Paradox of integration
– a computational model

Krzysztof Kułakowski [1]

in cooperation with

Małgorzata J. Krawczyk [1]
Piotr Gronek [1]
Alfio Borzi [2]

[1] AGH University of Science and Technology, Cracow, Poland
[2] University of Wuerzburg, Germany

EC & FENS 2017 in Warsaw, July 5-7th

outline

1. Social theory: what to do with minds?
2. Exchange : not only rational
3. Emergent consequences of exchange
4. Integration according to Peter Blau
5. Model algorithm and results*
6. The paradox, and…
7. Self-deprecating strategy + new results*
8. Conclusions

P.S. Mean-field variant**

PM Blau, *Exchange and Power in Social Life*, 1964

* MJ Krawczyk, KK, Physica A 468 (2017) 409

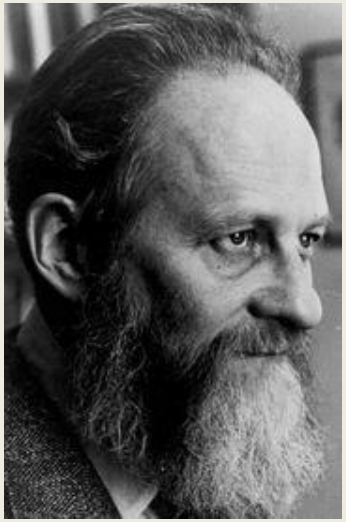
** KK, P Gronek, A Borzi, arXiv:1706.02466

Marxism (*XIX c; K Marx, F Engels, G Lukacs)
- consciousness attributed to social classes

Positivism (*XIX c; A Comte, E Durkheim)
- mere observation of social facts

Verstehen (* ~ 1900; M Weber, G Simmel)
- understanding interpretation, no objectivity

Behaviorism (*1913; J B Watson, I Pavlov, B F Skinner)
- the concept of consciousness not useful for science



Exchange theory (*1964; C G Homans, Peter M Blau)
- rational choice → cooperation, power, conformism

DO UT DES

(I give that you might give)

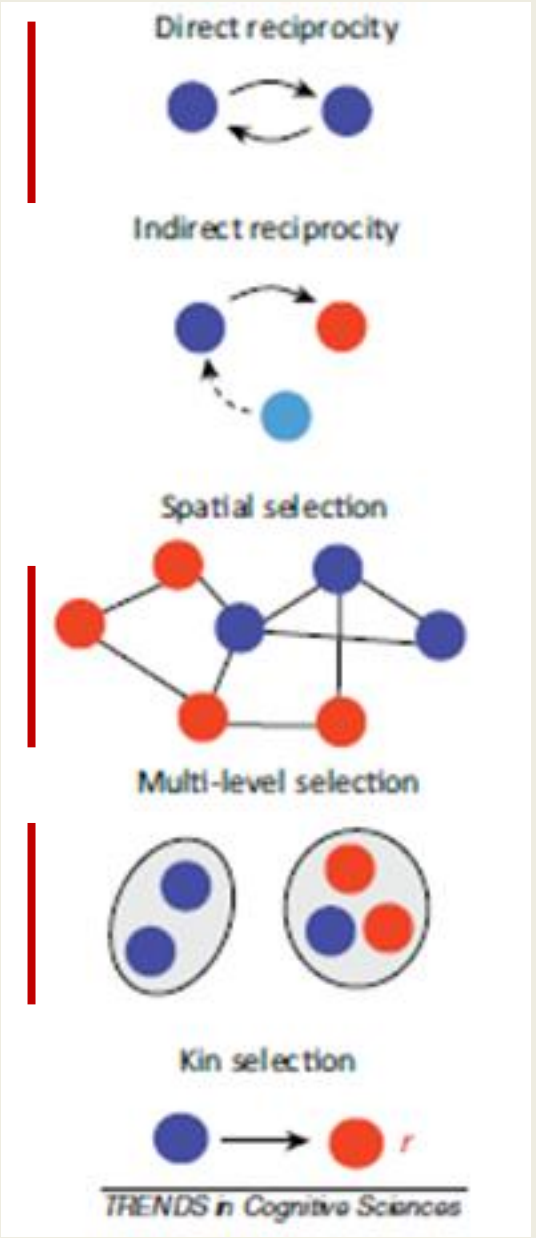
Usually we praise only to be praised.

Social exchange: nonnegotiated

„Neighbors exchange favors ;
children, toys;
colleagues, assistance;
acquaintances, courtesies;
politicians, concessions.”

emergence

integration,
conflicts,
structures
of power…



mechanisms of cooperation

[M A Nowak, 2006; D G Rand, M A Nowak, 2013]

The social integration according to Peter Blau

- X,Y,Z feel that the affiliation to a group is profitable (WHY?)
- they need acceptation
- they try to make a good impression → a competition
- diversification of the group in status

- Collective approval of power legitimates that power
- Collective disapproval of power engenders opposition

The model : (almost) binary interactions

Attempts to attain higher status at expense of somebody else = '**criticism**'
Attempts to reach sympathy of somebody else = '**praise**'

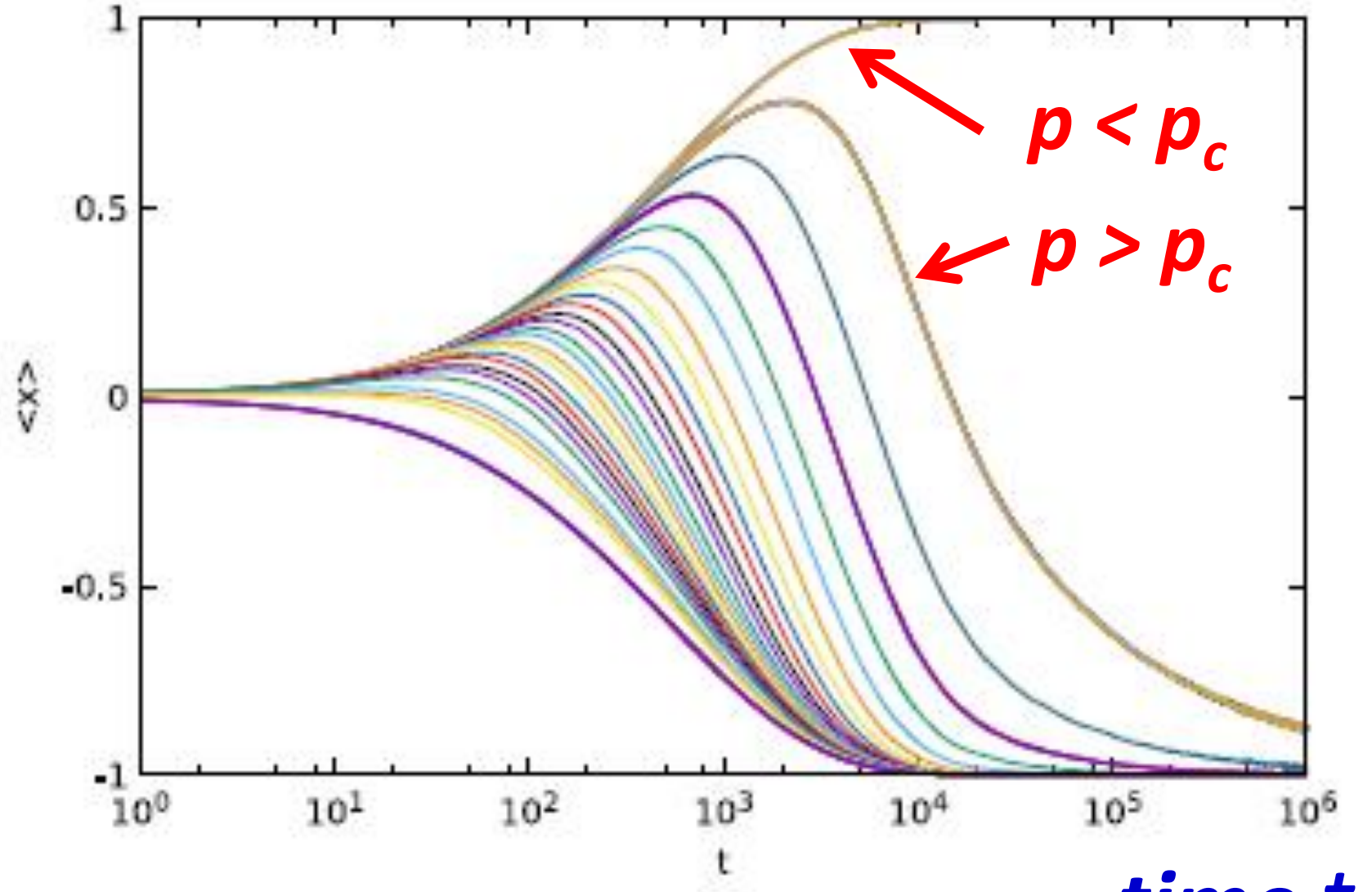
- fully connected network of *N* nodes
- actors (nodes *i=1,2,…,N*) endowed with status *A(i); A* $\in$ *Z*
- *v(A)* – number of nodes with status *A*
- *x(i,j)* $\in$ *[-1,1]* - feeling of *i* about *j*
- *p* $\in$ *[0,1]* - willingness to criticize
- *f(j)* – work function:

$$f(j) = -p + \frac{1-p}{N-1} v(A_j)$$

f(j) < 0 $\rightarrow$ *i* criticizes *j* ; *A(i)* $\rightarrow$ *A(i)*+1; *A(j)* $\rightarrow$ *A(j)*-1;
x(k,i) =-1 for all *k*: *A(k)=A(j)*

f(j) > 0 $\rightarrow$ *i* praises *j* ; *A(i)* $\rightarrow$ *A(i)*-1; *A(j)* $\rightarrow$ *A(j)*+1;
x(k,i) =+1 for all *k*: *A(k)=A(j)*

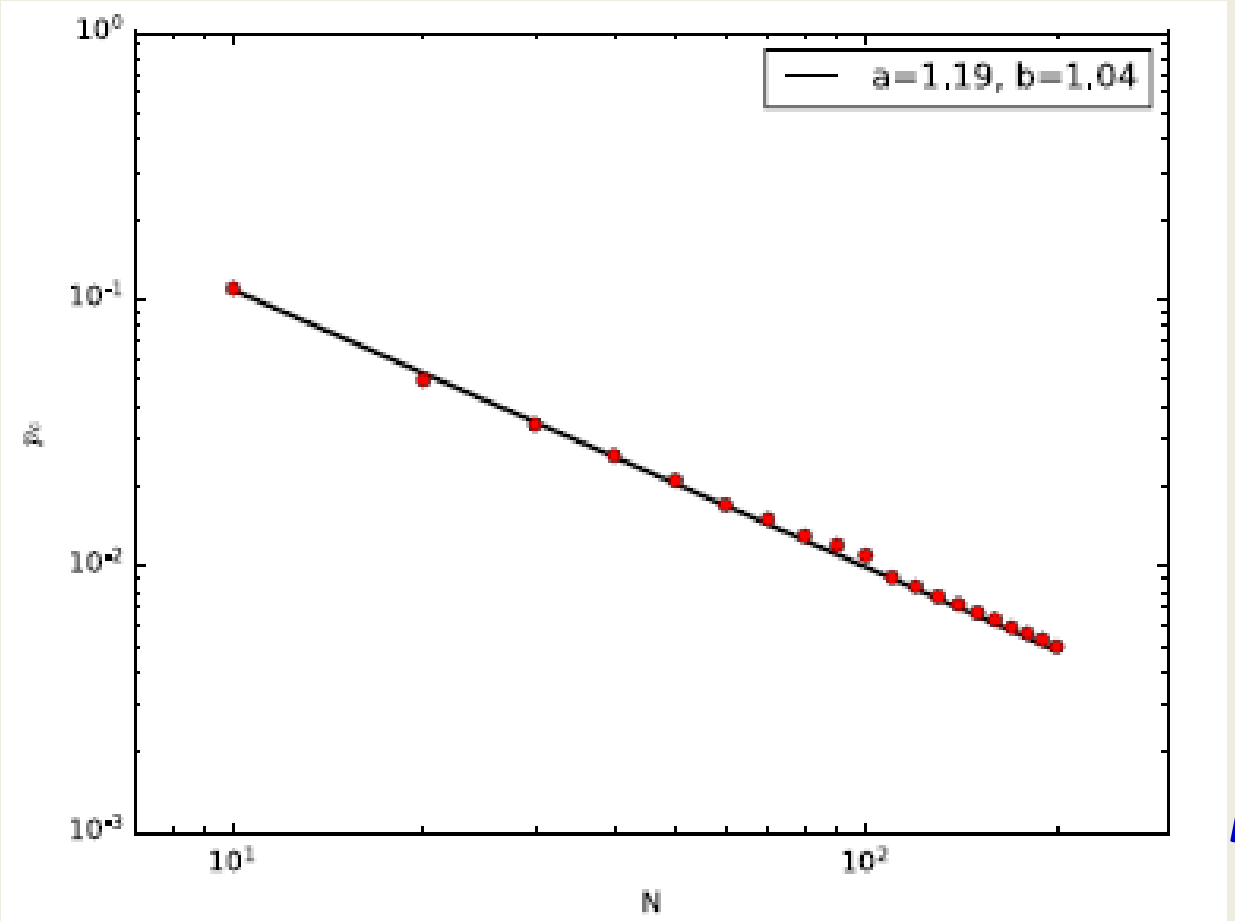
<X>



time *t*

N =75, # = 10^2 realizations

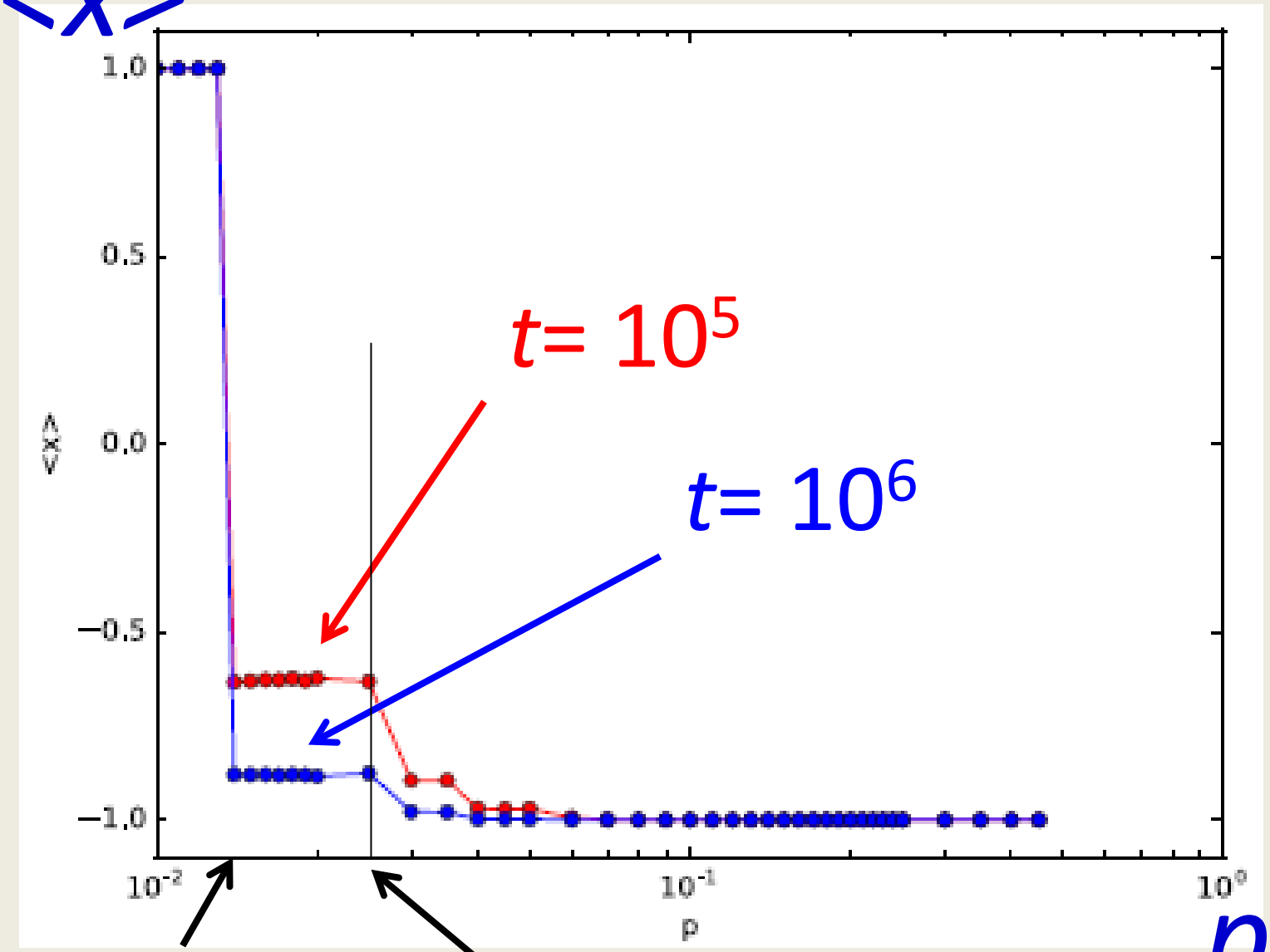
$$p_c \approx aN^{-b}$$



N

$$v_{\max} = 1 \rightarrow f = -p_c + \frac{1 - p_c}{N - 1} = 0 \rightarrow p_c = \frac{1}{N}$$

N =75, # = 10^2 realizations



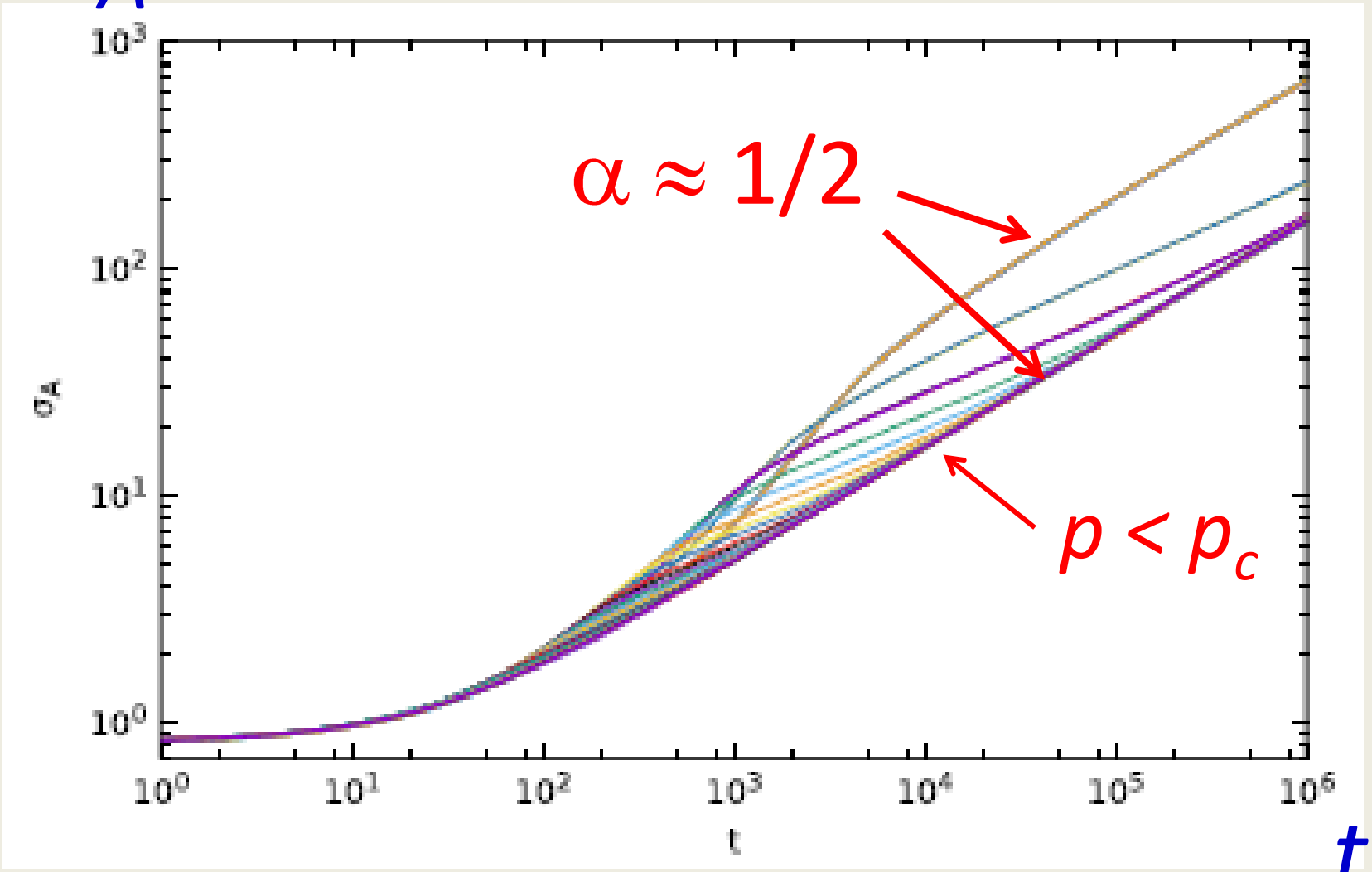
p

p_c = 0.0135 ≈ 1/75

„transient p_c", v_{max} = 2

$\sigma_A \approx t^{\alpha}$

<A>=const



t

N =75, # = 10^2 realizations

Paradox of integration

„In a group situation, impressive qualities make a person attractive in one sense and unattractive in another, because they raise fears of rejection and pose a status threat for the rest of the group. (…)

Paradoxically, the very attributes that make a person an attractive associate for others also raise fears of dependence that make them reluctant to acknowledge their attraction."

[P. M. Blau, Exchange and Power in Social Life, 1964/2009, p 43.]

Tuesday 13 June 2017

The Telegraph

Self-deprecation the key to the art of seduction

Photo: GETTY IMAGES

Self-deprecating humour, as much as floppy hair, was Hugh Grant's secret weapon in Four Weddings And A Funeral

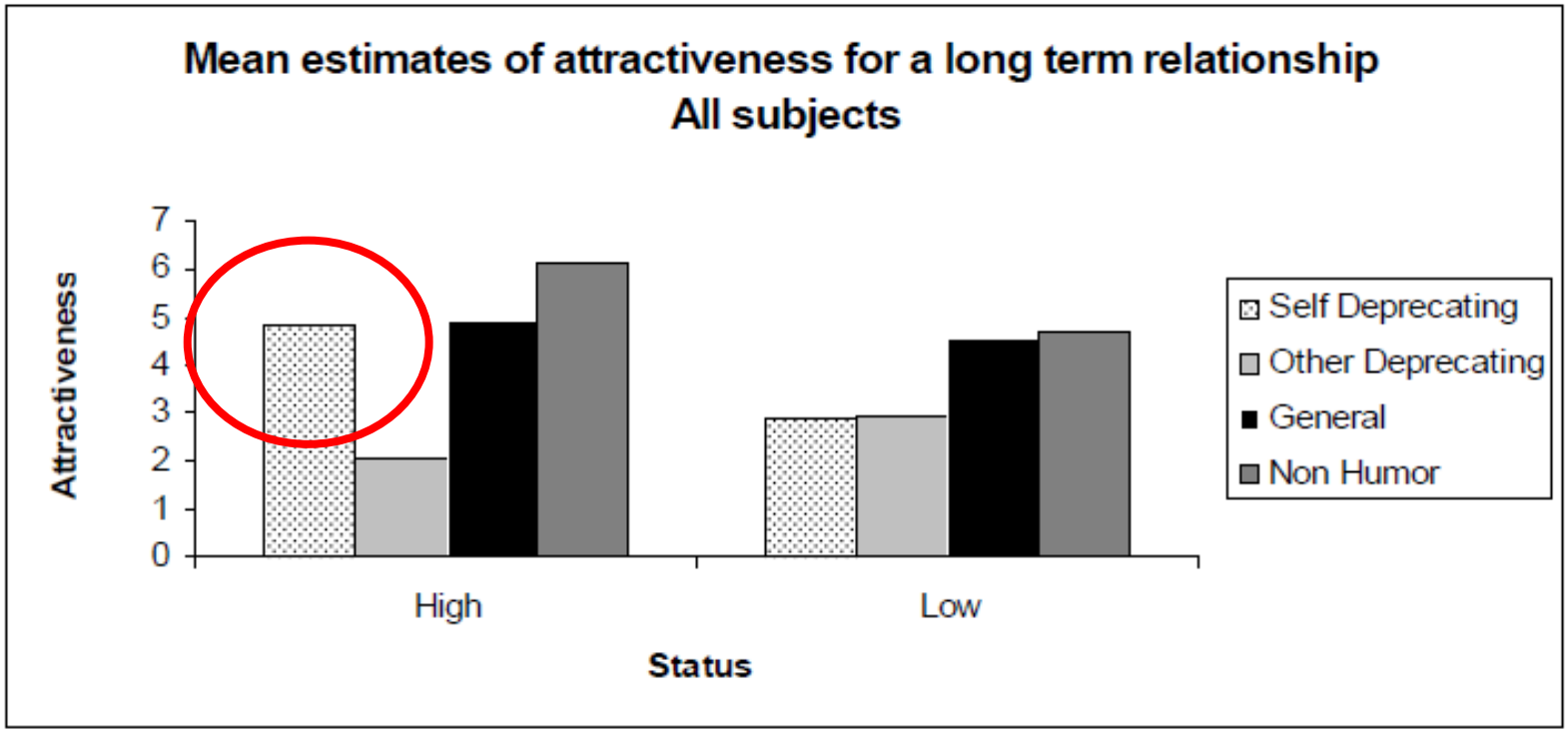
However, praising is an attribute of high social status

Walter Brennan, in Rio Bravo

-Do you think I'll ever get to be a sheriff?

… both men and women give higher long-term attractiveness ratings to potential mates who used self-deprecating rather than other-deprecating humor – but only if the potential mate was describing as having high status.

Figure 1. Mean estimates of long-term attractiveness (on a 0-8 scale) by humor type and presenter status, across all participants.



G Greengross, GF Miller, Evolutionary Psychology (www.epjournal.net – 2008. 6(3): 393-408)

The model : self-deprecating strategy

Attempts to attain higher status at expense of somebody else = '**criticism**'
Attempts to reach sympathy of somebody else = '**praise**'

- fully connected network of *N* nodes
- actors (nodes *i=1,2,…,N*) endowed with status *A(i); A* $\in Z$
- *v(A)* – number of nodes with status *A*
- *x(i,j)* $\in [-1,1]$ - feeling of *i* about *j*
- *p* $\in [0,1]$ - willingness to criticize
- *f(j)* – work function:

$$f(i,j) = -p' + \frac{1-p'}{N-1} v(A_j)$$

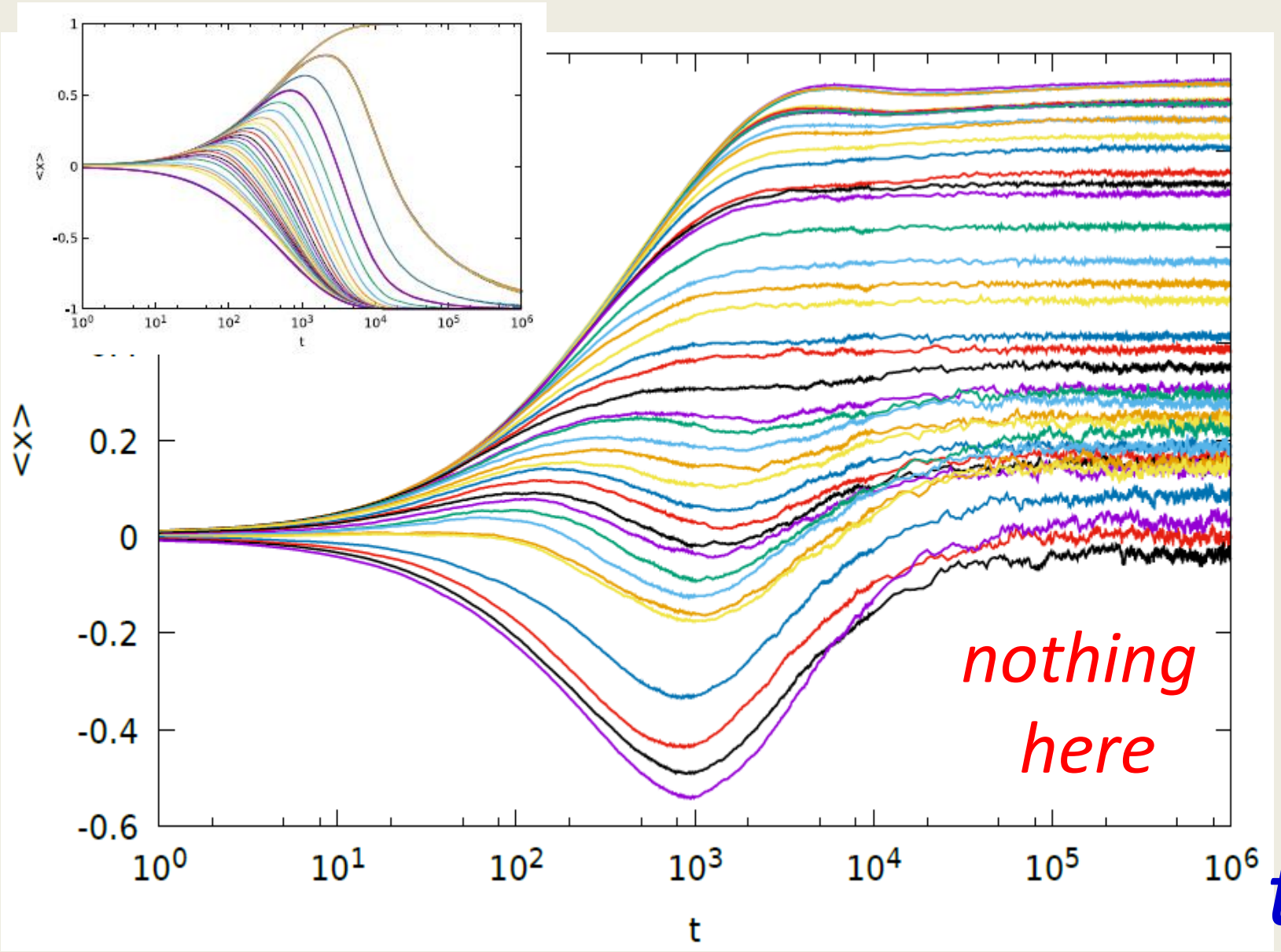
high status $\rightarrow$
more willing to praise

$$p' = \frac{2p}{1+2^{A(i)}}$$

f(j) < 0 $\rightarrow$ *i* criticizes *j* ; *A(i)* $\rightarrow$ *A(i)*+1; *A(j)* $\rightarrow$ *A(j)*-1;
x(k,i) =-1 for all *k*: *A(k)=A(j)*

f(j) > 0 $\rightarrow$ *i* praises *j* ; *A(i)* $\rightarrow$ *A(i)*-1; *A(j)* $\rightarrow$ *A(j)*+1;
x(k,i) =+1 for all *k*: *A(k)=A(j)*

<x>

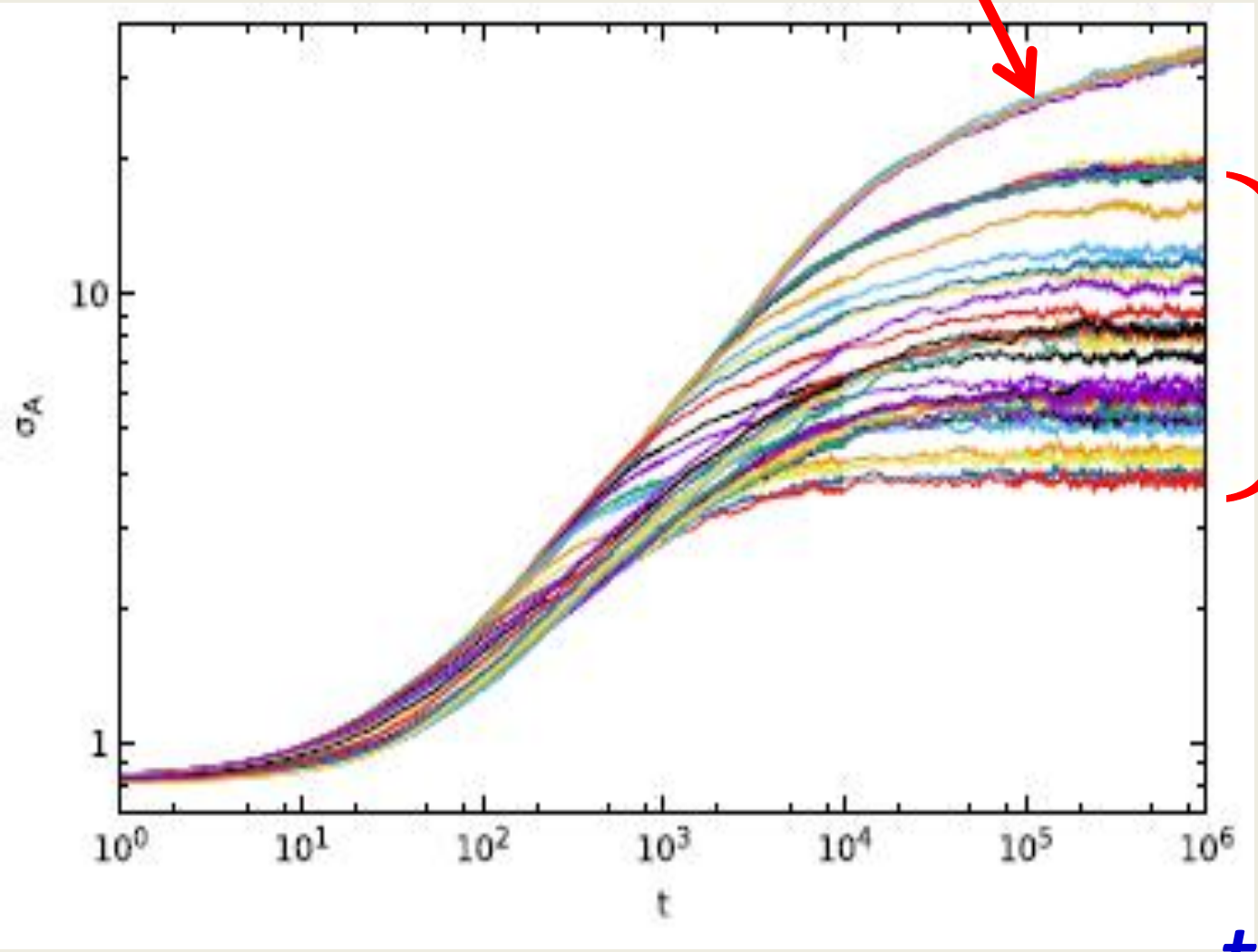


continuity

t

$\sigma_A \approx t^{\alpha}$

$p < p_c,\ \alpha > 0$



$p > p_c,\ \alpha \approx 0$

t

Conclusions

Without the self-deprecating strategy, a sharp transition appears between the state of overall acceptation and of prevailing hostility.

With the self-deprecating strategy, the transition is visible only in the variance of the status, which remains limited for $p > p_c$.
Also, the relations are much improved.

not the end yet...

The model : self-deprecating strategy, mean-field

Attempts to attain higher status at expense of somebody else = '**critique**'
Attempts to reach sympathy of somebody else = '**praising**'

- $v(A) \in Z$ – status *distribution*
- $x(A) \in [-1,1]$ - feeling about actors of status *A*
- $p \in [0,1]$ - willingness to criticize
- $f(A,B)$ – work function:

$$f(A,A') = -p' + \frac{1-p'}{N-1} v(A)$$

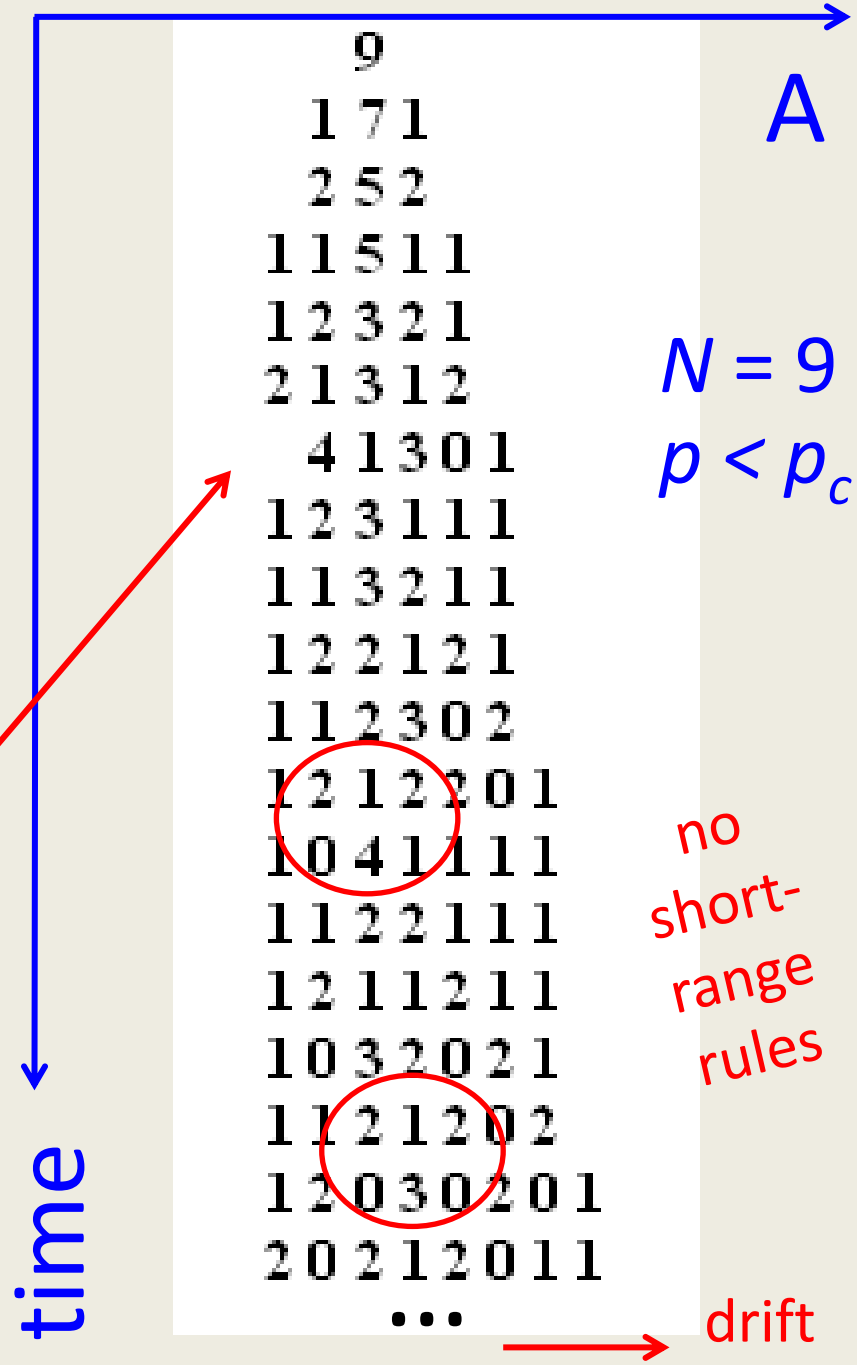
$$p' = \frac{2p}{1+2^{A'}}$$

- praising (or not) is decoupled from being praised (or not)
- only averaged work functions matter.

see our poster

An example
of a time evolution
of the distribution v(A)

<A> ≠ const;
a drift
towards
higher status
for $p < p_c$



see our poster

Thank you