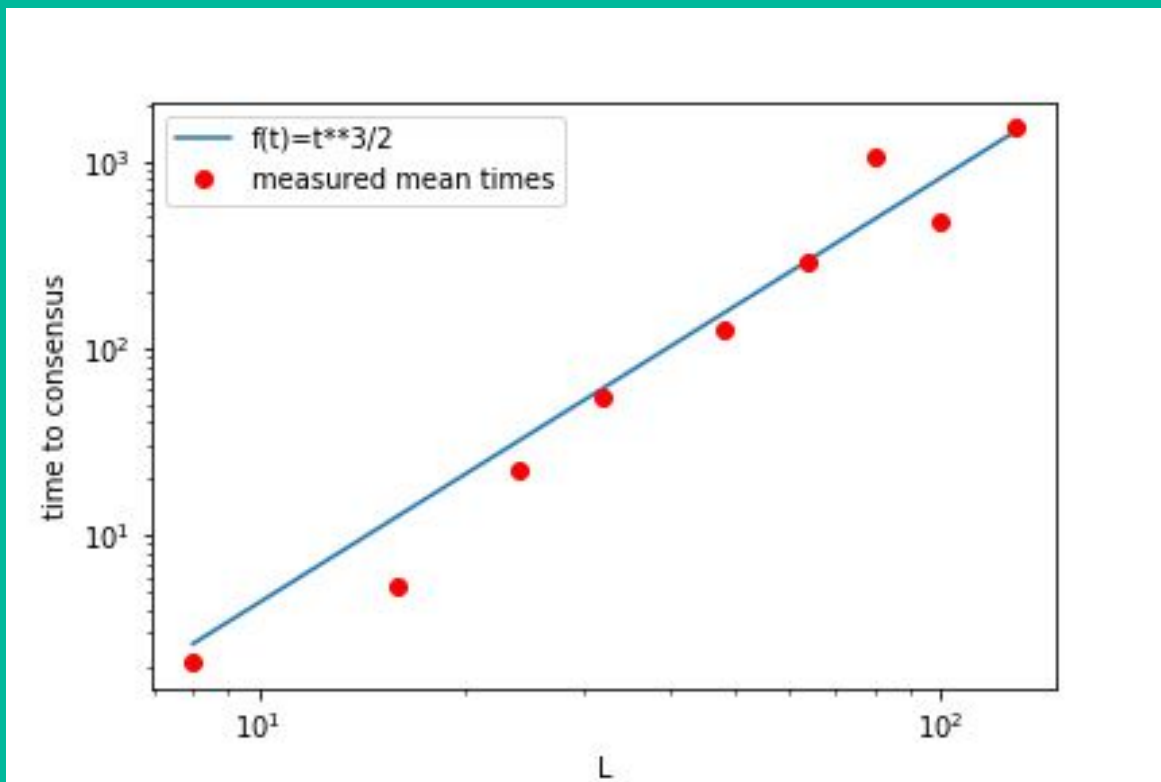
## ***absorption states***



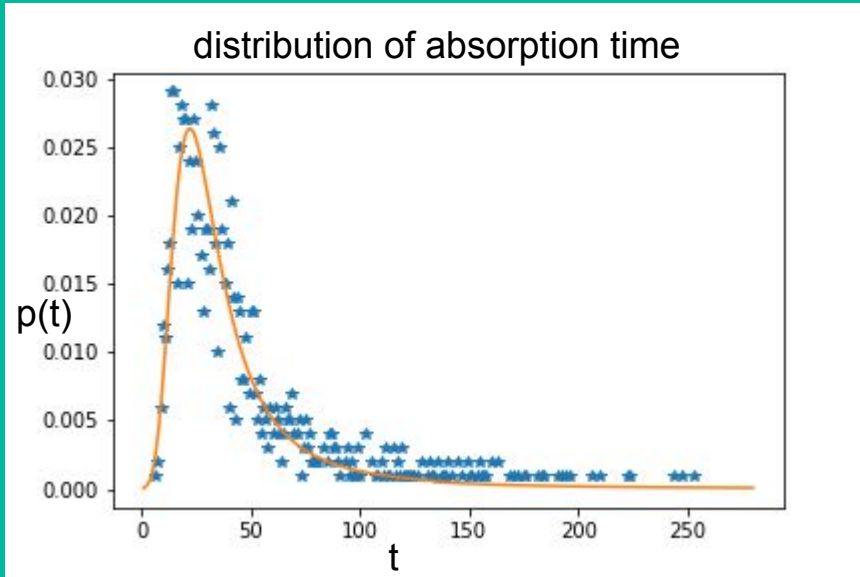
Starting with a random uniform distribution, the system always reaches state of consensus. These states are called “dictatorship”.

They are absorption states: when the dictatorship is reached, the dynamic of the system doesn't allow to change opinion.

## *Hitting time for “dictatorship” states*



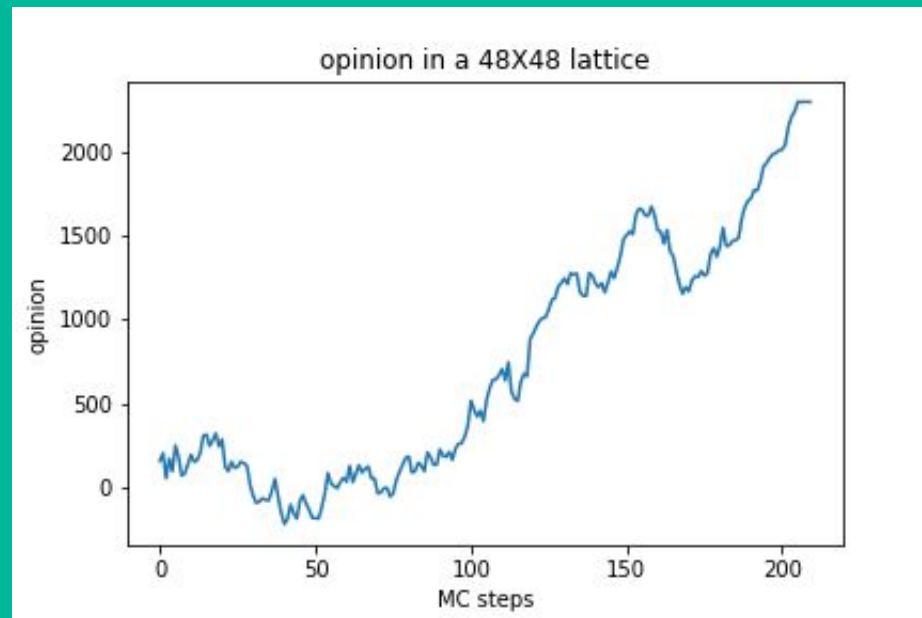
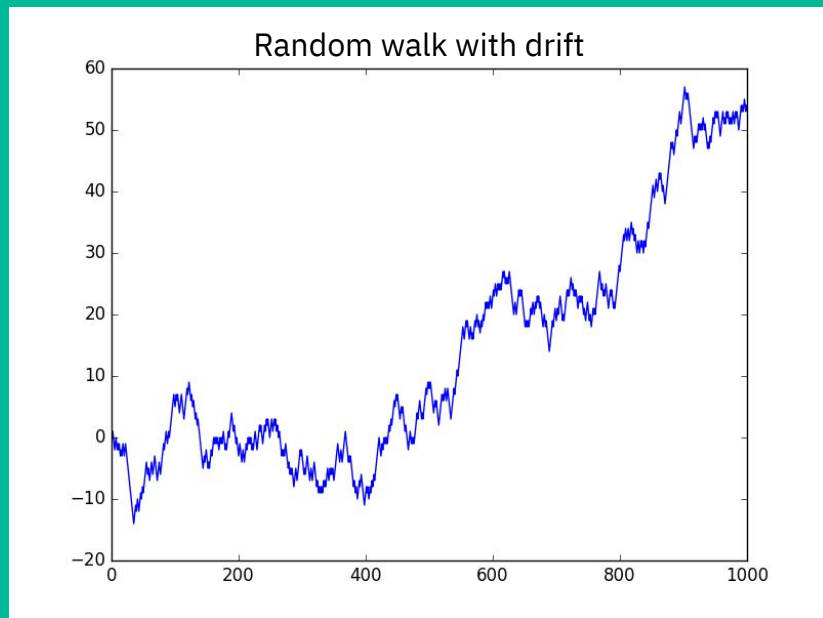
# ***Absorption time $T$***



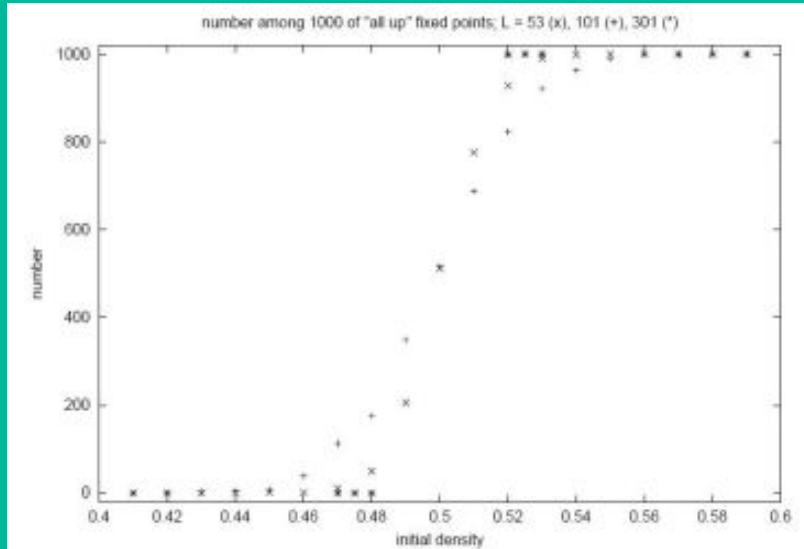
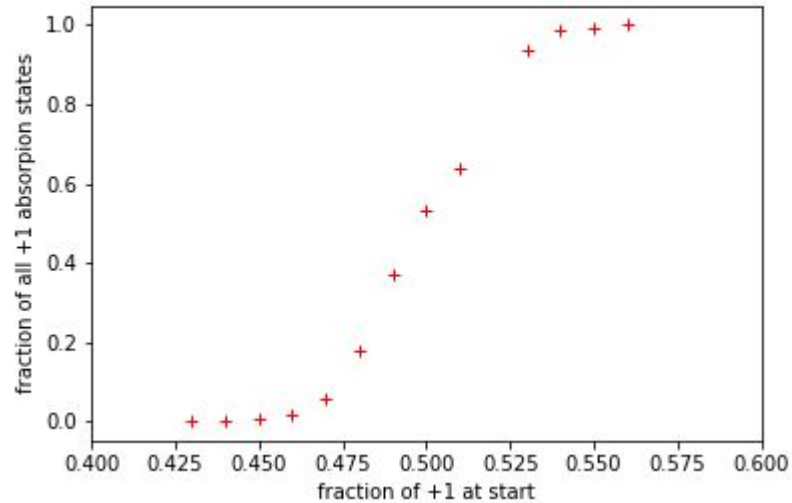
The system arrives to the dictatorship state according to a Levy's distribution.

This kind of distribution is the same we found in arrival times for a given point in a random walk with drift.

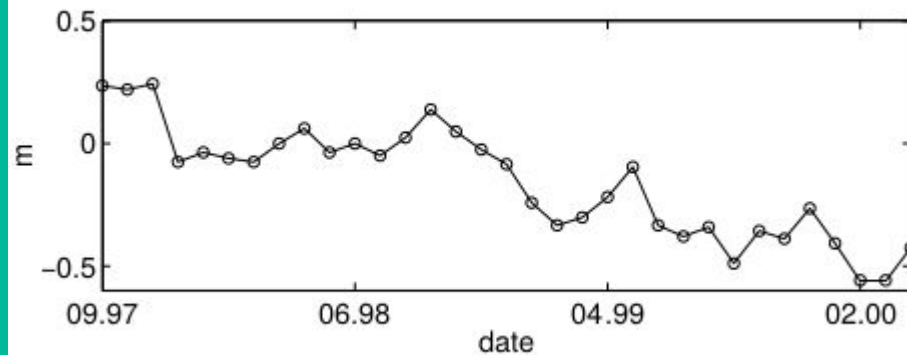
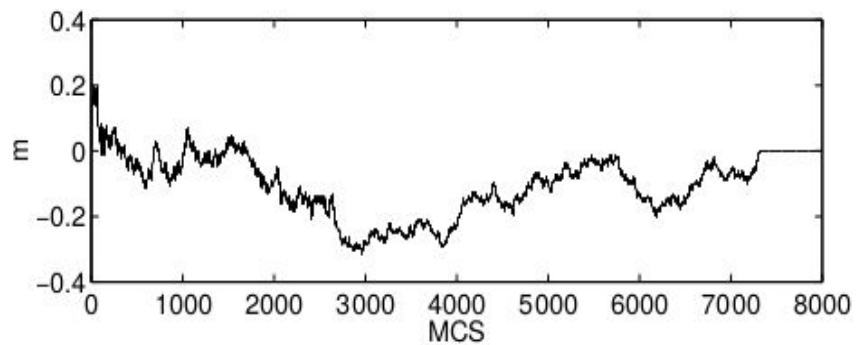
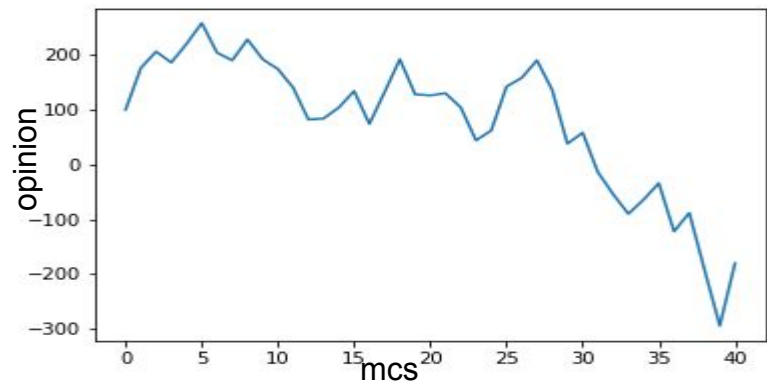
## ***hitting time $\tau$ (random walk with drift)***



## *different density at start*



## ***model vs reality***



# ***Nonconformism***

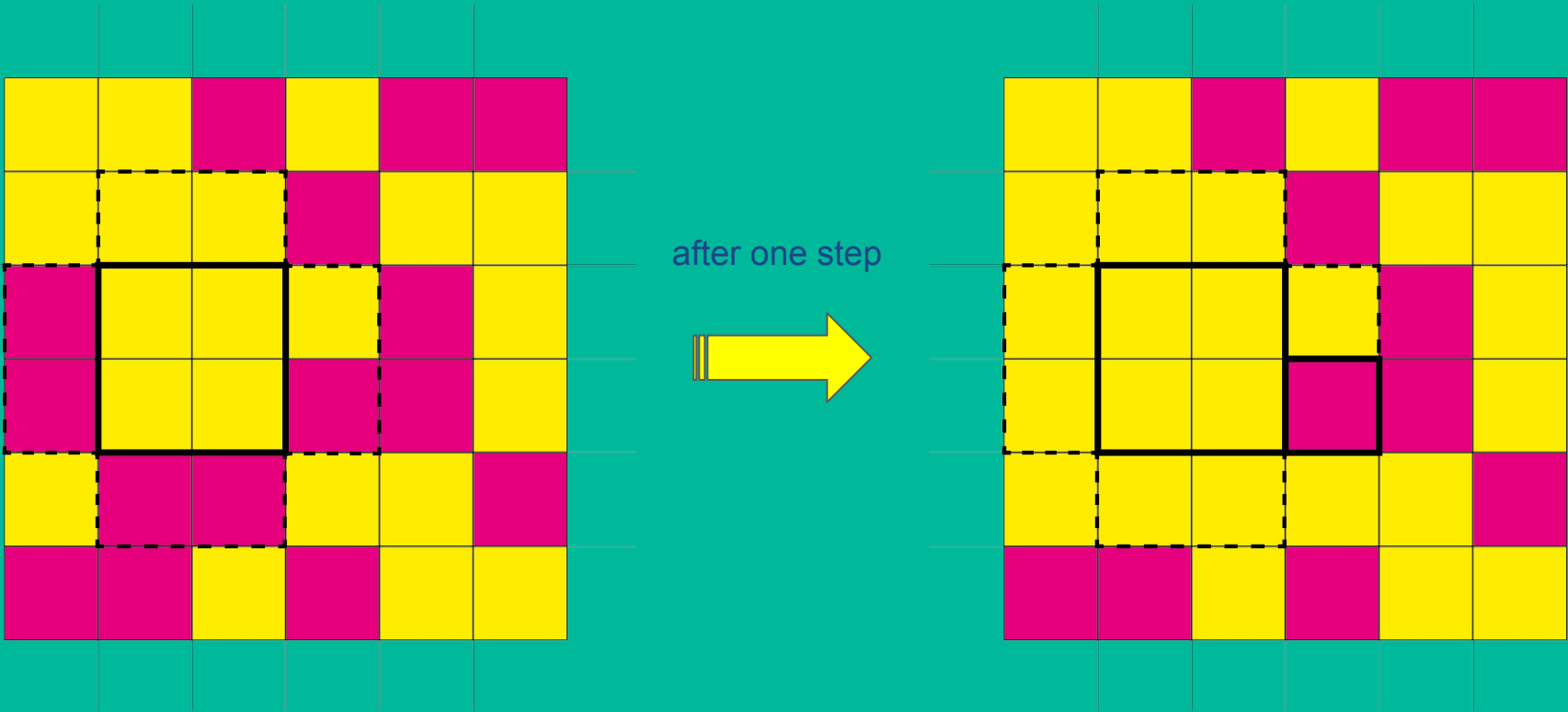
Not everyone is so easily convincible, sometimes even if most of the people near a person have the same opinion the person will keep a different one.

That means that the rule is not always satisfied, there is some “thermal” noise inside the system.



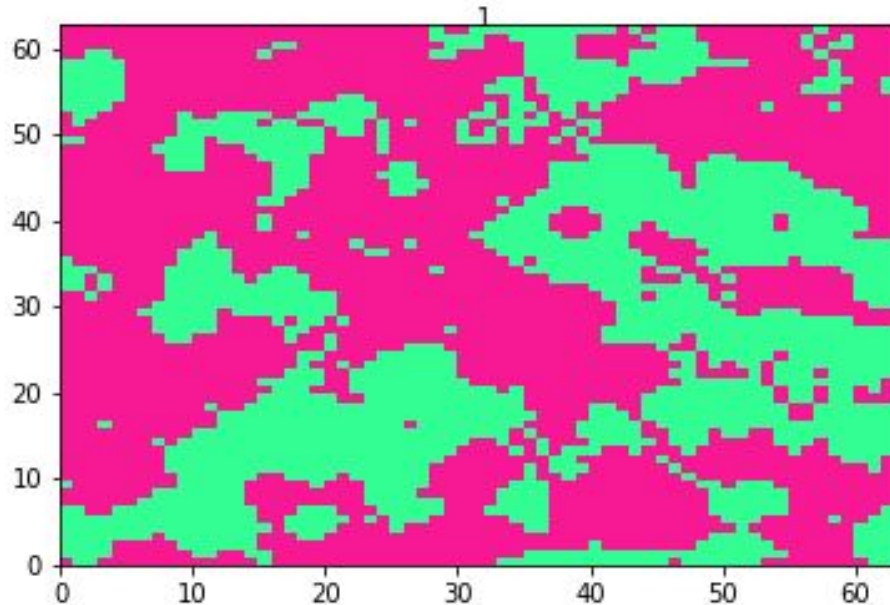
# *The new dynamic*

When the plaquette is chosen the neighbours have probability  $q$  of chose his value randomly

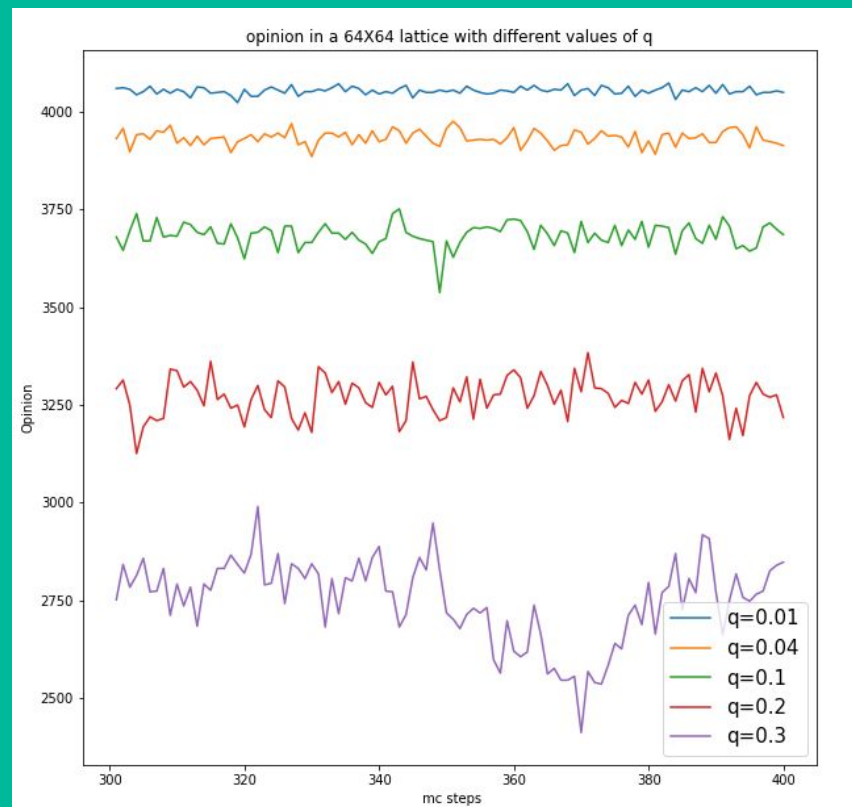
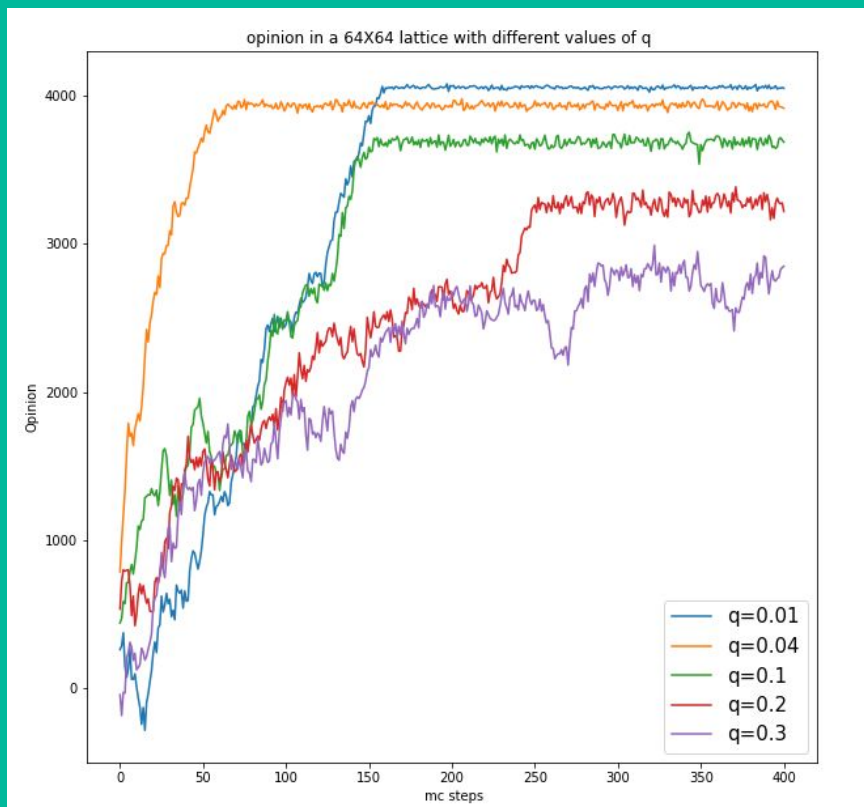




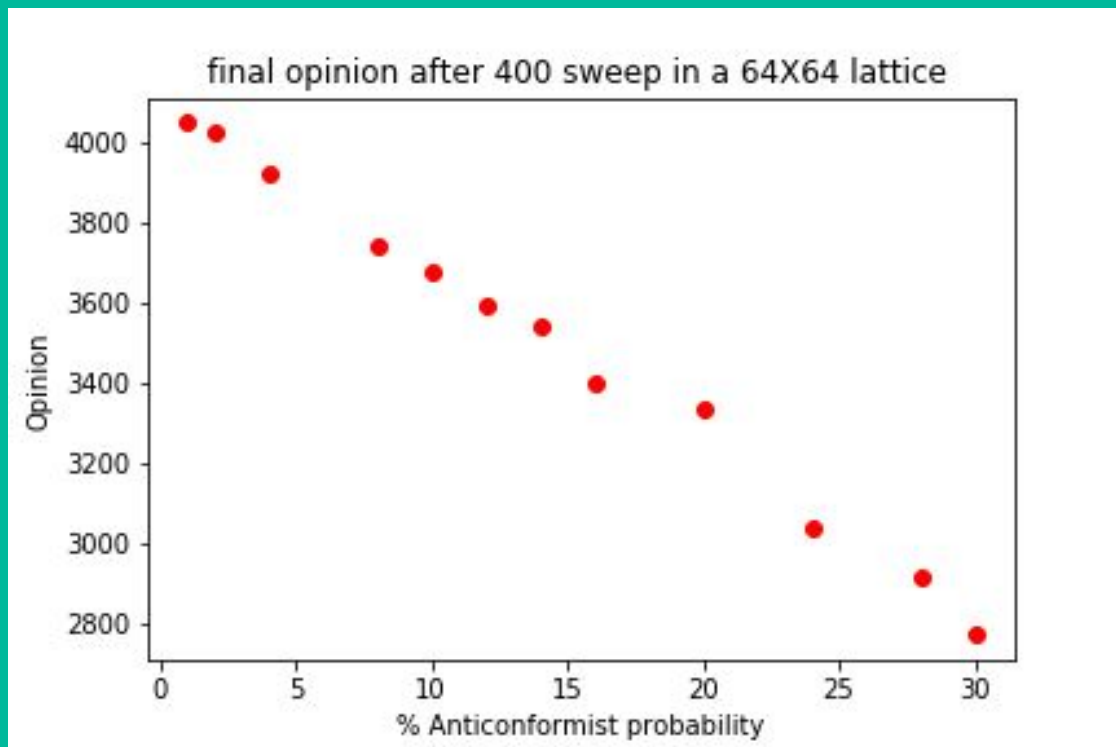
## ***The new dynamic***



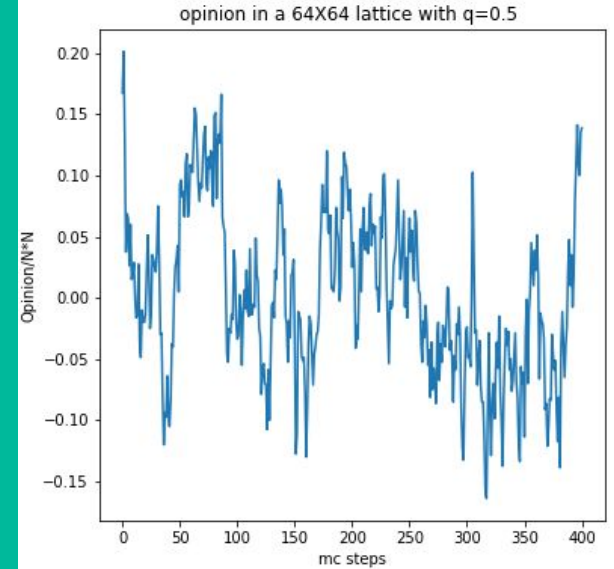
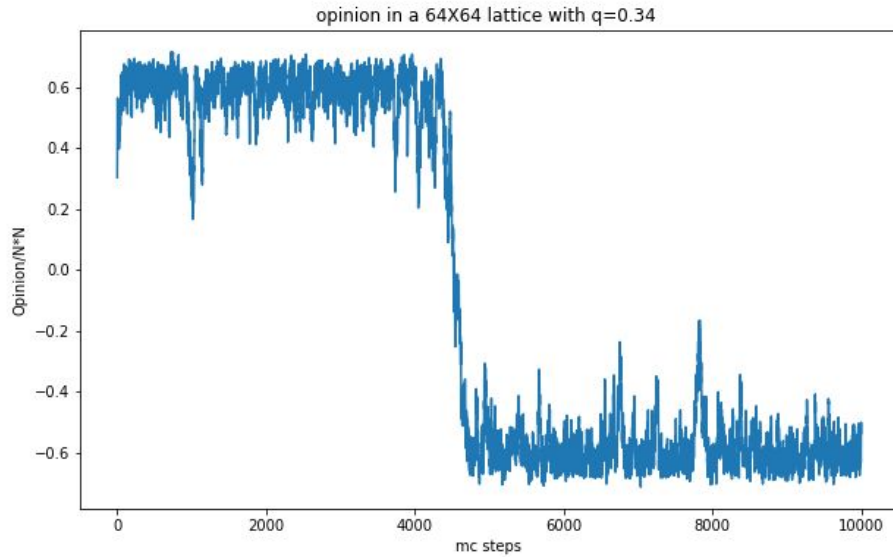
# ***Different probability of being nonconformist***



## ***the steady states for different values of $q$***



## *High values of $q$*





*"That's all Folks!"*