

# What do we mean by Analytical Sociology?

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# Queen Elisabeth' visit to the LSE in 2008

▶ 'Professor Luis Garicano, director of research at the LSE's management department, said: 'The Queen asked me, **"If these things were so large, how come everyone missed them?"**'

▶ Letter to the Queen, signed by LSE economist Tim Besley: ***"Everyone seemed to be doing their own job properly on its own merit. (...) The failure was to see how collectively this added up to a series of interconnected imbalances over which no single authority had jurisdiction."***



Mail online, Nov. 6, 2008. Guardian, July 27, 2009,

Ex-ante description/explanation of complex systems is extremely difficult!

As always, there are explanations **after** the fact. These include:

1. **Preferences** (trivial): Institutional and individual actors want to make money!
2. **Beliefs**: Mortgage will stay low; real estate prices will increase; asset backed securities are safe and profitable investments
3. **Opportunities** (restrictions, the rules of the game.) New financial „institutions“ as „collateralized debt obligations“ (CDOs), including „toxic“ subprime mortgages. Rating agencies (triple AAA) understating the risk; fragile banks with low capital endowment; lack of financial regulations.

► As often, the interplay of these elements and its macro-consequences were not well understood!

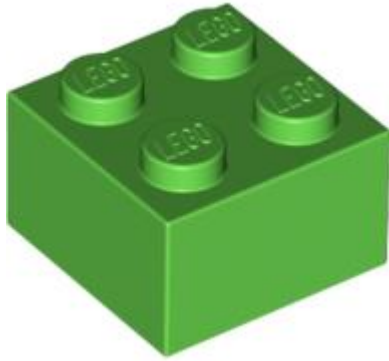
# Analytic Sociology starts with these elements

## Key elements of a theory of social action

Desires, Beliefs, Opportunities (DBO, Hedström 2005)

Beliefs, Preferences, Constraints (BPC, Gintis 2007)

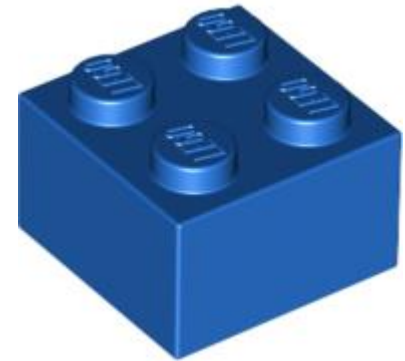
**Preferences** (aims, goals, desires)



**Beliefs** (assumptions about „nature“ and likely choices of other actors)



**Opportunities** (budget, technology, institutions, social context)

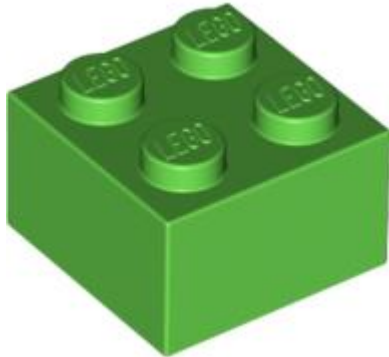


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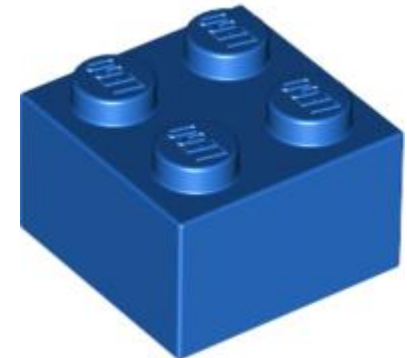
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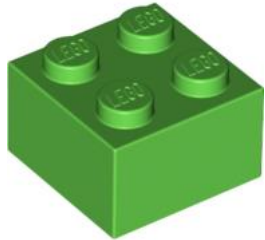


► **But note: DBO is NOT a theory! These are just concepts and concepts alone do not constitute a theory. Not falsifiable!**

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► Key elements of a theory of social action

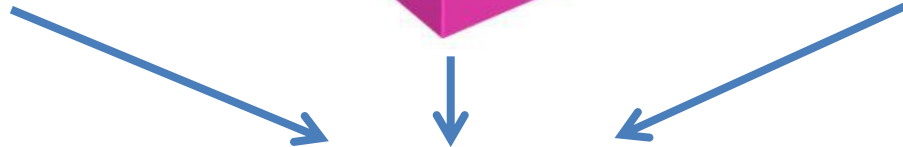
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**Action**

**Decision and game theory combines the elements**

- 1. Risk and uncertainty:** Subjective expected utility, maximin, regret theory, bounded rationality, heuristic principles
- 2. Strategic interaction:** Equilibrium strategies, refinement of eq. strategies, evolutionary stable strategies, learning, myopic behaviour, adaptation .

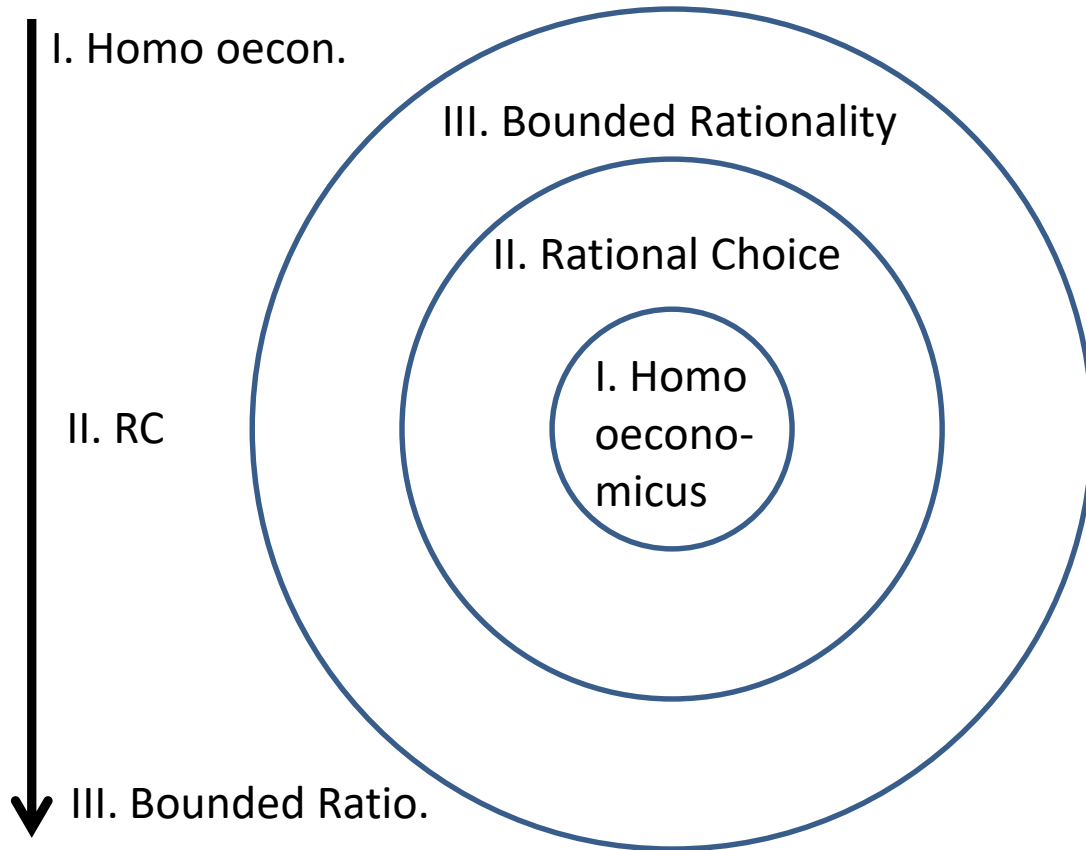
► **Toolbox of behavioural decision and game theory**

- **P, B, O is an overarching „umbrella“**; all micro theories make use of these concepts.
- Rational Choice (RC) is a special but important case.
- I define RC by the axioms of von Neumann-Morgenstern and Savage. Rationality is consistency with (testable) axioms, e.g. transitivity.
- By this definition, RC includes all types of preferences.
- Classical RC does not assume egoistic preferences and is open for all types of preferences (also altruistic ones).
- In this respect, the concept of „wide“ RC is misleading!
- We should stick to clearly defined concepts.
- RC does not incorporate, e.g. prospect theory (Kahneman & Tversky) or many other decision theories (based on different sets of axioms or assumptions).

# Analytical Sociology: three categories of micro theories

**Rationality (Definition): Consistency with axioms, e.g. transitive choices**

Decreasing restrictions  
on assumptions of decision theory



**I. Homo oeconomicus** = selfishness, material interests (time, money), axioms of rationality (i.e. transitive preferences etc.)

**II. Rational choice: consistency with axioms of rationality** (i.e. transitive preferences etc.) **Note: no restriction on preferences! By definition “wide version” concerning preferences**

**III. Bounded rationality:** Learning, heuristic principles, evolution



“I suggest that **we should avoid intentional explanations** in all but the rare cases where we have access to reliable information on the mental states of the acting individuals». (Hedström 2022)

Ironically, sounds like economist Stigler & Becker, De gustibus non est disputandum!

# „Tocqueville Paradox“

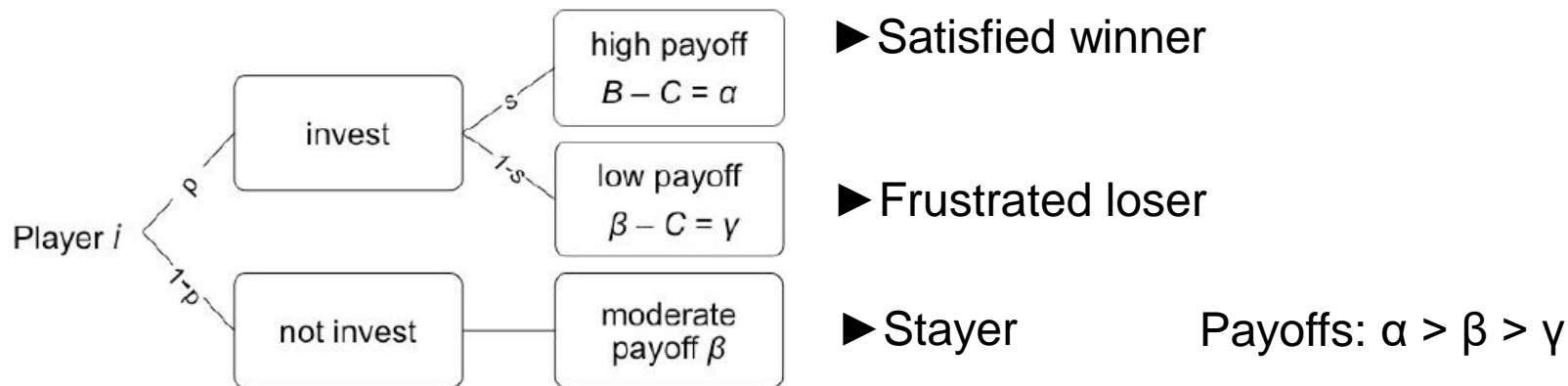


*"So it would appear that the French found their condition the more unsupportable in proportion to its improvement."*

(Alexis de Tocqueville, 1856: 214)

# Boudon's Competition Model Explains the Paradox

Investment decision = participating in a costly competition



Intuition:

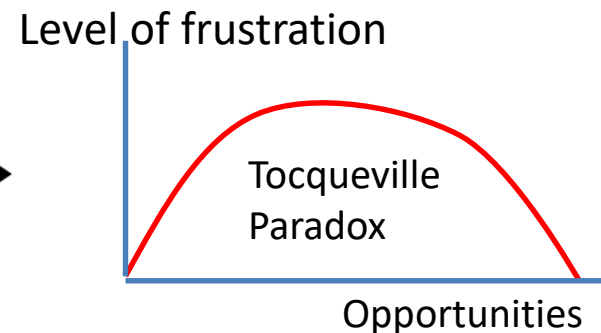
Exogenous rise of opportunities ( $k$ )



Overproportional Increase of Investing (competing) actors



Leads to the decline of winning chances and an increase of frustrated loser



# Mixed Nash Equilibrium Strategy of Boudon's Competition Game (RC-Model)

$$E(k,n) = \begin{cases} \frac{k}{n}\alpha + \frac{n-k}{n}\gamma & \text{for } k < n \\ \alpha & \text{for } k \geq n. \end{cases}$$

		Number of other investors ( $n-1$ )				
		0	1	2	...	$N-1$
Player i	Investment	$E(k, 0)$	$E(k, 1)$	$E(k, 2)$	...	$E(k, N-1)$
	No Investment	$\beta$	$\beta$	$\beta$	...	$\beta$

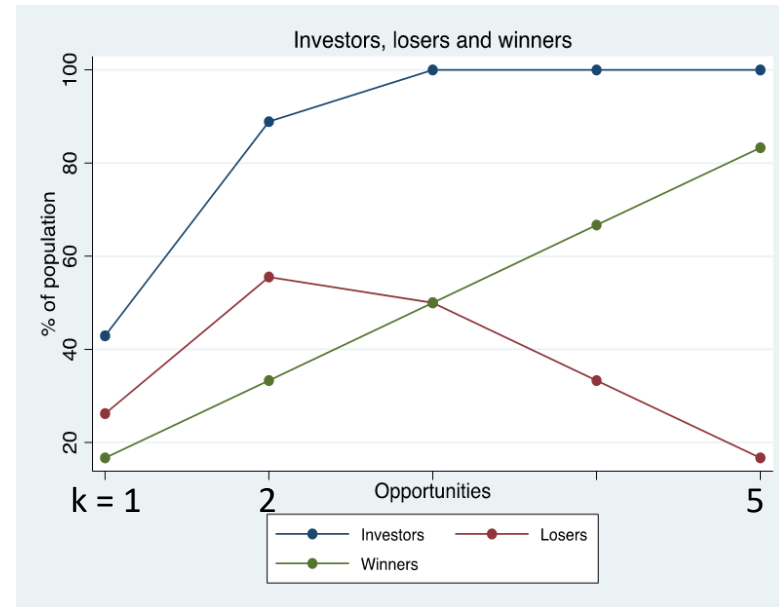
The gain of investment depends on other players' decisions: It is not a dominant strategy!

$N$  = number of actors  
 $k$  = number of positions  
 $n$  = number of investors

**$p$  = probability to invest (decision variable)**

$$E(Inv.) = (1-p)^{N-1} \cdot E(Inv., n-1=0) + \binom{N-1}{1} p(1-p)^{N-2} \cdot E(Inv., n-1=1) + \binom{N-1}{2} p^2(1-p)^{N-3} \cdot E(Inv., n-1=2) + \dots + p^{N-1} \cdot E(Inv., n-1=N-1) = \beta$$

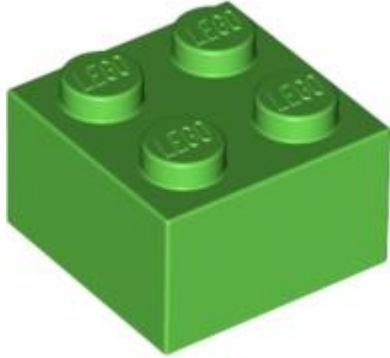
- ▶ Three lab experiments with small groups (Berger & Diekmann 2015)
- ▶ In progress: Experiment with larger group size using Amazon Mechanical Turk



**Theoretical prediction of Tocqueville paradox (red line)**

# Micro

Assumptions



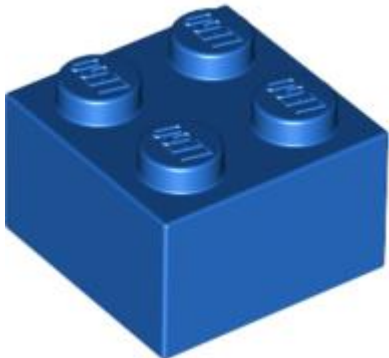
P Type of rewards



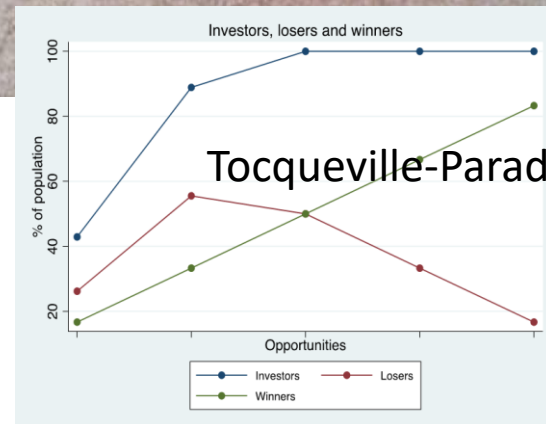
B Beliefs („mixed Equilibrium“)



O Opportunities:  
Proportion of  
vacancies



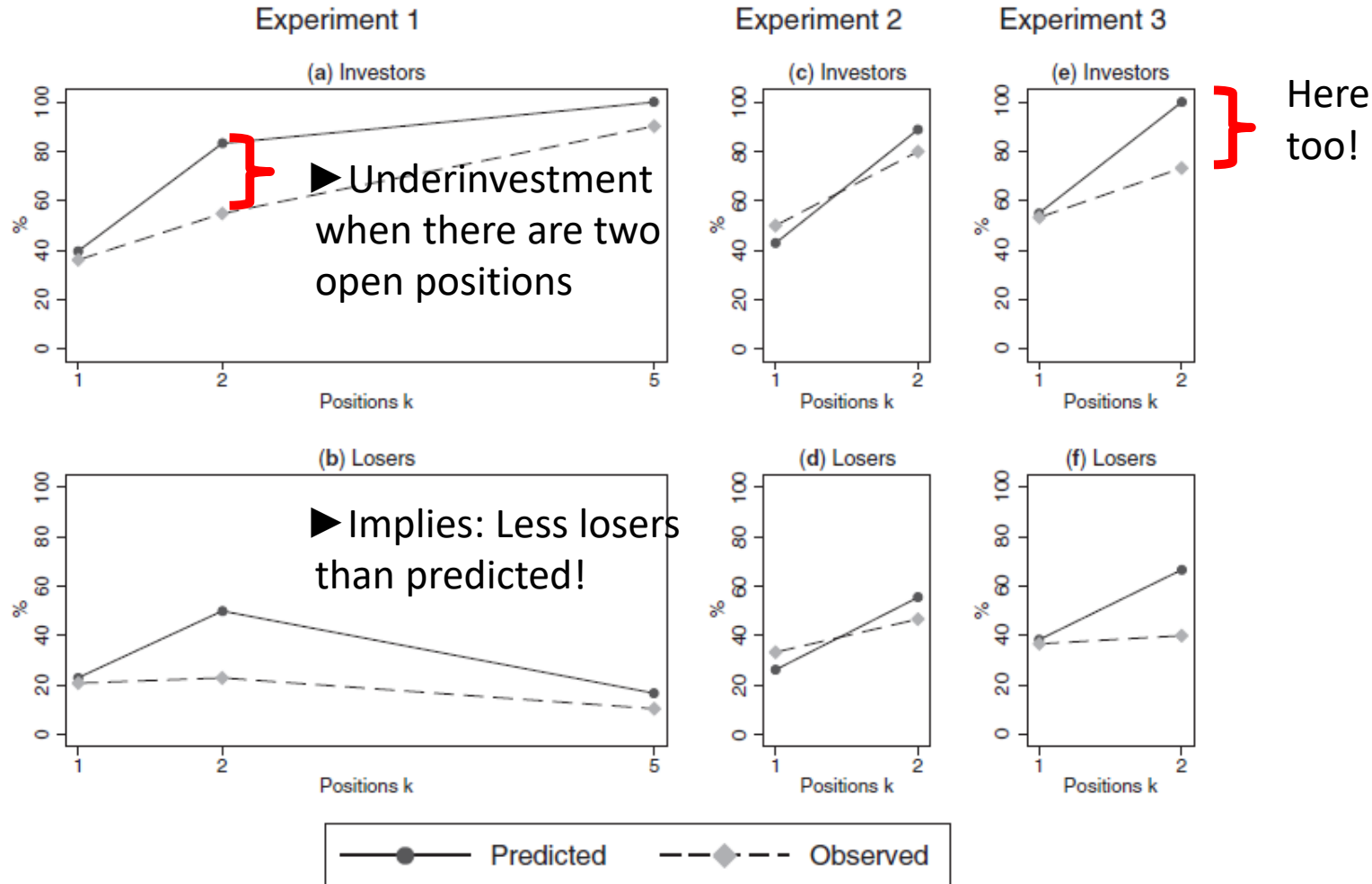
# Macro



Tocqueville-Paradox (red line)

Macro prediction

# Testing the theory: Experimental Results



Berger & Diekmann 2015

- ▶ Boudon's RC model is falsified!
- ▶ Why? Possibly wrong assumptions about preferences/beliefs.

## What is wrong with the assumptions?

1. **Preferences:** Instead of **absolute rewards** (Boudon model): **relative deprivation** may be more realistic. Using the Gini index yields better approximations (Berger & Diekmann 2015).

**Modify the model by assuming an alternative utility function! That means consider alternative intentions!** There is an interesting proposal on the extension of the utility function by a relative deprivation term (will appear in ESR soon). **Here assumptions about preferences are crucial!**

► **Type of preferences/desires/goals/intentions are key factors in explaining the macro outcomes!**

2. **Beliefs:** We found a large degree of „underinvestment“ when opportunities were relatively favorably. **Is „mixed equilibrium“ a good approximation?**

3. **Opportunities:** Is given by experimental design and not a problem here (in other models/explanations assumptions on opportunities play a key role).

“I suggest that **we should avoid intentional explanations** in all but the rare cases where we have access to reliable information on the mental states of the acting individuals». (Hedström 2022)

Ironically, sounds like economist Stigler & Becker, De gustibus non est disputandum!



«What Merton and likeminded analysts have failed to appreciate, however, is the considerable **heterogeneity that exists in individuals' motivations**. Some may do X because of belief B, while others may do X because of belief C or desire D, and the same individual may do X for entirely different reasons at different points of time.”  
(Hedström 2022).

# Hedström's CODA (2022)

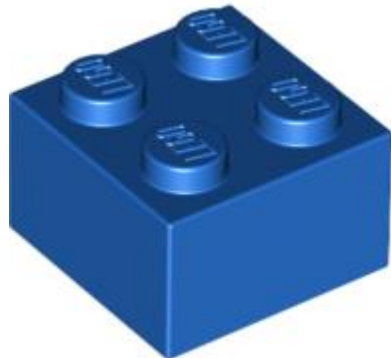
Micro



P Preferences/  
Desires/  
Goals



B Beliefs



O Opportunities

Macro



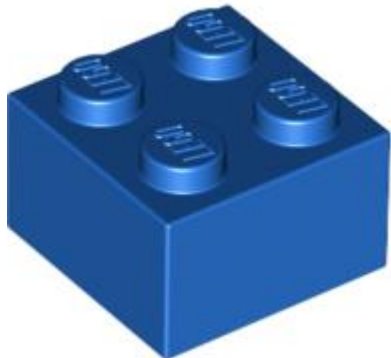
# Micro



P Preferences/  
Desires/  
Goals



B Beliefs

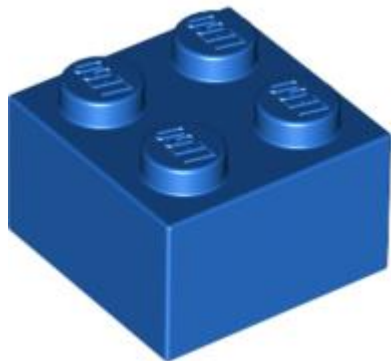


O Opportunities

# Macro



# Micro



0 Opportunities

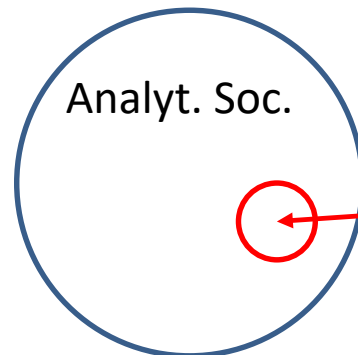
# Macro



► Imitation, contagion: analytical sociology as a kind of social epidemiology

## Hedström's Coda (2022)

- 1) Gives up the DBO concept; in particular, gives up preferences and beliefs and keeps only „O“ (opportunities)
- 2) Waives game theory (leaves it to economists)
- 3) Suggests a kind of social epidemiology
- 4) Extremely restrictive concept of Analytic Sociology – in contrast „preferences, beliefs, opportunities“ is an umbrella concept for explanatory social sciences.
- 5) **BDO is interdisciplinary; a concept unifying the social sciences (Gintis); common in economics and social psychology. CODA would cut all links to e.g. behavioral economics and social psychology.**



Hedström's Coda excludes all other types of AS research! And the link to other social science disciplines.

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## Coda—The past and future of analytical sociology<sup>1</sup>

*Peter Hedström*

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“Since the field has grown considerably during these years, my reflections will only cover a small subset of the issues that analytical sociologists are concerned with, **and my set of priorities for the future may not necessarily be shared by everyone.**”  
(Hedström 20220)

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# ANALYTICAL SOCIOLOGY

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*Its Logical Foundations  
and Relevance to Theory  
and Empirical Research*

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**Joseph R. Pearce**



1994

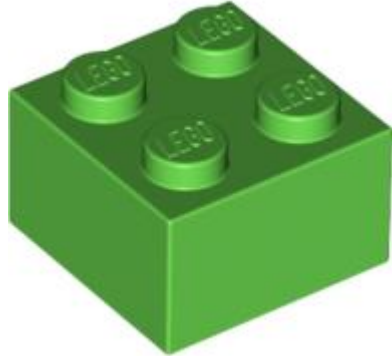


Jim Walsh about Mark Mallman's song, Arts & Culture 3/4/16





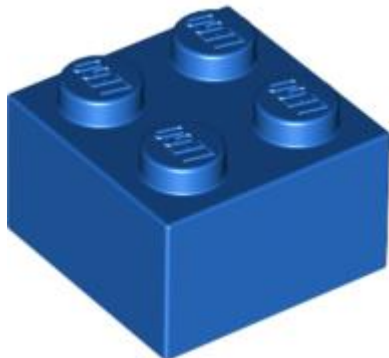
# Micro



**P** Preferences/  
Desires/  
Goals



**B** Beliefs



**O** Opportunities



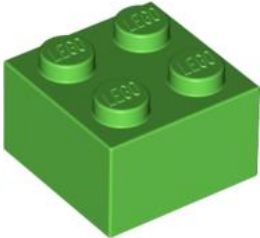
# Macro



**We should not discard action theory. We need all three elements for the explanation of the „mechanism“ and the explanation of macro effects!**

**Beliefs and opportunities are not exogenous**  
**Beliefs and opportunities are dependent on the structure of social interaction.**

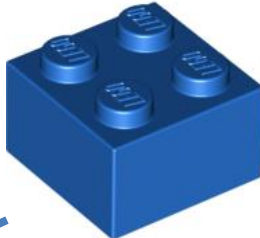
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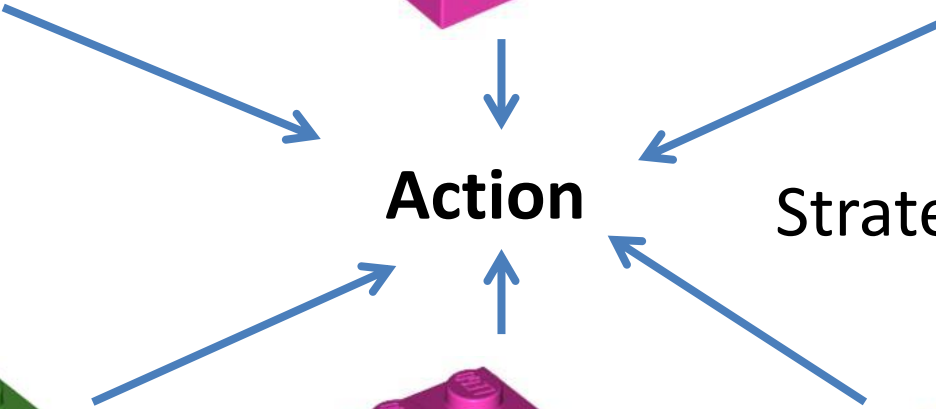
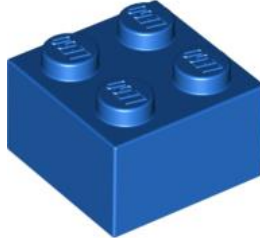
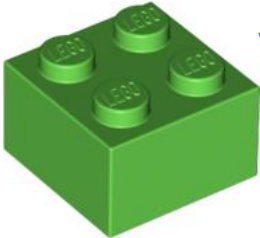


**Opportunities** (budget, technology, institutions, social context)



**Action**

Strategic interaction



# Strategic Interaction

► **Fundamental problems of sociological research are of strategic character**

Examples:

- The emergence of **cooperation and social order**
- The dynamics of **competition and conflict**
- **Social norms** and the problem of **sanctioning**
- The impact of **signals and signs** on beliefs and behaviour
- **Inequality of power, status, resources**
- The **emergence of institutions**
- **Social exchange** and the **problem of trust**
- The development of **protest movements**
- The dynamics of **segregation, herding, “bubbles”**
- **Social dilemmas** and **collective goods**