SANTA FE INSTITUTE

Social learning strategies

Cognitive representations of social norms

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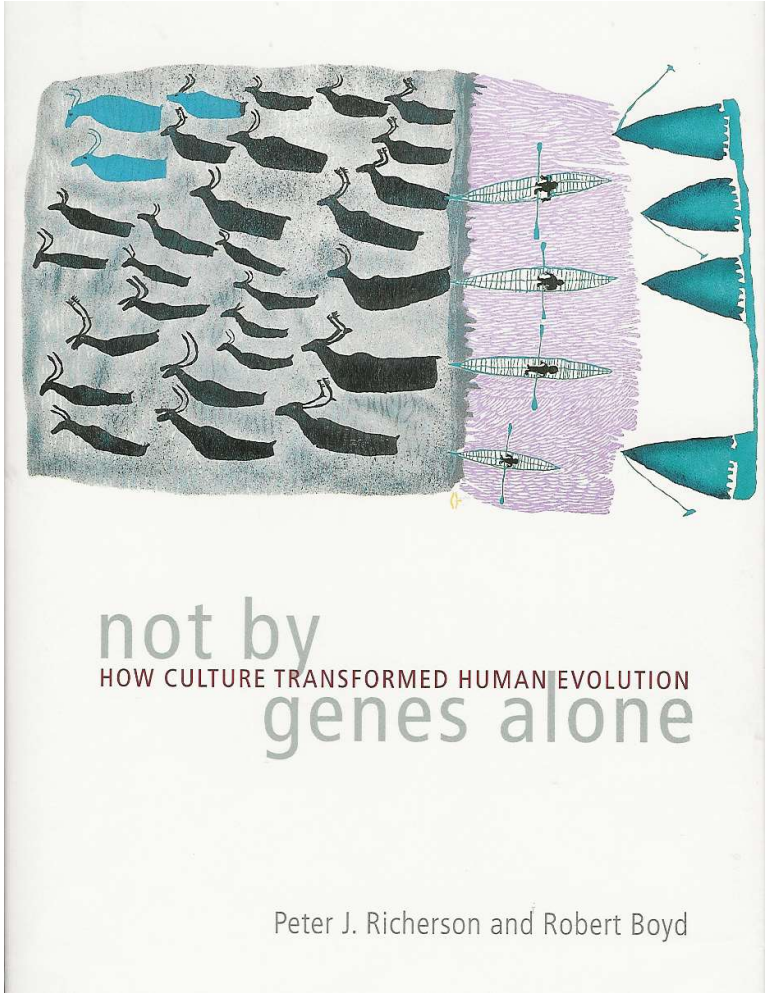
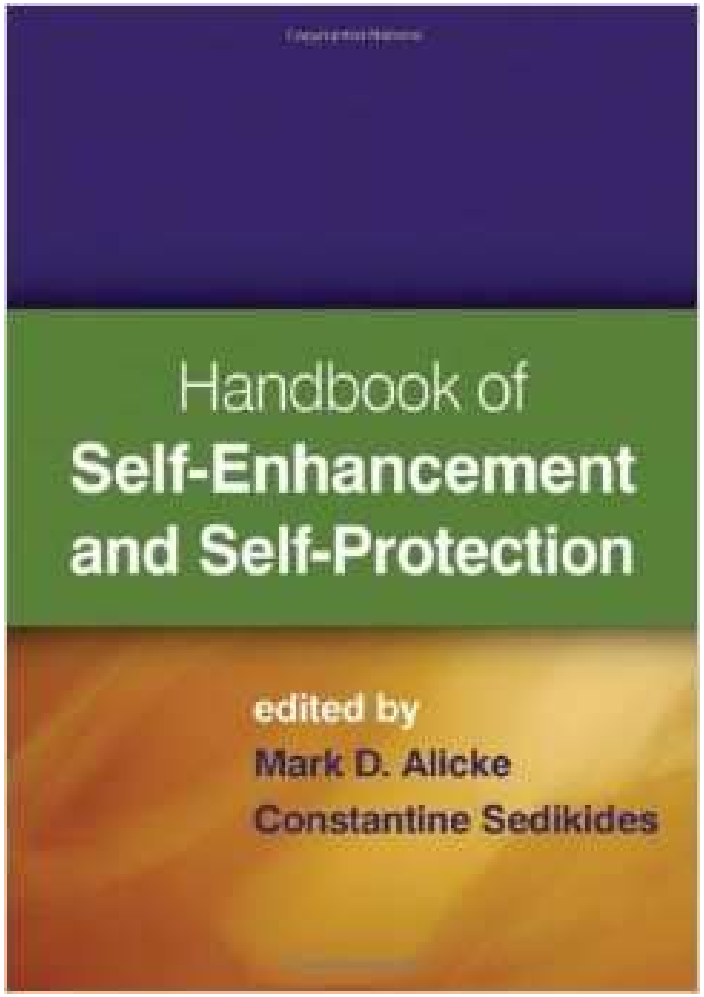
Santa Fe Institute

Social norms: What is, and what should be

Different views of human social cognition





Biases, biases …

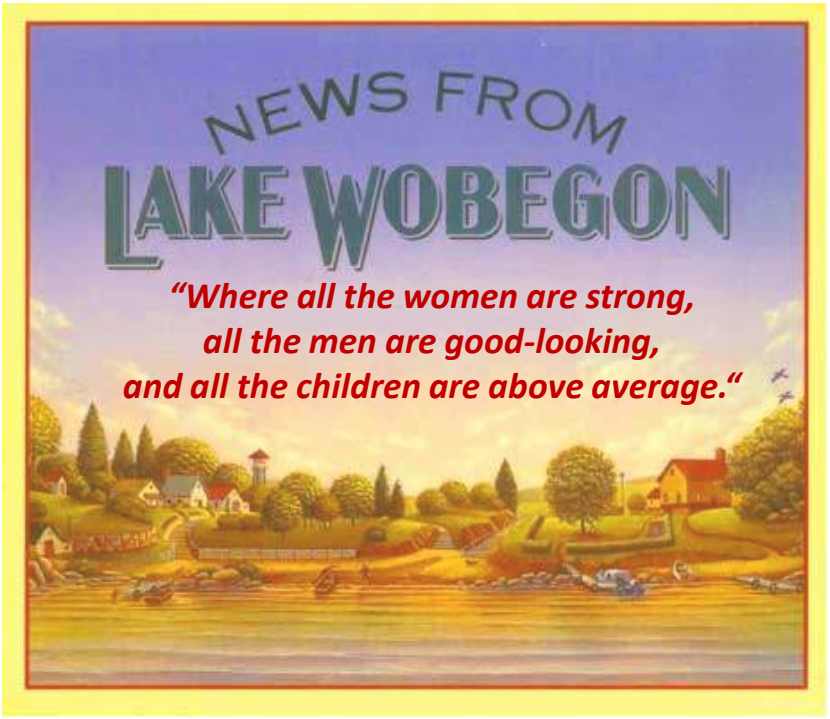
Table 1. *Some errors of judgment identified and labeled by social psychologists*

Overconfidence bias	Correspondence bias
Fundamental attribution error	Halo effect
False consensus effect	False uniqueness effect
Positivity bias	Negativity bias
Confirmation bias	Disconfirmation bias
Justice bias	Male bias
Hot hand fallacy	Gambler's fallacy
Self-protective similarity bias	Hindsight bias
Self-serving bias	"Ultimate" self-serving bias
Optimistic bias	Pessimistic bias
Sinister attribution error	Conjunction fallacy
Ingroup/outgroup bias	Positive outcome bias
Hypothesis-testing bias	Diagnosticity bias
Durability bias	Vulnerability bias
Self-image bias	Labeling bias
Observer bias	External agency illusion
Systematic distortion effect	Intensity bias
Asymmetric insight illusion	Just world bias
Dispositional bias	Romantic bias
Clouded judgment effect	Bias blind spot
Empathy neglect	Empathy gaps

Note: Partial list of major topics of studies published since 1985.

Krueger & Funder, 2004,
Behavioral and Brain Sciences.

Self-enhancement

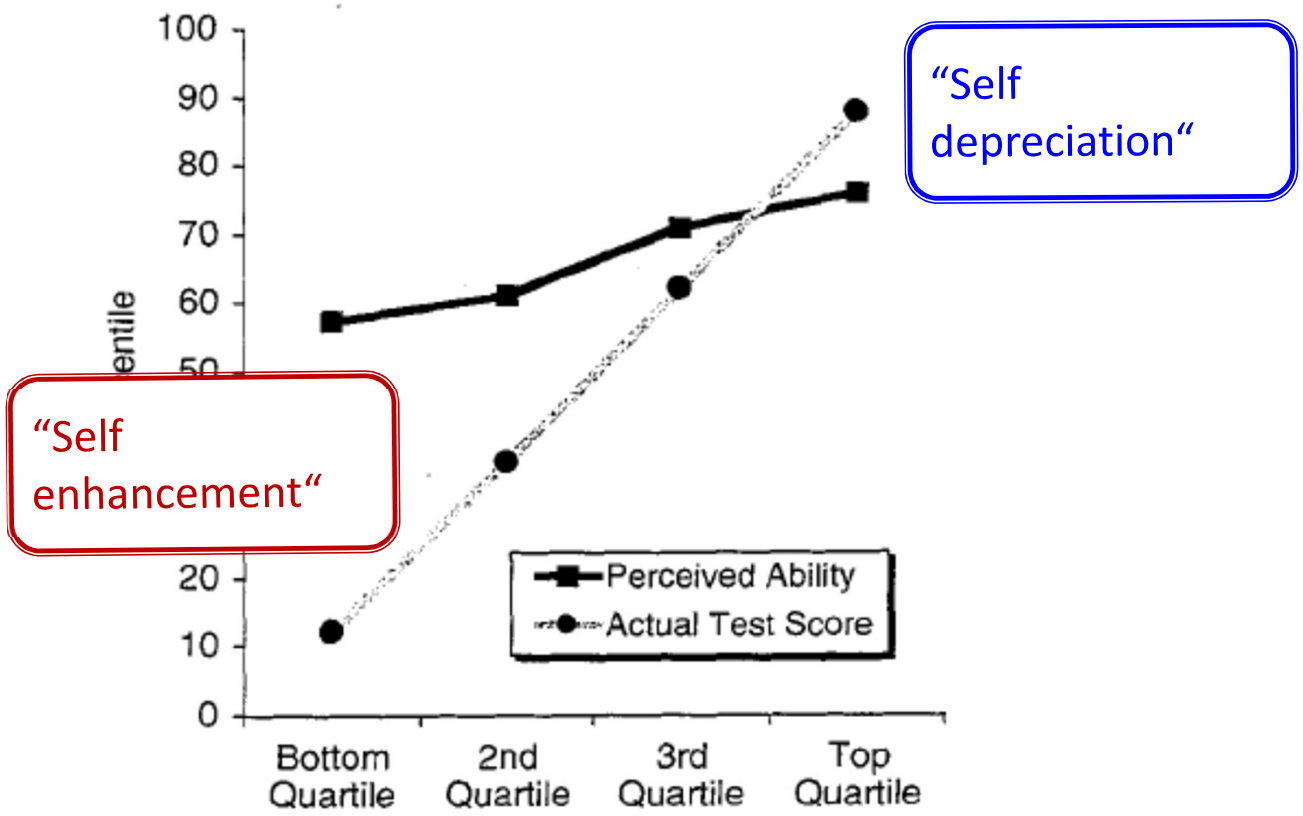


"*Among the most robust and widely replicated phenomena from the literature on social comparative judgments*"

(Chambers & Windschitl, 2004; also Alicke & Govorun, 2005; Roese & Olson, 2007).

Self enhancement: Typical finding

"Compare your ability [in this test] *with an average student."*



Kruger & Dunning, 1999
"Unskilled and unaware of it"

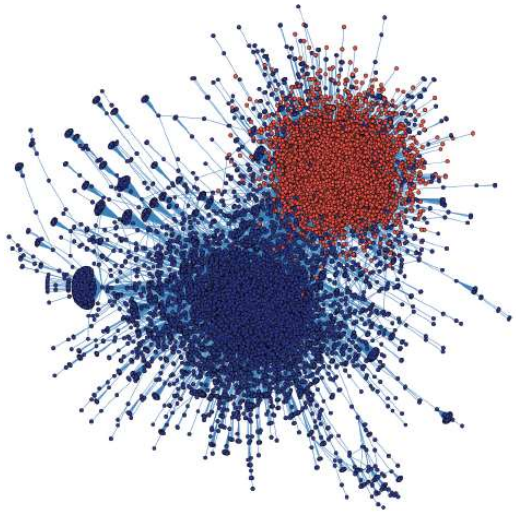
Some explanations for self-enhancement

- Motivational bias (Alicke, Klotz, Breitenbecher, Yurak, & Vredenburg, 1995)
- Cognitive incompetence (Kruger & Dunning, 1999)

→ Can‘t explain self depreciation

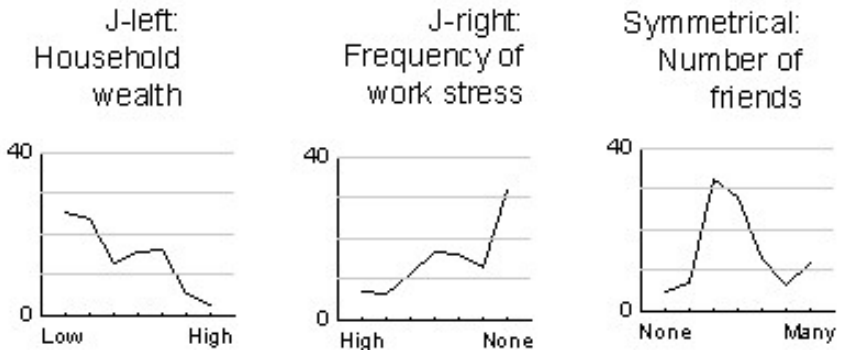
Social sampling model

Social networks



Social-cognitive algorithm

Task properties



Galesic, Olsson, Rieskamp, 2011,14,17

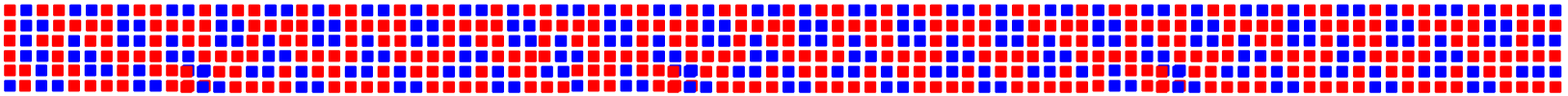
Algorithm

"What % of group X has a certain characteristic?"

A. Recall own social contacts that are similar to group X
B. Recall those among them who have the characteristic
C. Estimate B/A

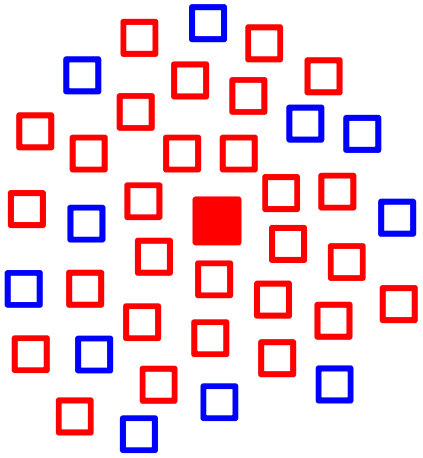
Social networks

Whole society:



60:40

Social contacts of a red person:



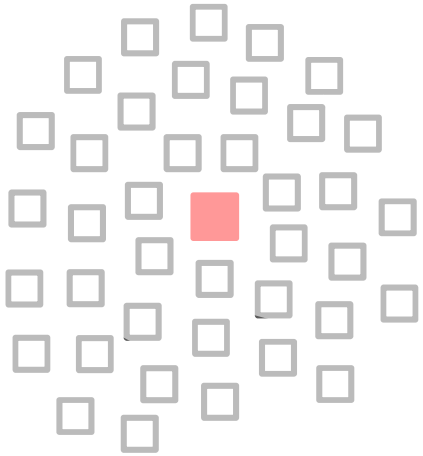
72:28

Example

„What % of the general population are red?“

A. Recall ρ social contacts most similar to general population (→ Sample)

B. Recall those who are red (with probability α)



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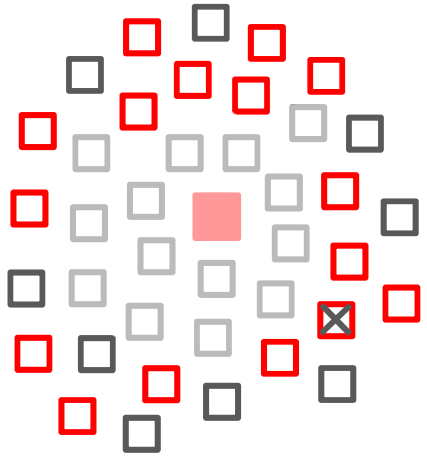
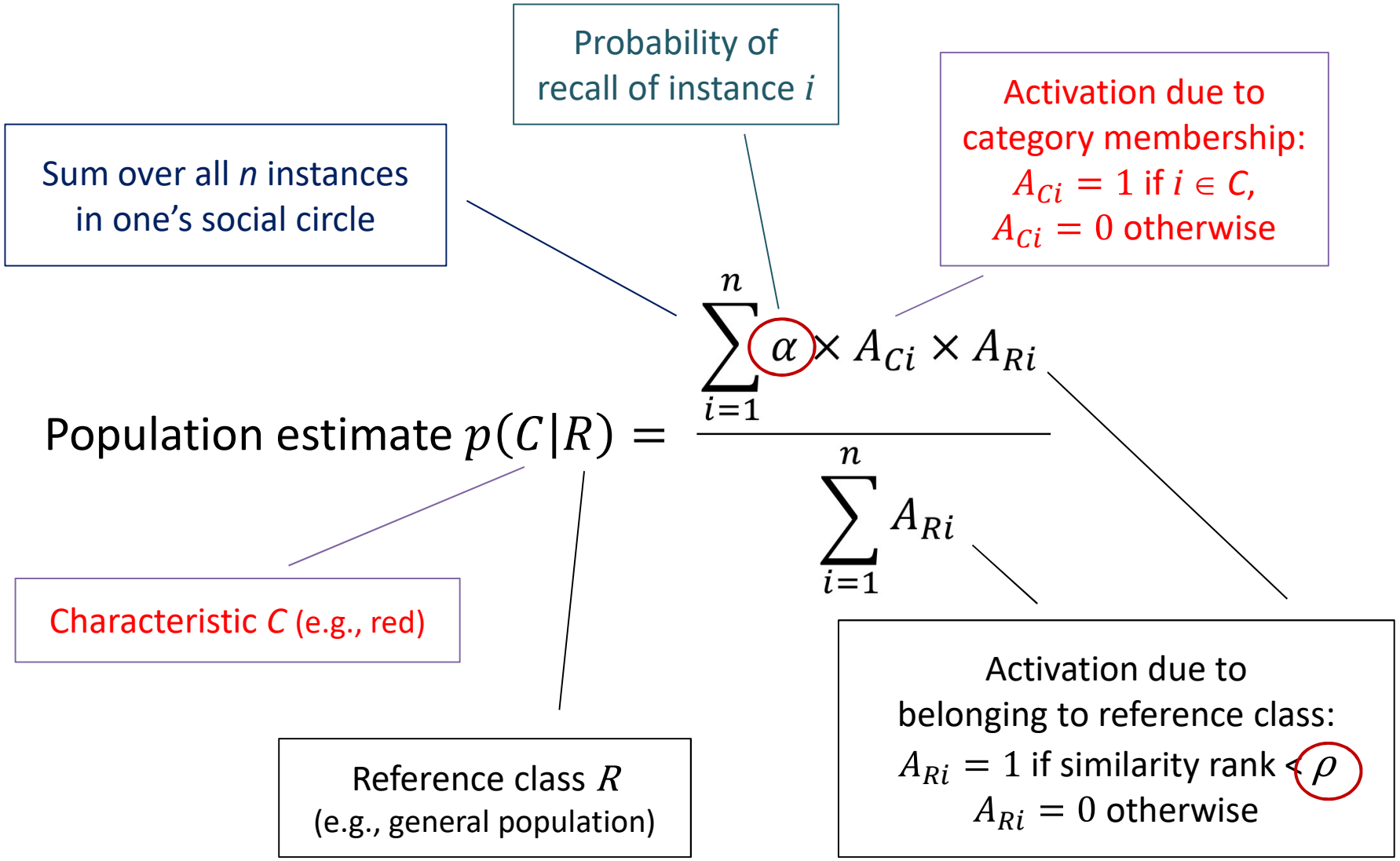


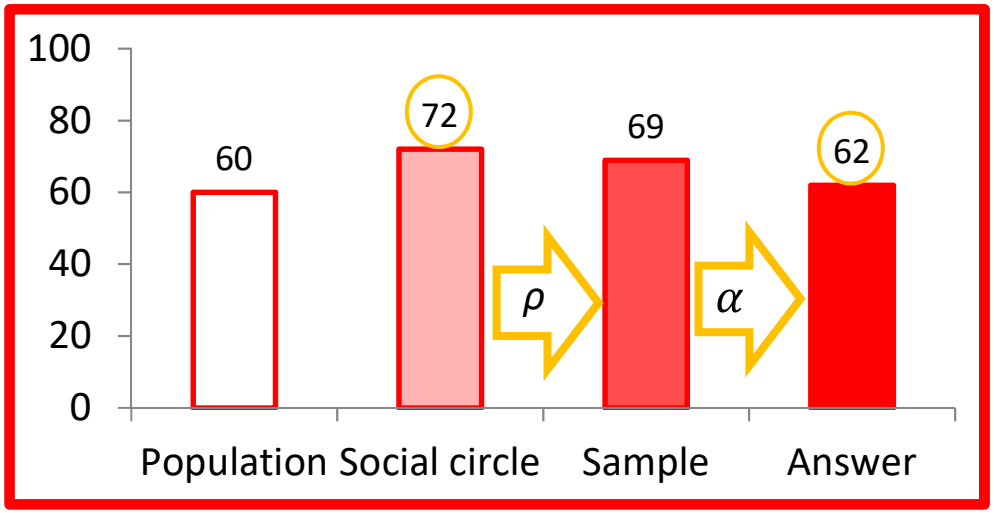
C. Estimate answer: Reds / Sample → 15 / 25 = 60%

Algorithm: formal implementation

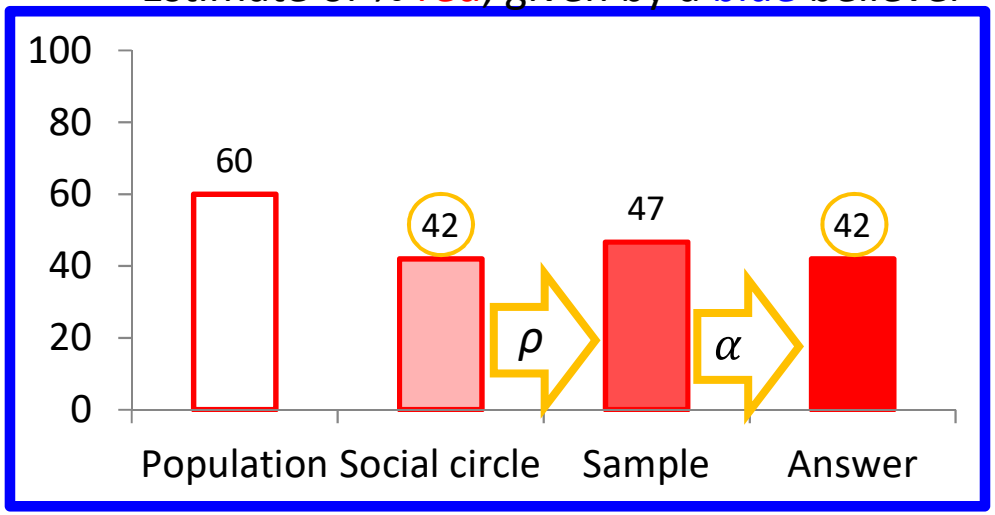


Tasks with 2 categories

Estimate of % red, given by a red believer



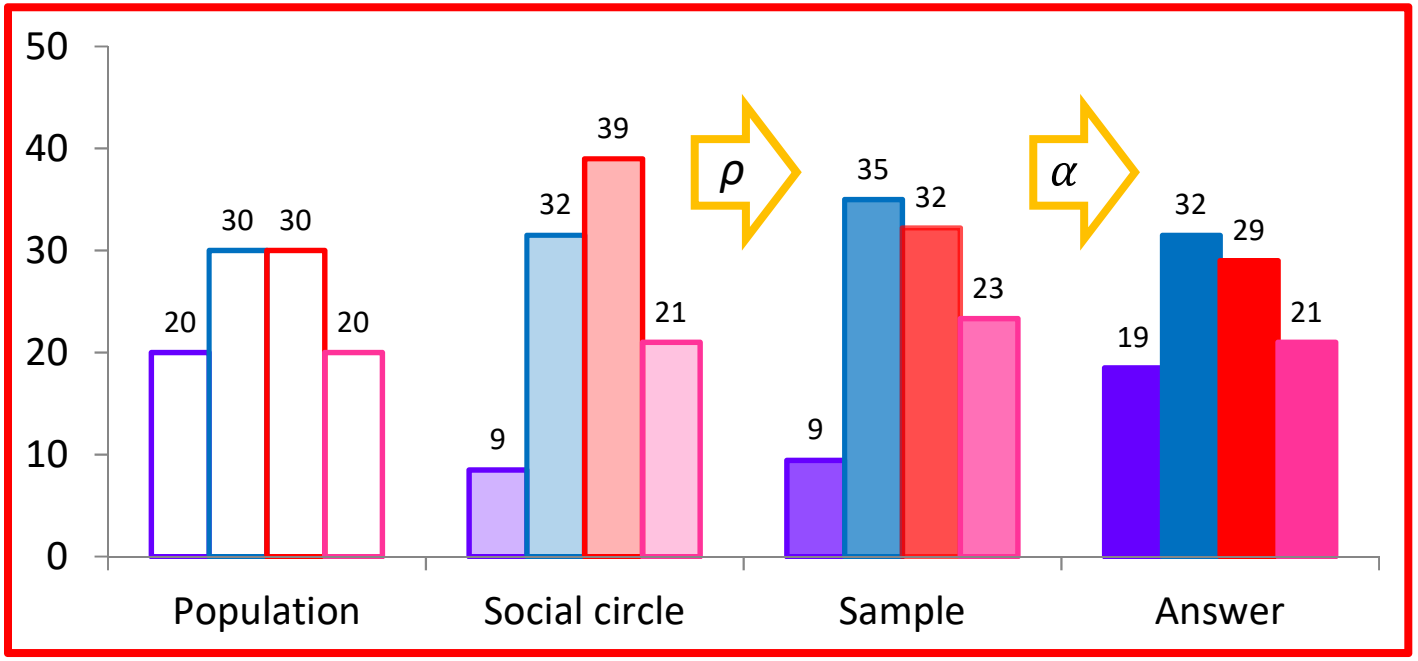
Estimate of % red, given by a blue believer



$\rho = .9$, $\alpha = .9$

Tasks with more than 2 categories

Estimate of % pink, red, violet, and blue, given by a red person



$\rho = .9$, $\alpha = .9$

Empirical test

- Probabilistic national sample, NL, n=1400+
- Questions:
  1. Own characteristics
     - income, health, partner conflicts, work stress, friends, education → actual population distributions (benchmark)
  2. Estimates of social circles
     - % of one's *social circle* that belongs into each category

       "All adults you were in personal, face-to-face contact with at least twice this year ... your friends, family, colleagues, and other acquaintances."

  3. Estimates of general population
     - % of Dutch population in each category

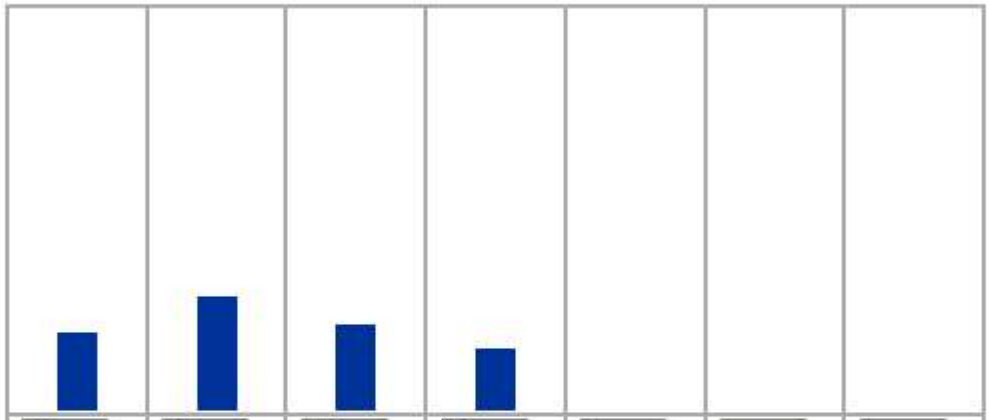
Example question: Personal income

CentER data

De volgende vraag gaat over het totale **persoonlijke** netto inkomen van uw sociale contacten in de afgelopen maand. Dat wil zeggen inkomen uit werk, pensioen, rente, dividend enz. die mensen persoonlijk ontvangen bij elkaar opgeteld, na aftrek van belastingen.

LISS

Hoeveel procent van uw sociale contacten valt in de volgende categorieën:



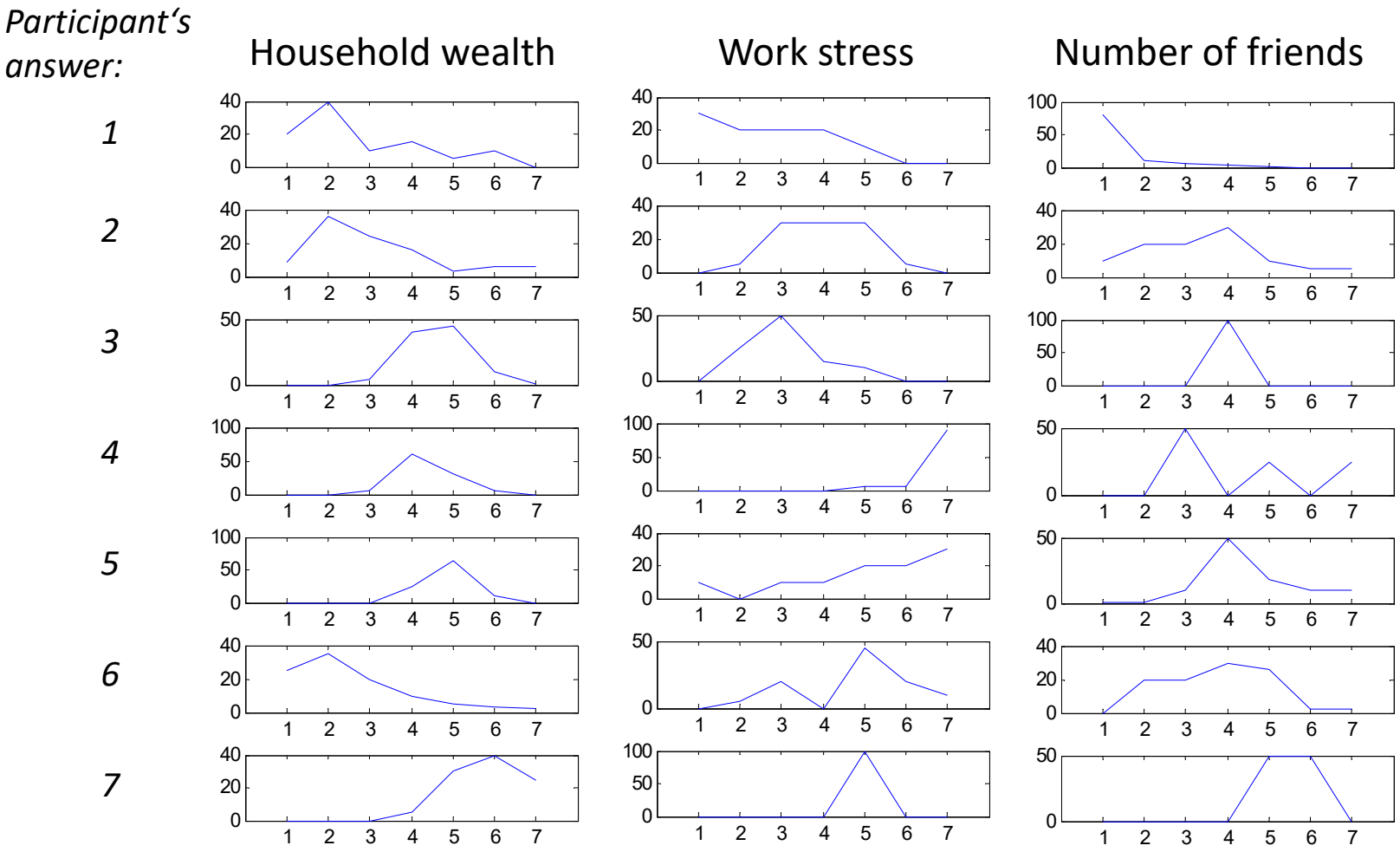
20 %	29 %	22 %	16 %	%	%	%
tot €1.000	€1.001 – €1.500	€1.501 – €2.000	€2.001 – €2.500	€2.501 – €3.000	€3.001 – €5.000	€5.001 of meer

Totaal: 87 %

Vorige Verder

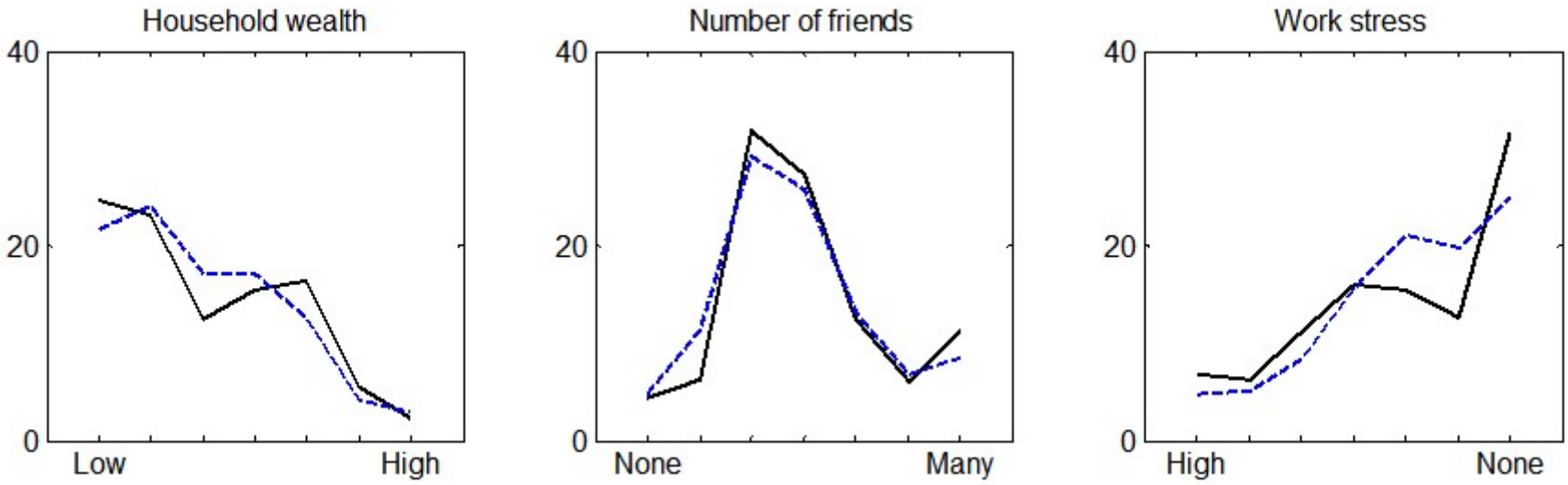
UNIVERSITEIT VAN TILBURG

Examples of social circle distributions



Netherlands, *N*=1416

People know their social circles well



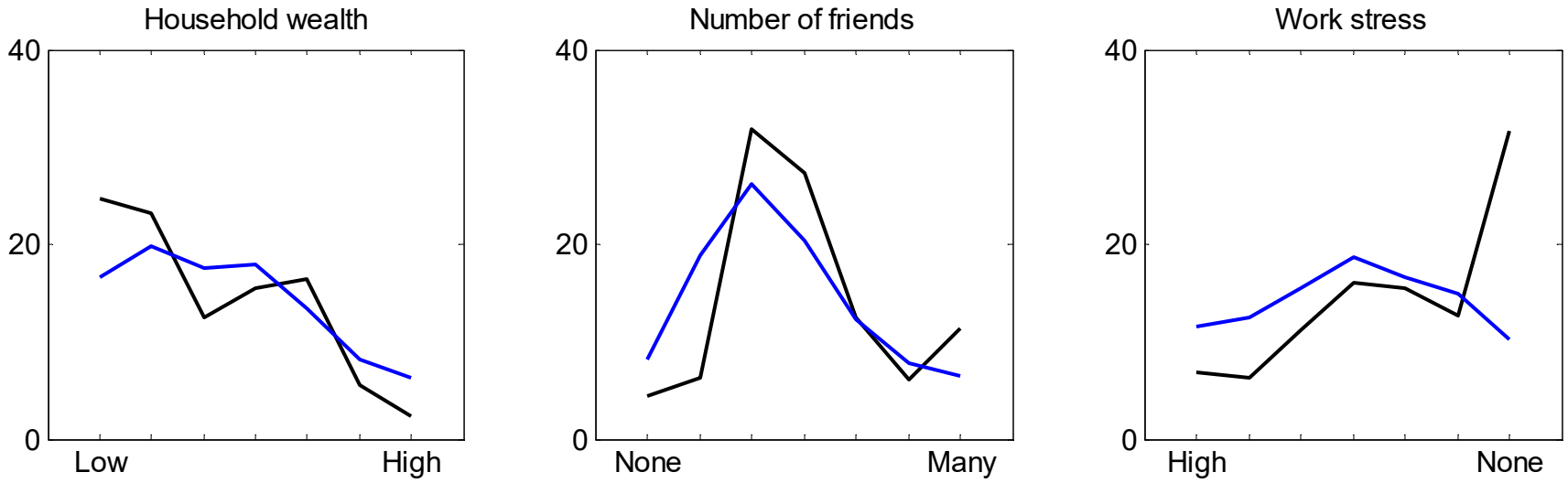
Median r = .87, $RMSE$ = 5.9

Actual population distributions

Average of social circle distributions

Netherlands, N=1416

But they know general population less well



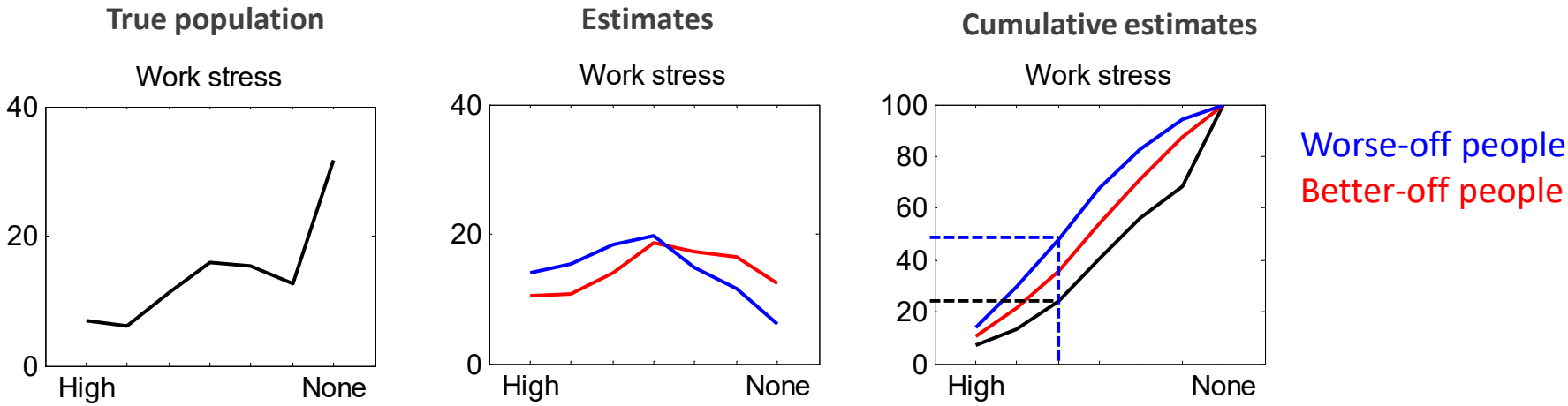
Median *r* = .57, *RMSE* = 8.9

Actual population distributions

Estimated population distributions

Netherlands, *N*=1416

Population distribution determines apparent biases



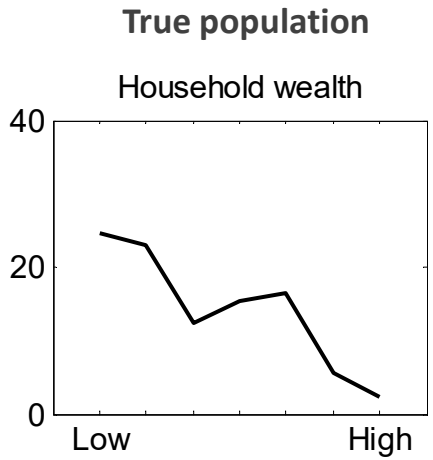
J-right shape

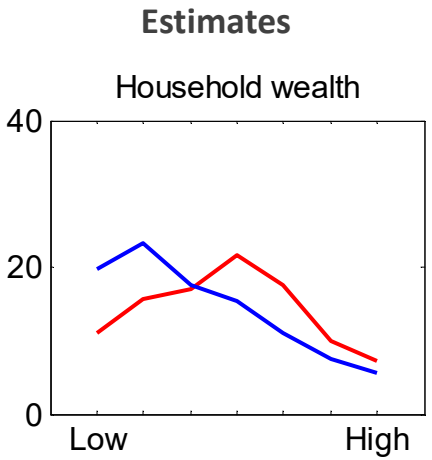
Apparent self-enhancement

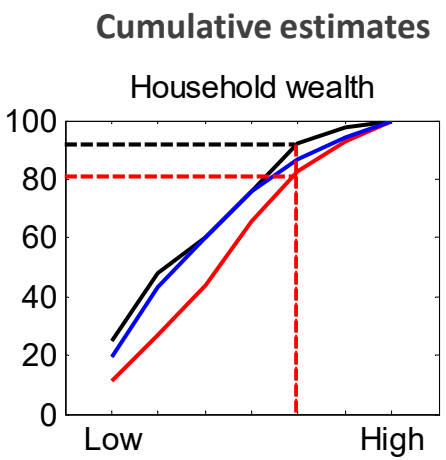
- own position appears better than it really is
- more so for worse-off people.

Netherlands, *N*=1416

Population distribution determines apparent biases







Worse-off people
Better-off people

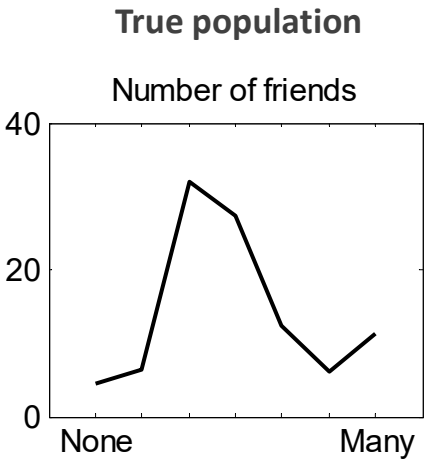
J-left shape

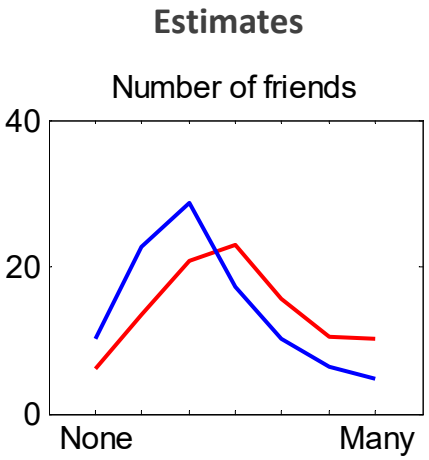
Apparent self-depreciation

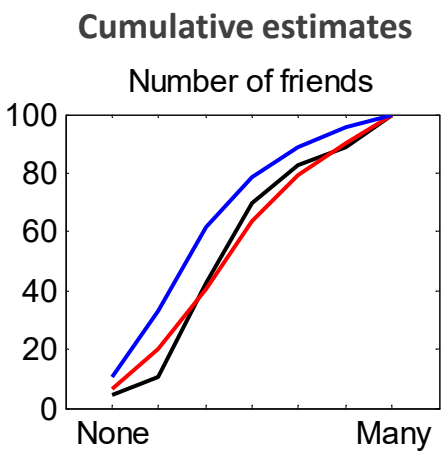
- own position appears worse than it really is
- more so for better-off people.

Netherlands, *N*=1416

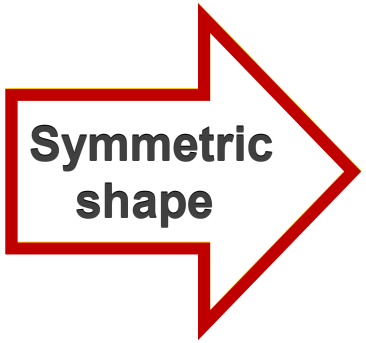
Population distribution determines apparent biases







Worse-off people
Better-off people



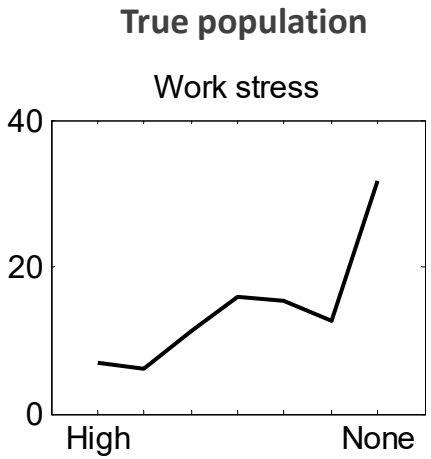
Both apparent biases:

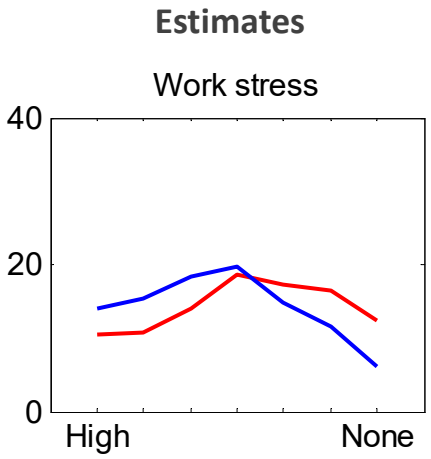
- Self-enhancement for worse-off,

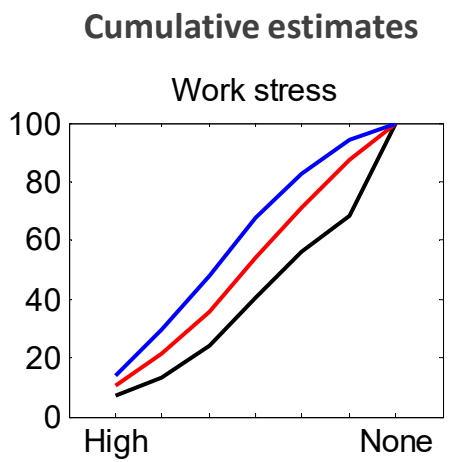
  Self-depreciation for better-off people.

Netherlands, *N*=1416

SSM predictions of empirical results







Worse-off people
Better-off people

J-right shape

Apparent

self-enhancement

Netherlands, *N*=1416
$\rho = .55$, $\alpha = .47$

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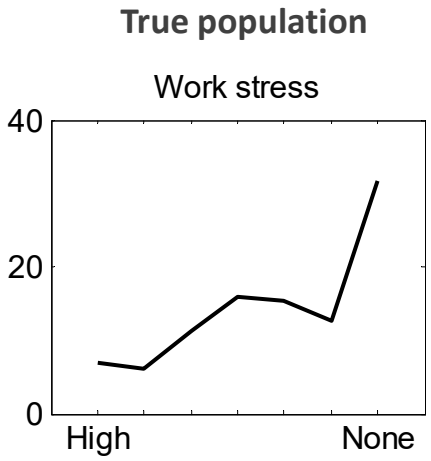
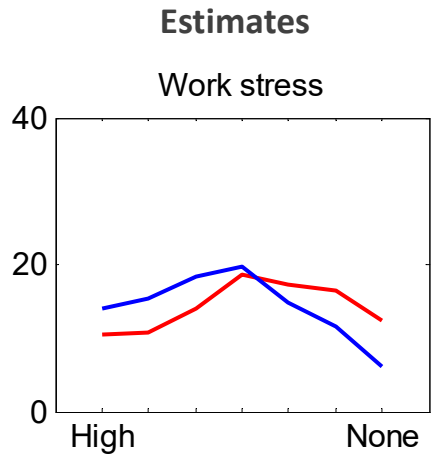
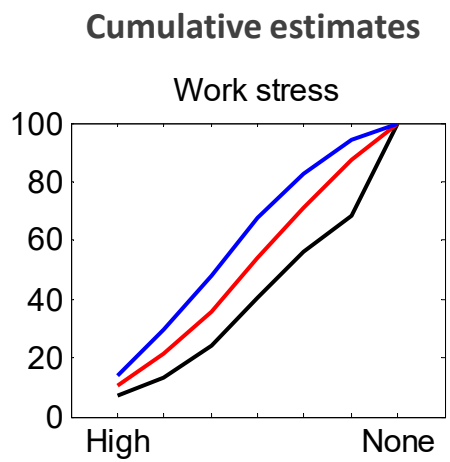
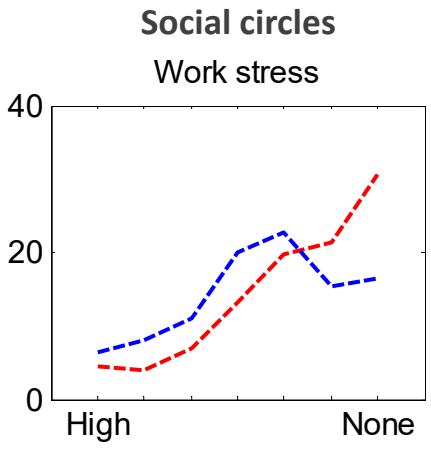
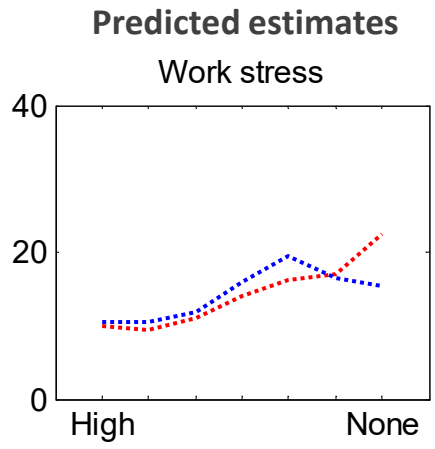


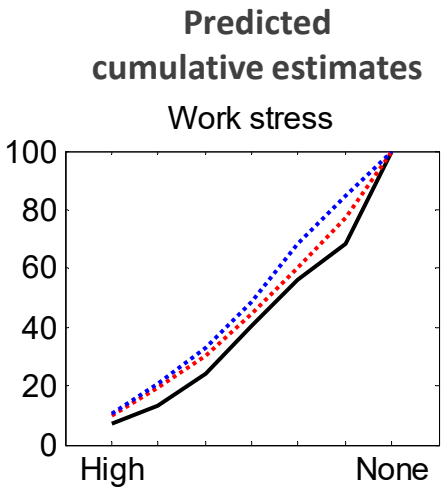




Worse-off people
Better-off people







Netherlands, *N*=1416
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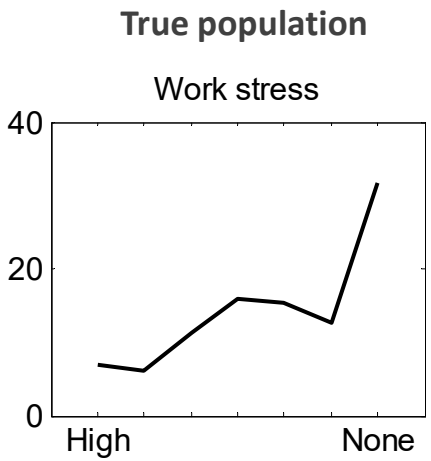

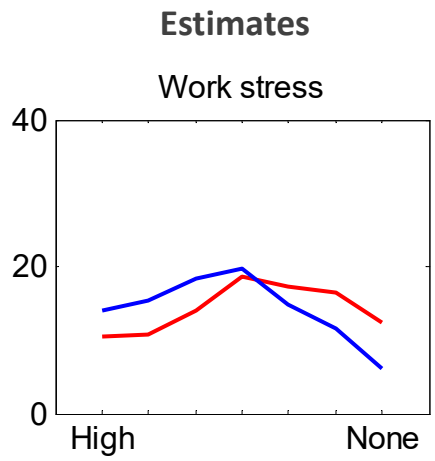

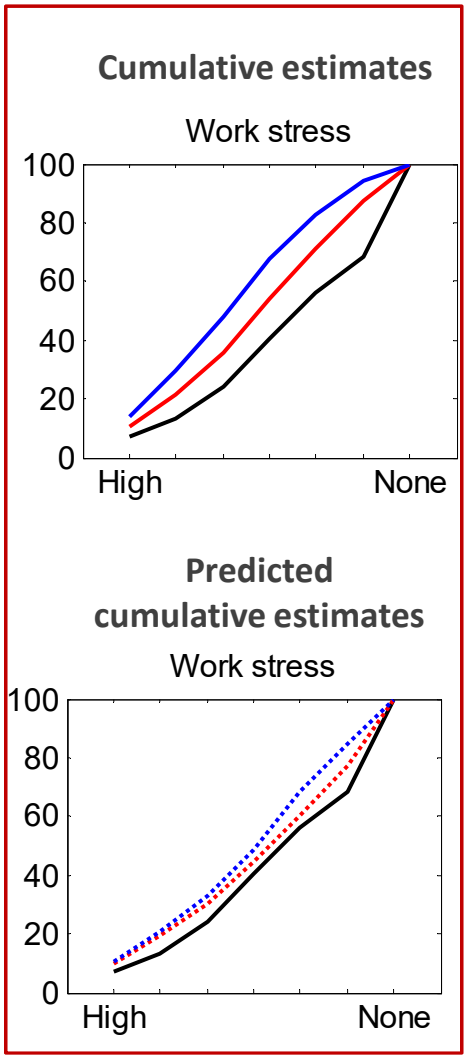

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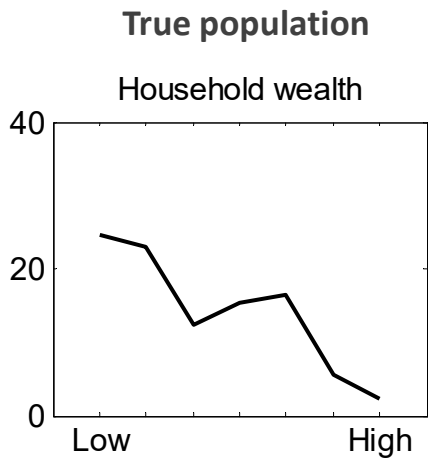

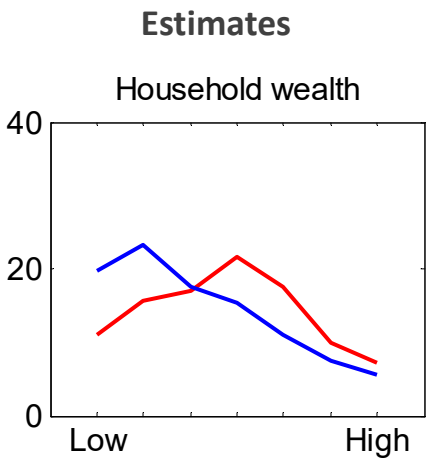

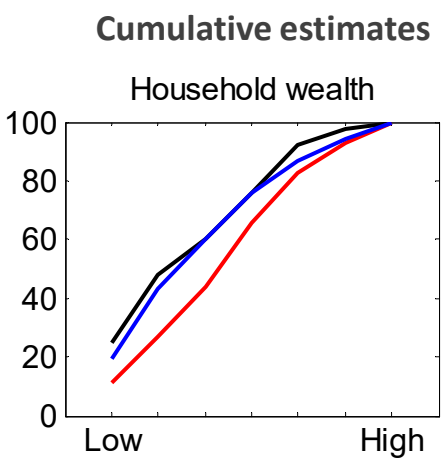

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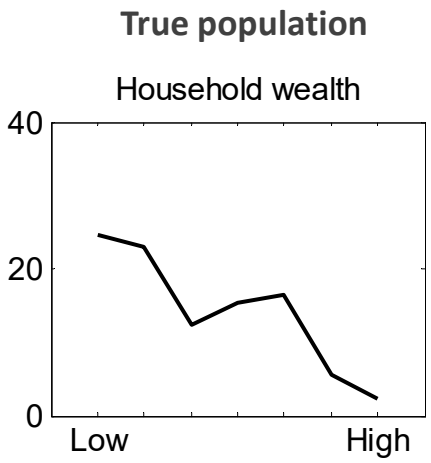

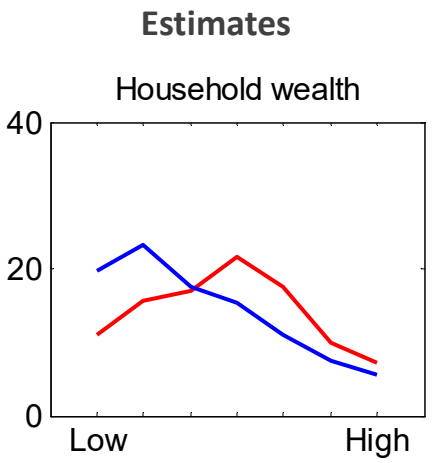

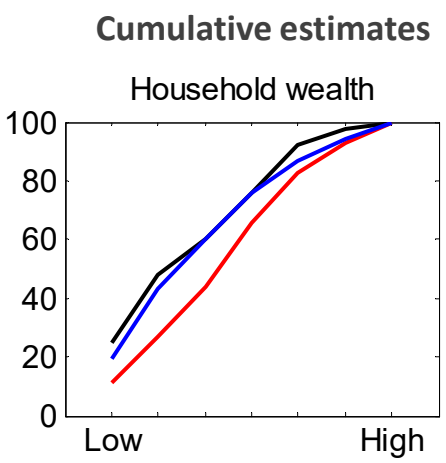

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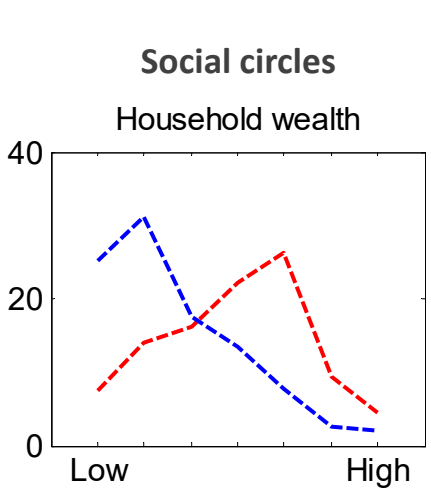

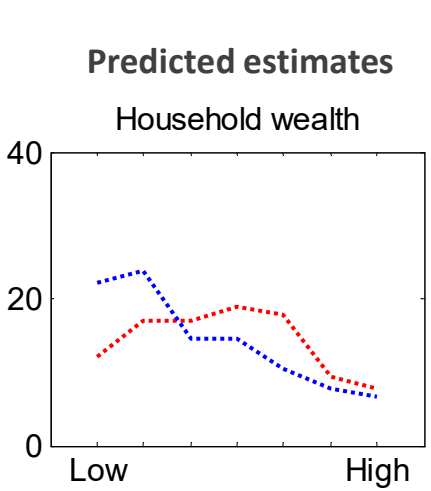

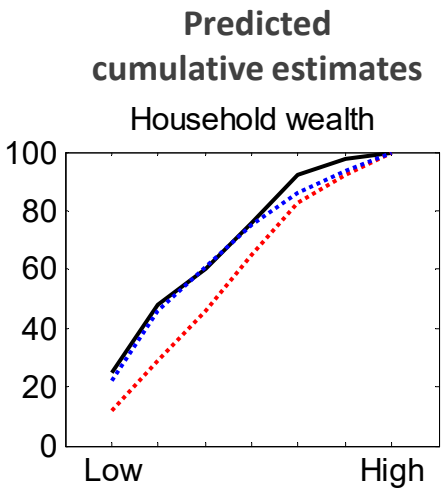

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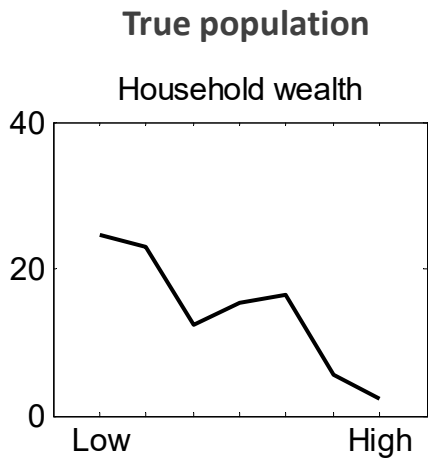
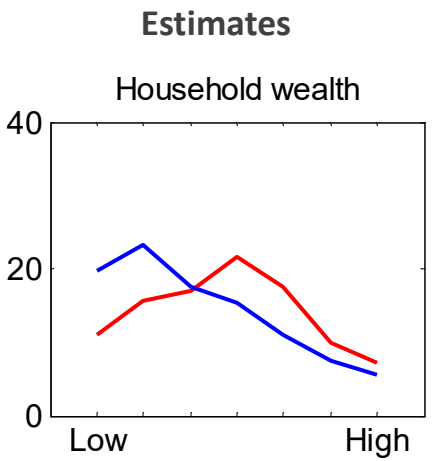
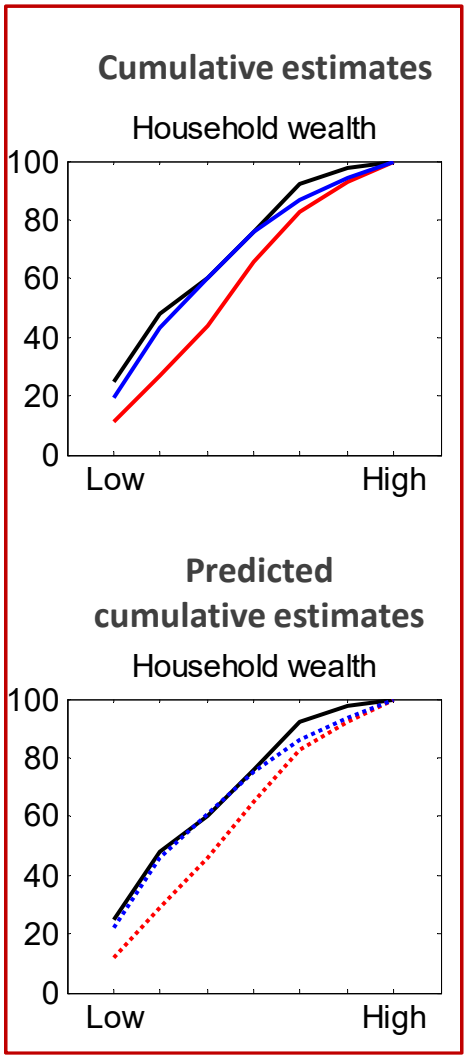






Worse-off people

Better-off people

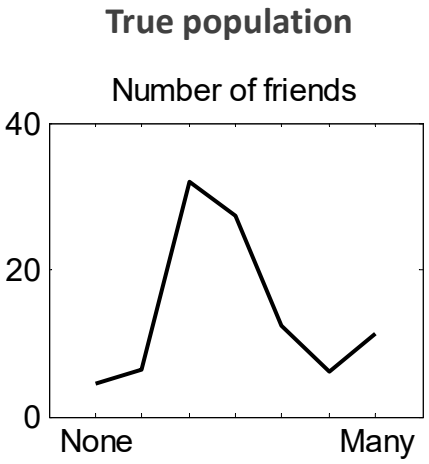
J-left shape

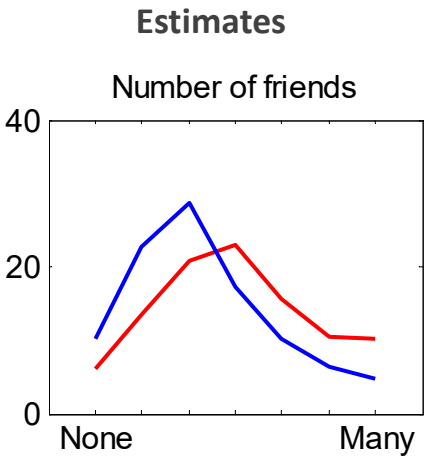
Apparent self-depreciation

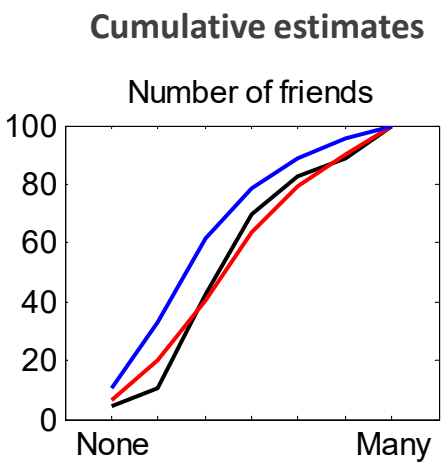
Netherlands, *N*=1416

$\rho = .55$, $\alpha = .47$

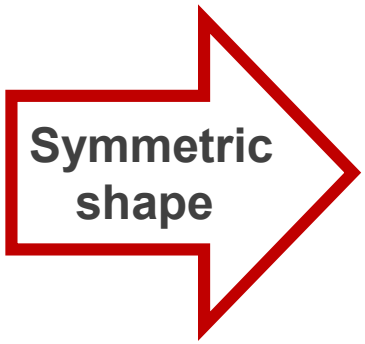
SSM predictions of empirical results







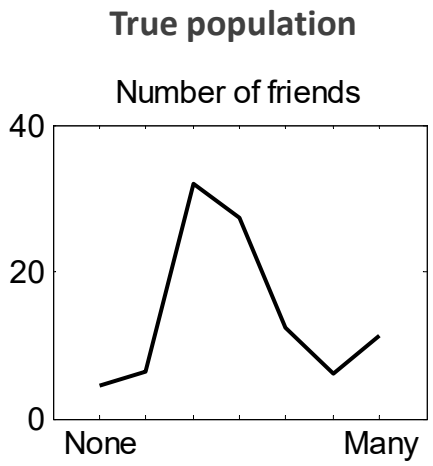
Worse-off people
Better-off people

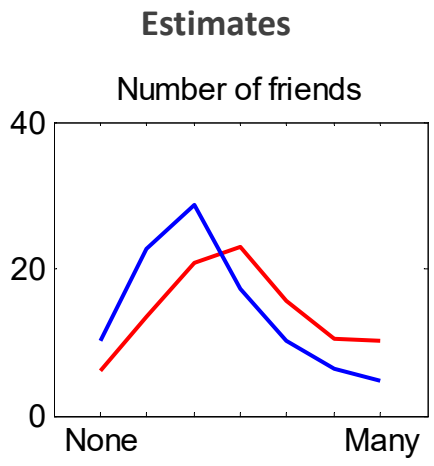


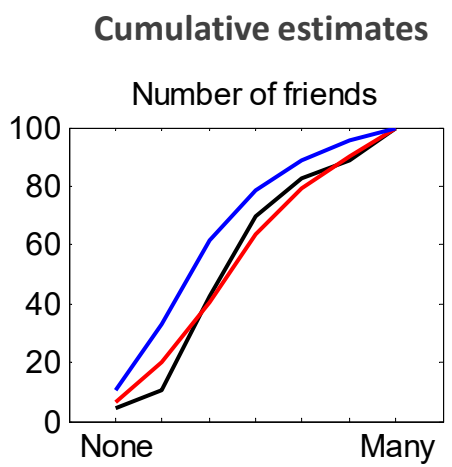
Both apparent biases

Netherlands, *N*=1416
$\rho = .55$, $\alpha = .47$

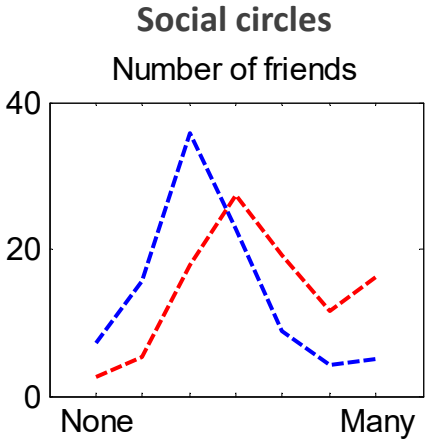
SSM predictions of empirical results

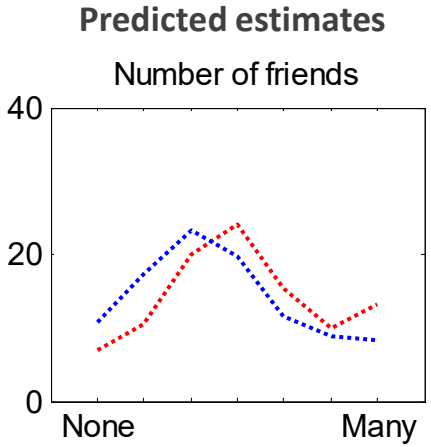


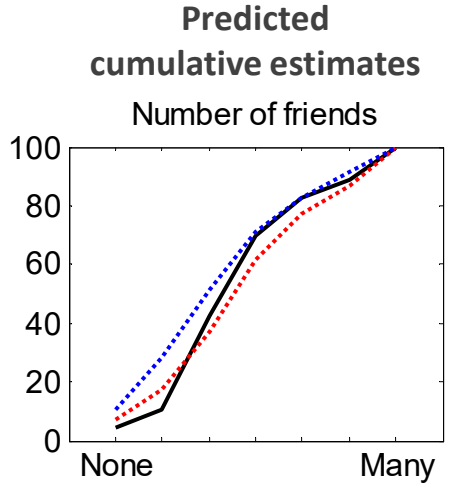




Worse-off people
Better-off people

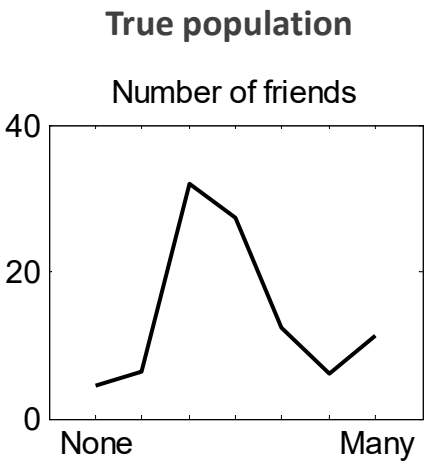


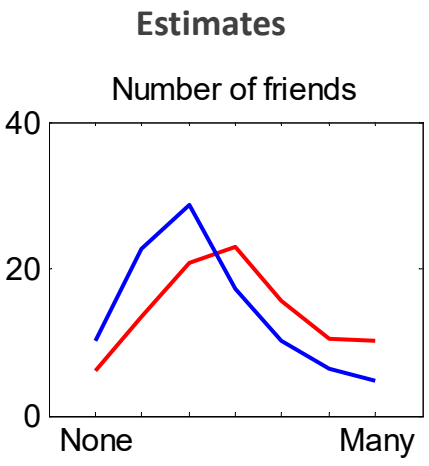


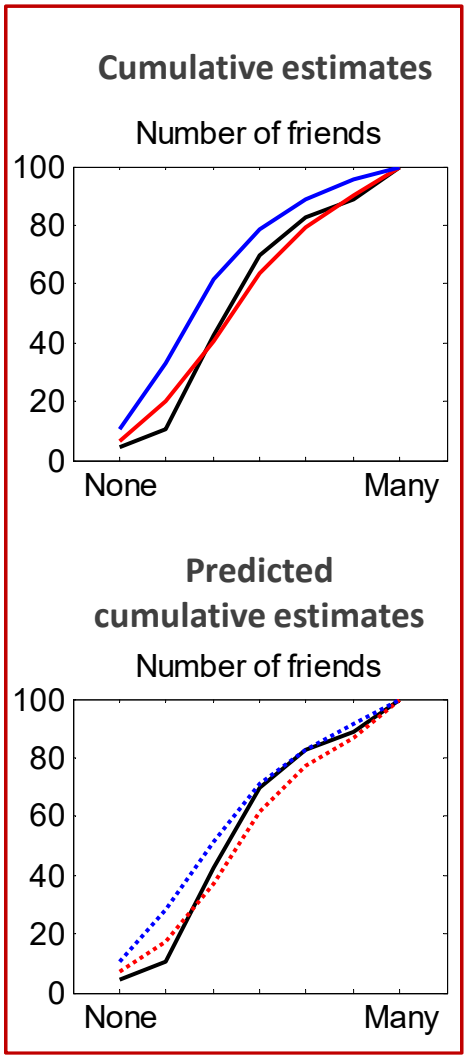


Netherlands, *N*=1416
$\rho = .55$, $\alpha = .47$

SSM predictions of empirical results







Worse-off people
Better-off people

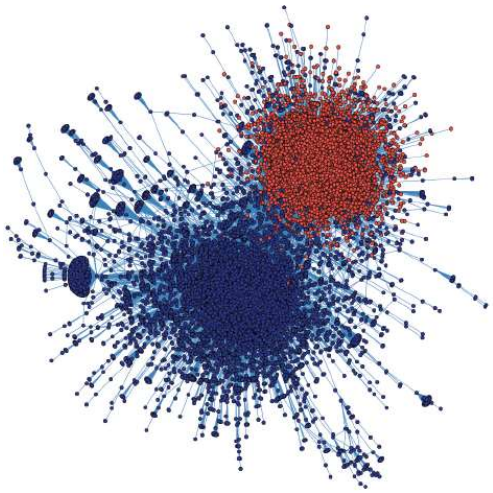
Symmetric shape

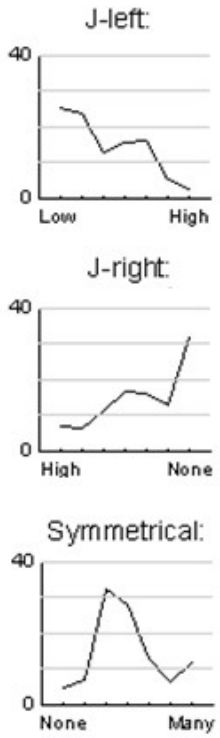
Both apparent biases

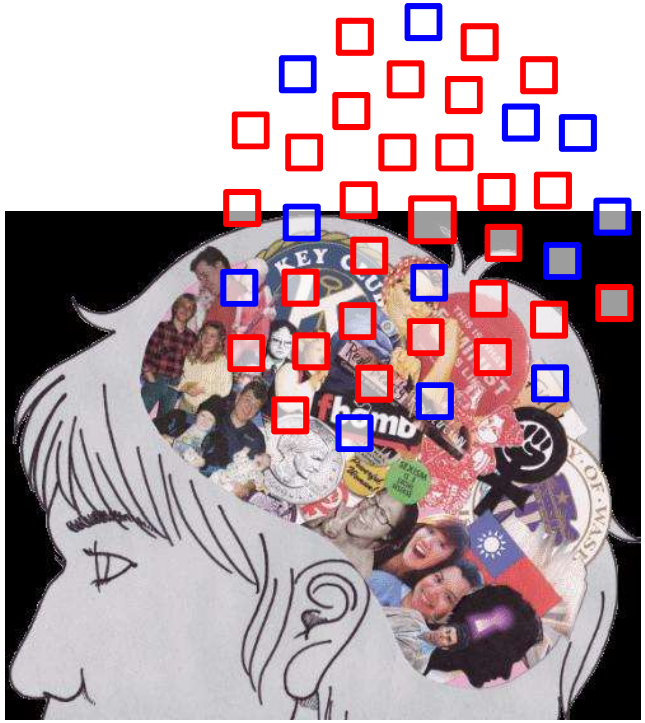
Netherlands, *N*=1416
$\rho = .55$, $\alpha = .47$

Maybe people are not biased but adapted

Both apparent biases can be explained by an interplay of a simple cognitive algorithm with social and task environments







Practical implications

Can asking people about their social circles…

1) Improve election predictions?

2) Help understand individual voting behavior?

Galesic, Bruine de Bruin, Kapteyn, Darling, & Meier, 2017

Can asking people about their social circles…

1) Improve election predictions?

2) Help understand individual voting behavior?

Social circle question:
"Of all your social contacts who are likely to vote, what percentage do you think will vote for Clinton, Trump, or someone else?"

Social contacts: "friends, family, colleagues, and other acquaintances of 18 years of age or older that you have communicated with at least briefly within the last month, either face-to-face, or otherwise"

USC Dornsife / LA Times Election Poll

Members of the Understanding America Study panel: probabilistic national sample, answering online

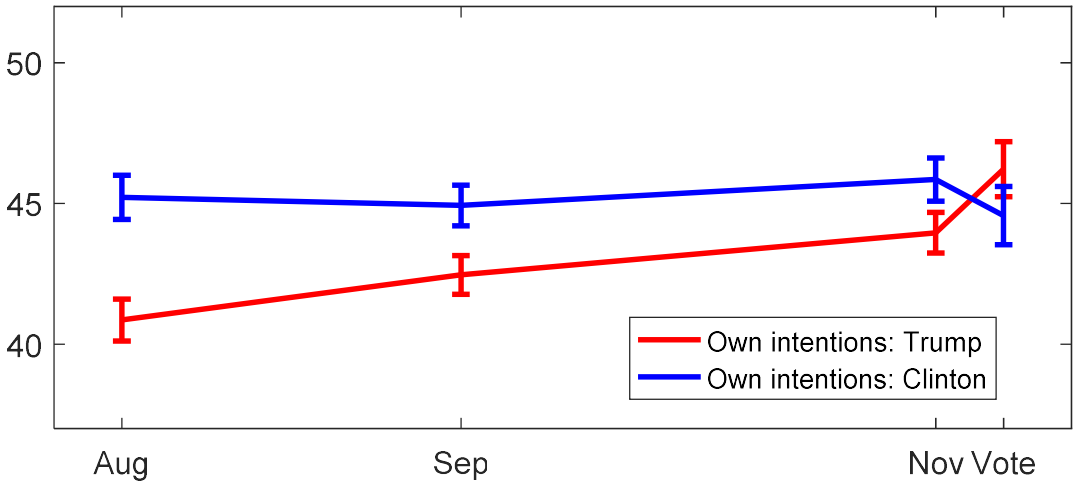
Weekly question about own election intentions:

"If you do vote in the election, what is the percent chance that you will vote for Clinton, Trump, or someone else?"

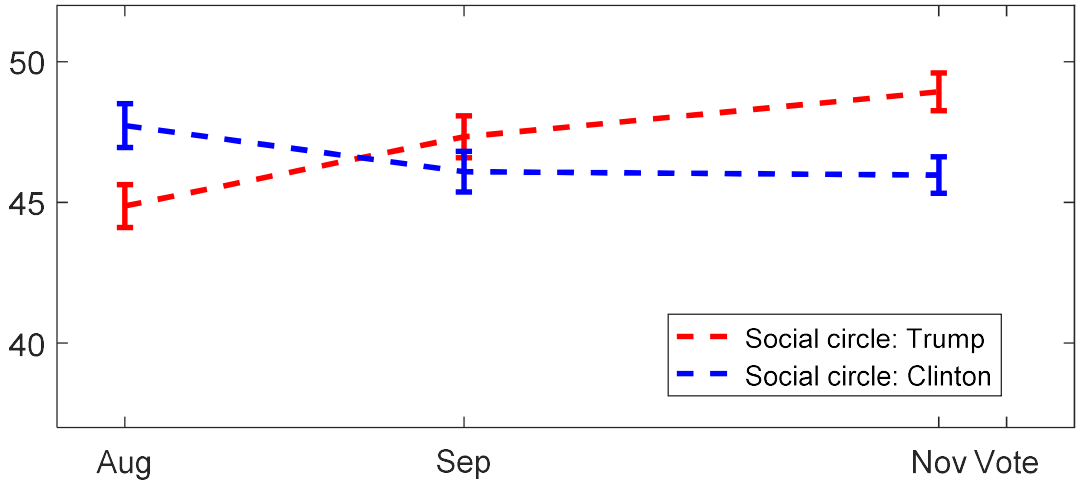
Social circle question asked in 5 weeks: July 11, August 8, September 12, October 31, November 9, 2016

Social circles improve election predictions

Own intentions over time

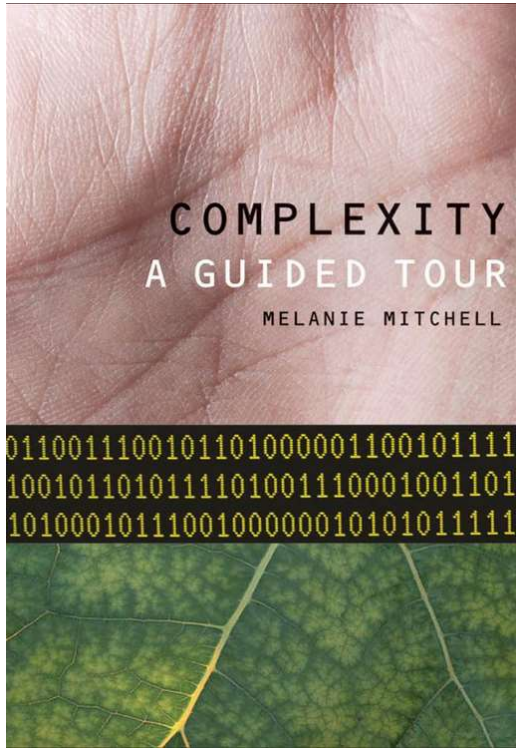


Social circles over time



Implications for modeling

Seemingly complex patterns might emerge from interactions of networked agents using simple algorithms to adapt to their local environment

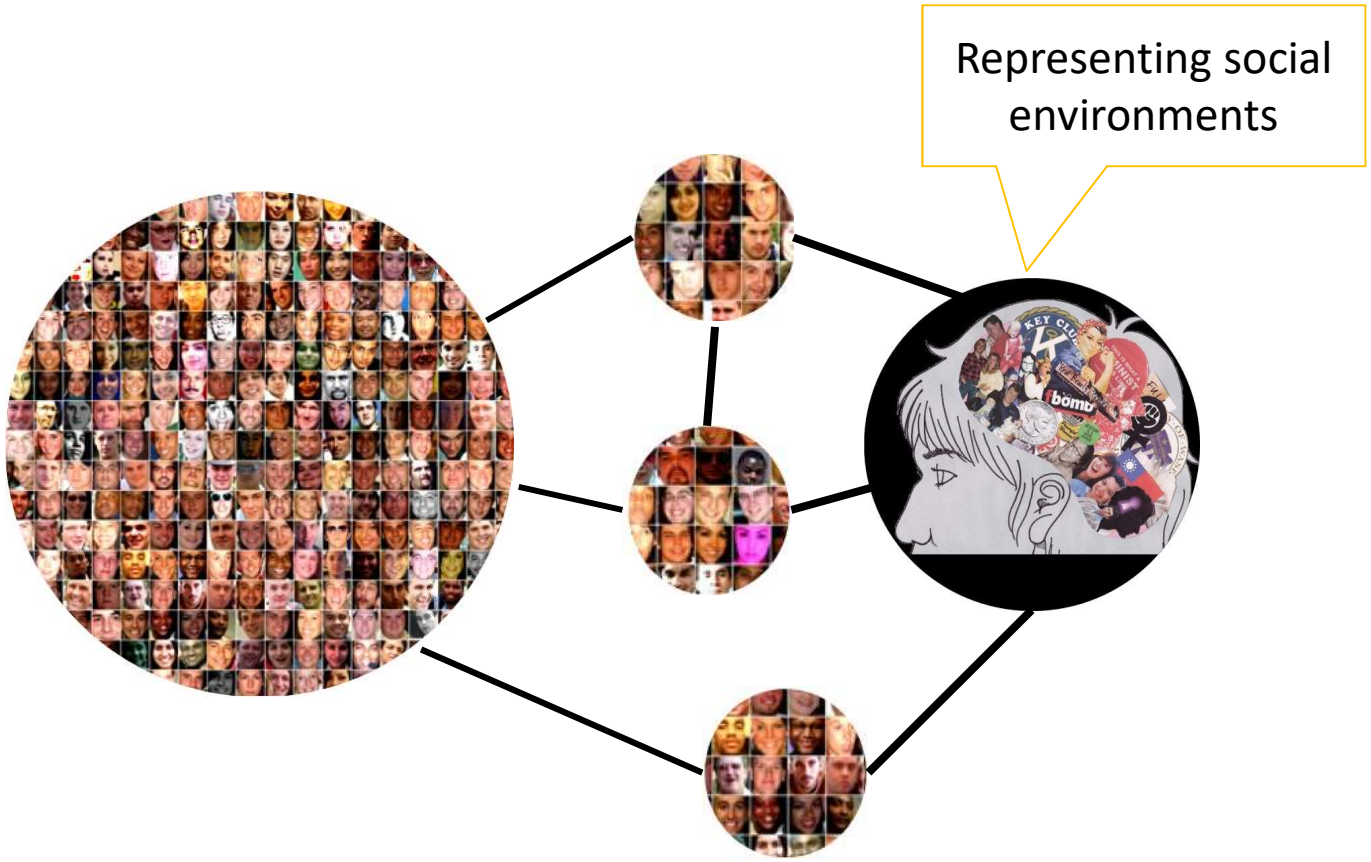


Principles for building ABMs of social phenomena

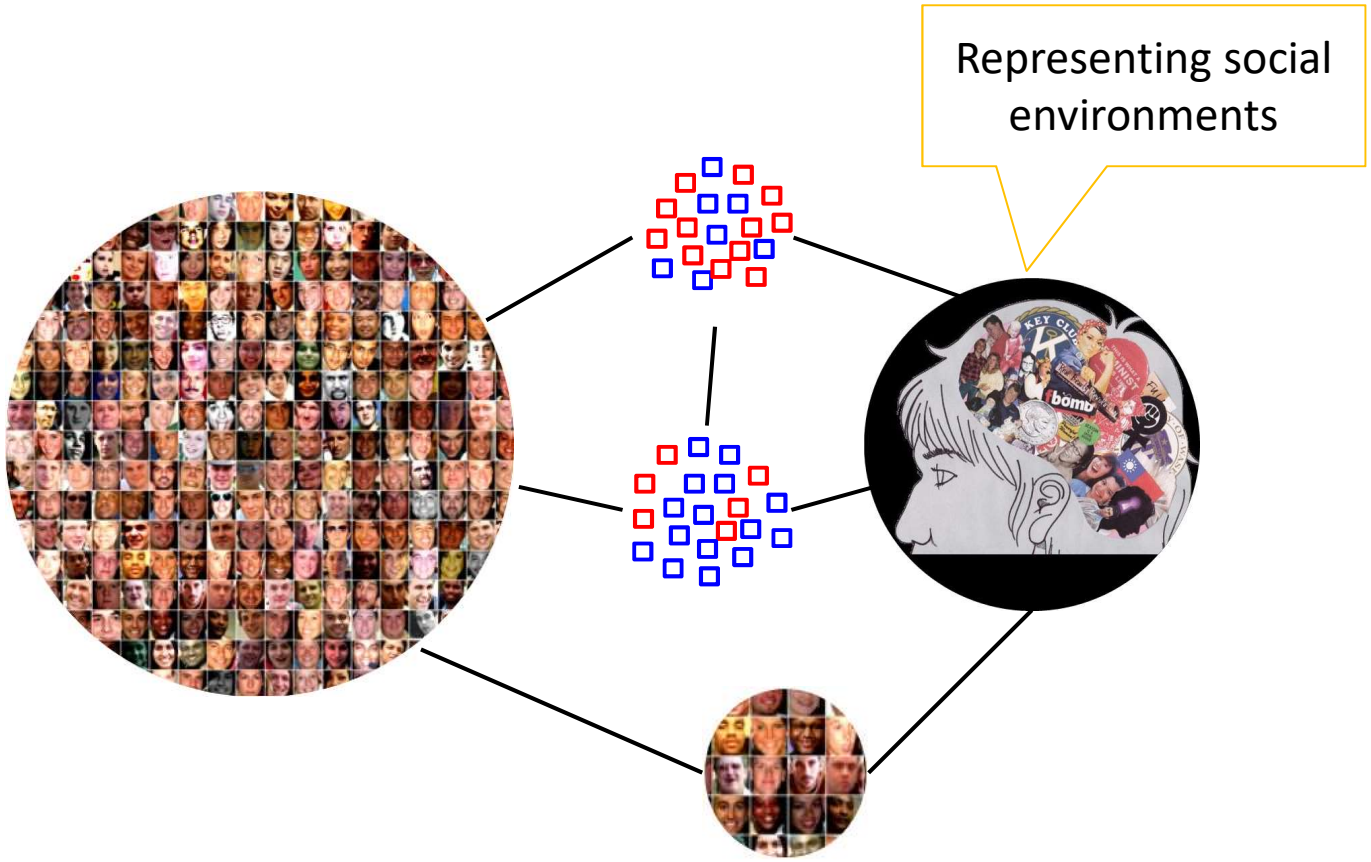
- What social algorithms do people use?
- What is the local task environment?
- What is the underlying social network structure?

→ What patterns of collective behaviors emerge?

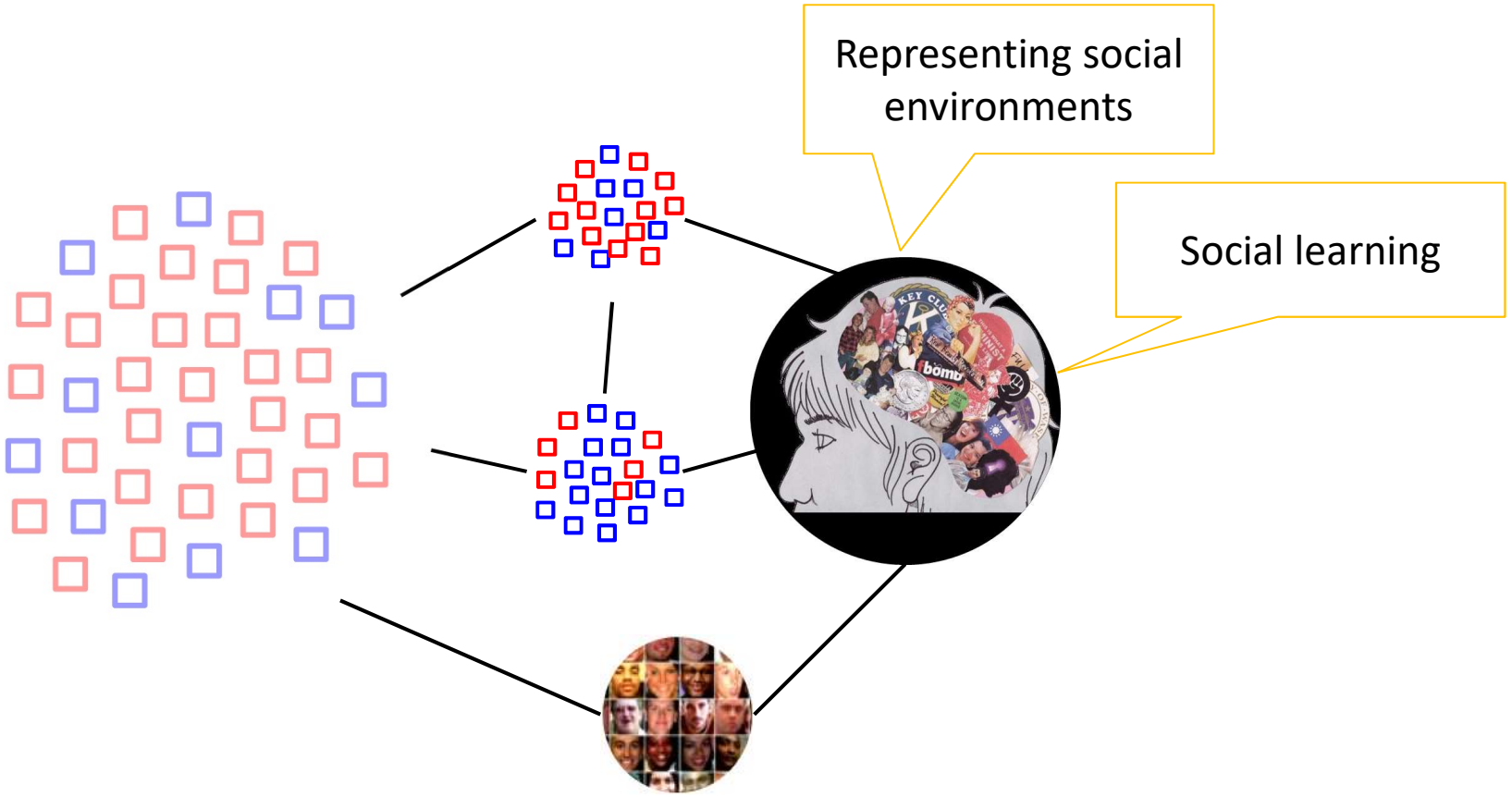
Social algorithms



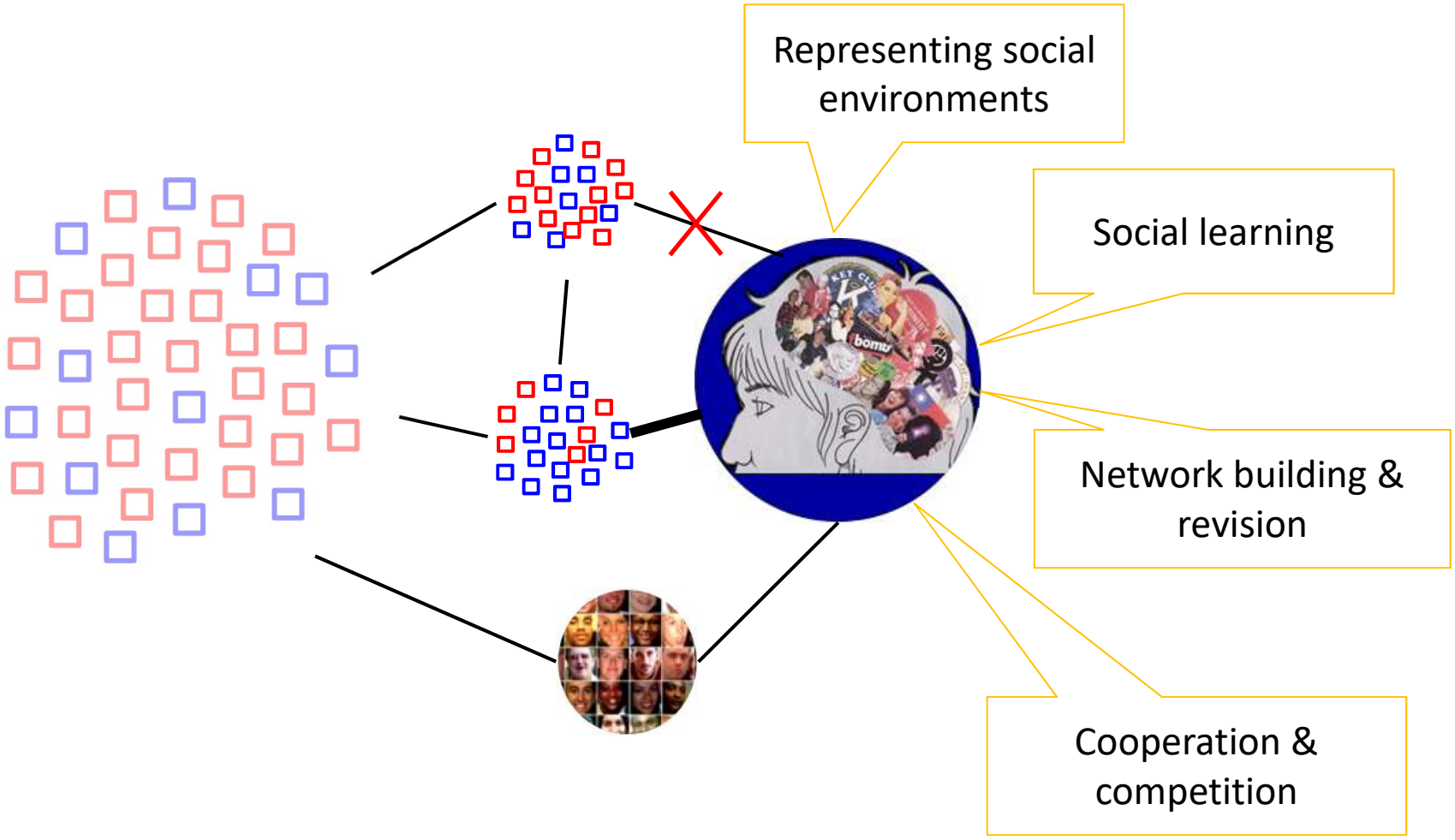
Social algorithms



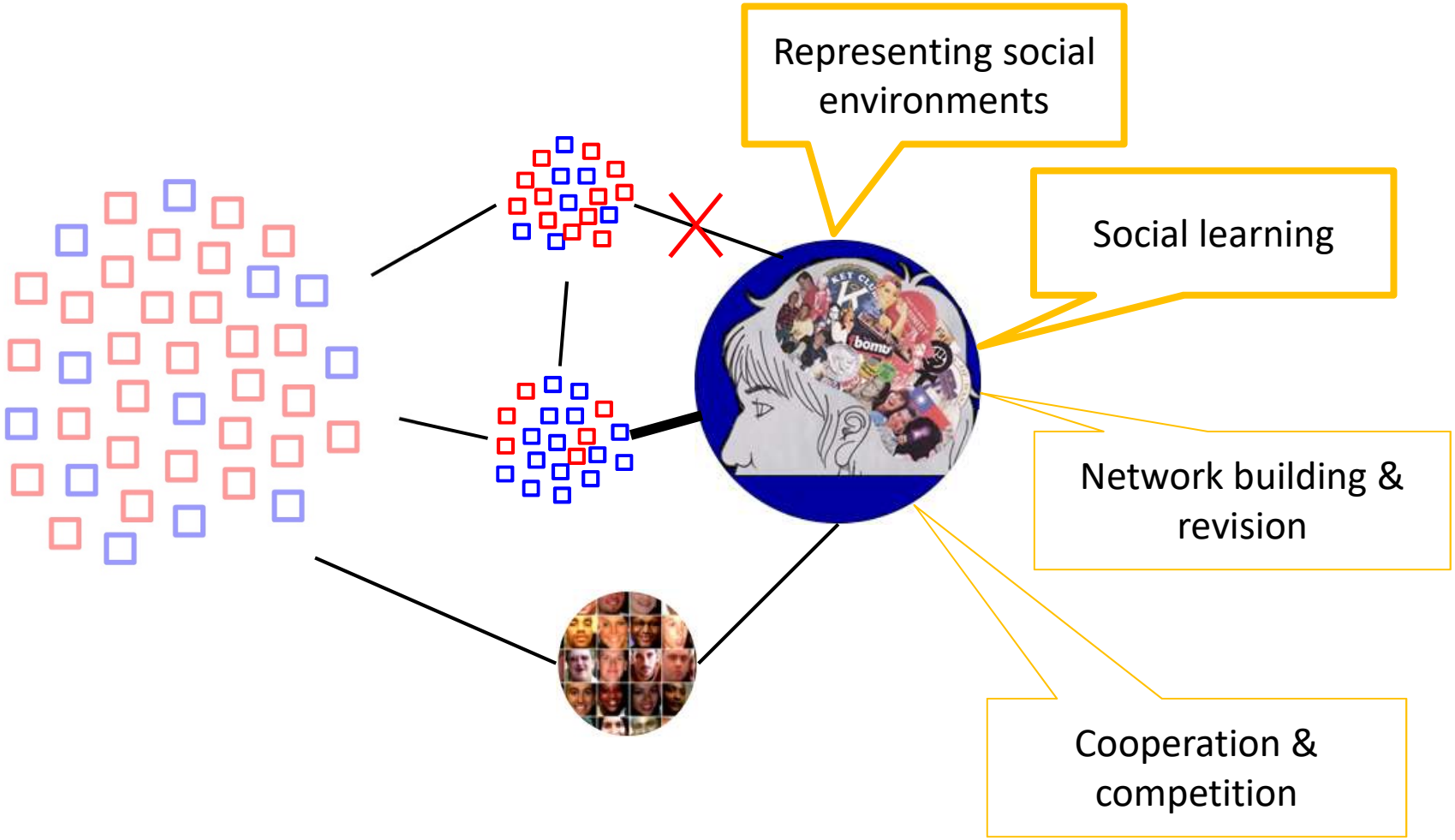
Social algorithms



Social algorithms



Social algorithms



Social algorithms: How many do we need?

Social learning algorithms

- Imitate the majority
- Imitate the leader
- Imitate the expert

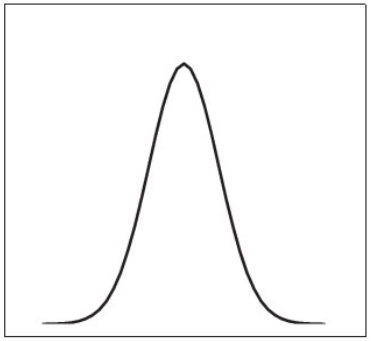
Network building & revision

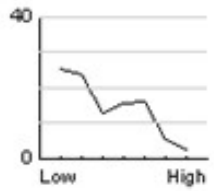
- Connect to most connected
- Cut if similarity < *x*
- Connect to similar

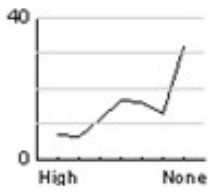
Cooperation & competition

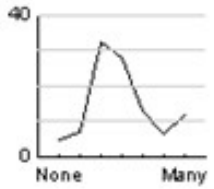
- Tit for tat
- Win-stay, lose-shift
- Fight similar rank or weaker

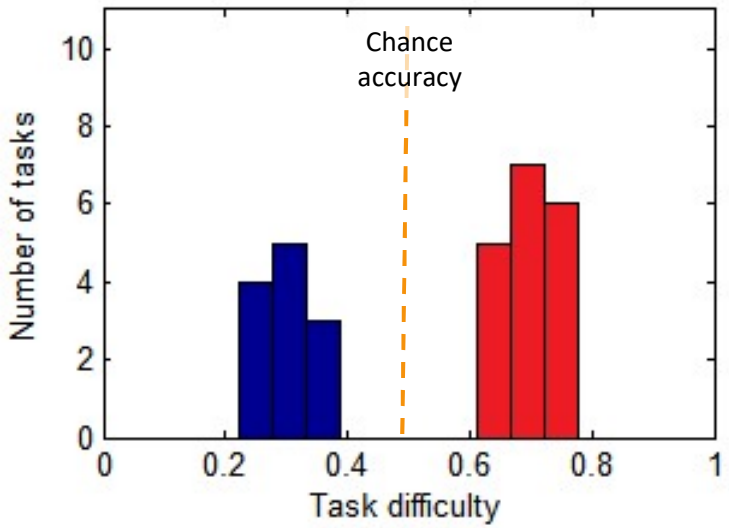
Task environment



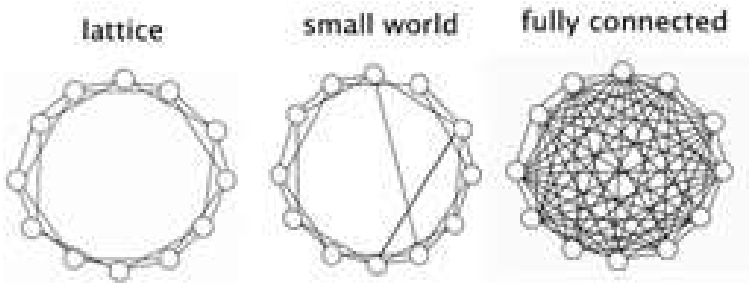


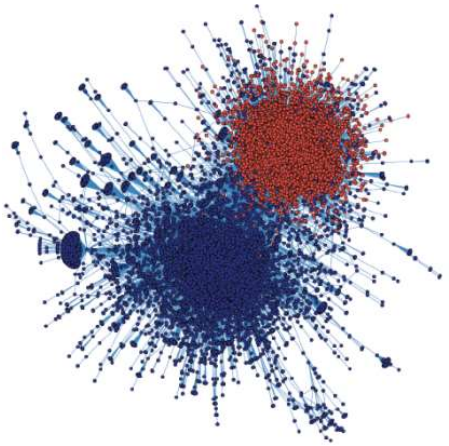




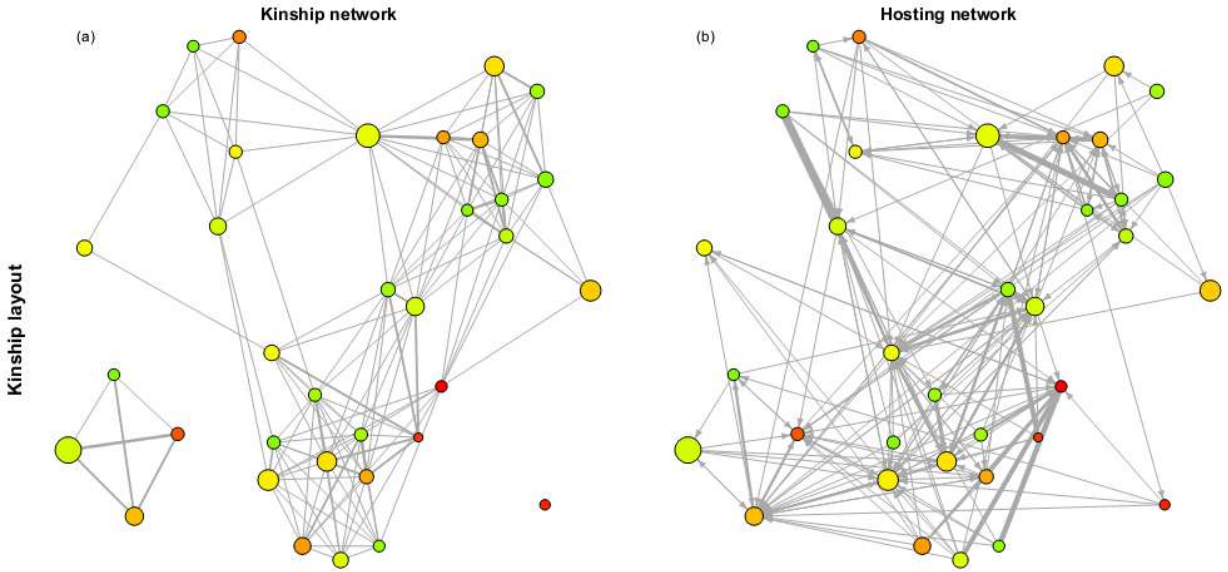


Network structure



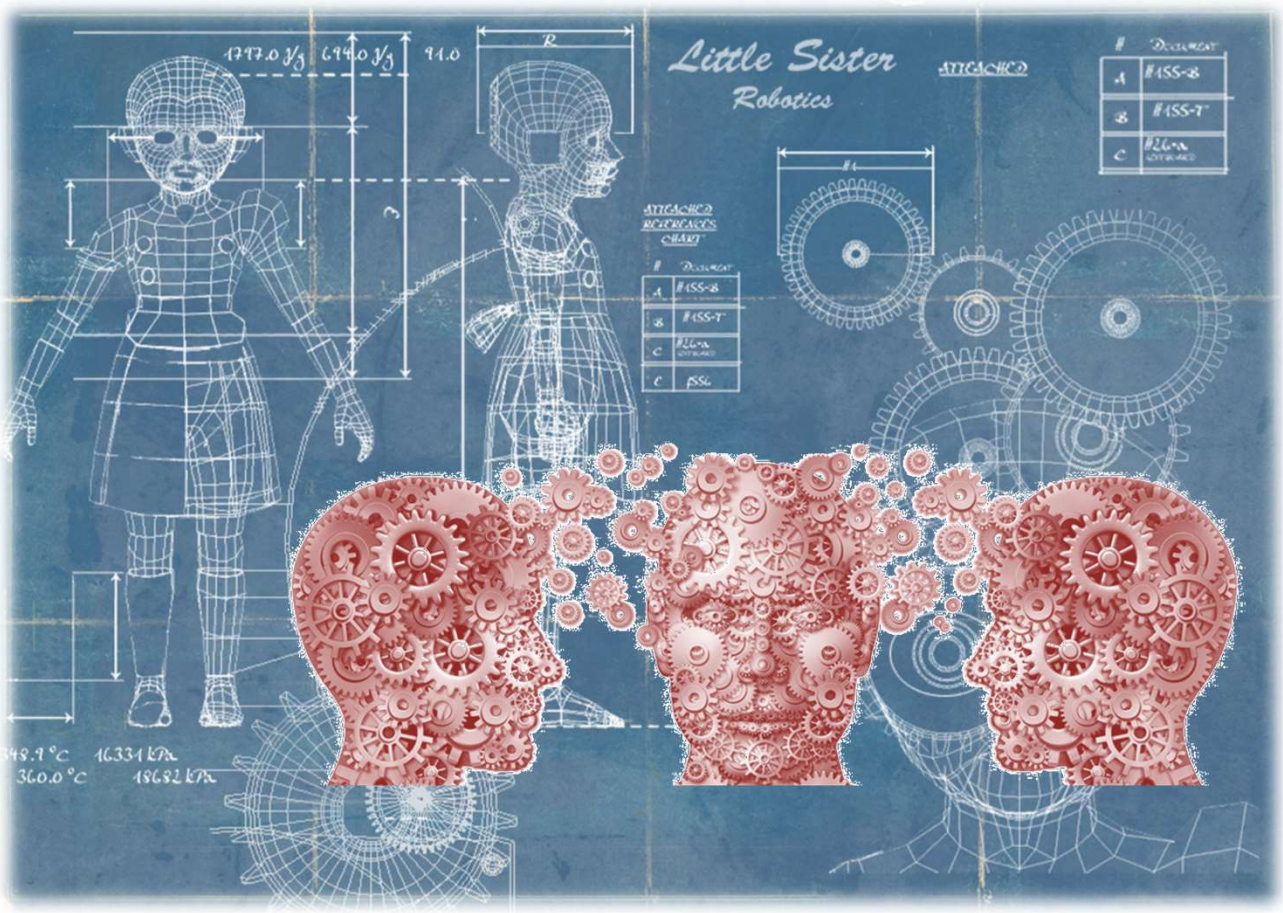


Conover et al (2011)



Hooper, DeDeo, Caldwell-Hooper, Gurven, & Kaplan (2013, Entropy)

A blueprint for modeling social phenomena



http://bioshock.wikia.com/; https://www.elearningnetwork.org/

A blueprint for modeling social phenomena

A. Determine cognitively plausible algorithms

- Representing social environments
- Social learning
- Network building & revision
- Cooperation & competition

Collect empirical data to parametrize, test, and revise models

B. Model their performance in realistic task environments

C. and in realistic social networks