

Background

- Classical view: macro-phenomena cannot be reduced to micro behavior



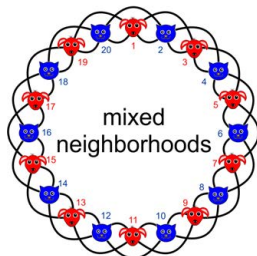
“The determining cause of a social fact must be sought among antecedent social facts and not among the states of the individual consciousness.” (Durkheim 1982:134)

- Methodological individualism: Reduction is possible, but theories and measurement need to be very precise (e.g. Kuran 1991).
- A third approach: Theories need to consider deviations from otherwise dominant patterns of individual decision making.

Deviations can trigger off behavioral cascades which critically influence macro-patterns.

Our study

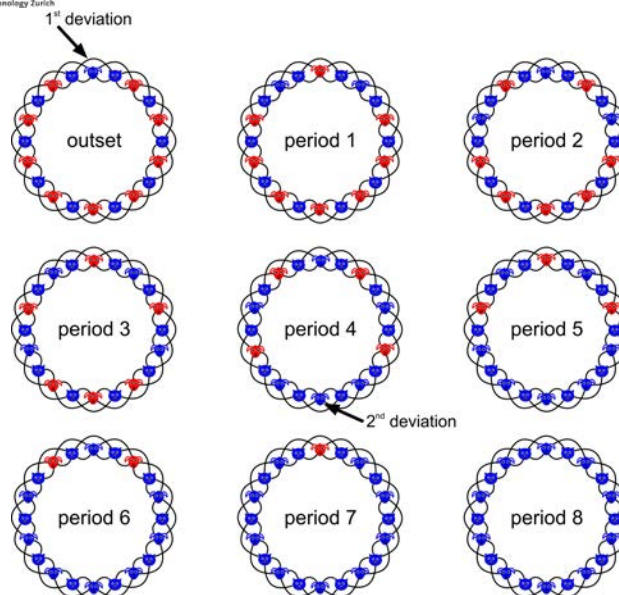
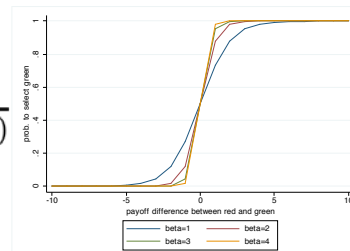
- Proposition: Deviations on the micro-level can have critical impact on macro-patterns.
- We focus on coordination (norm formation) in social networks



Generating predictions

- Theory of individual decision making (McFadden, Young):
 - Subjects received information needed to apply **best-response rule**
 - Deviations from best-response are integrated with a logit-model
 - Deviations are **random**
 - Parameter β_i : “responsiveness to rationality”

$$p_{i,t}^A = \frac{1}{1 + e^{-(\beta_0 + \beta_1(U_i(A, x_{-i}^{t-1}) - U_i(B, x_{-i}^{t-1})))}}$$

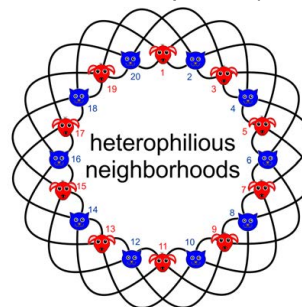
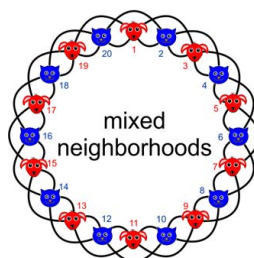


Best-response prediction without deviations: anomie

Best-response prediction with deviations: coordination

The experiment

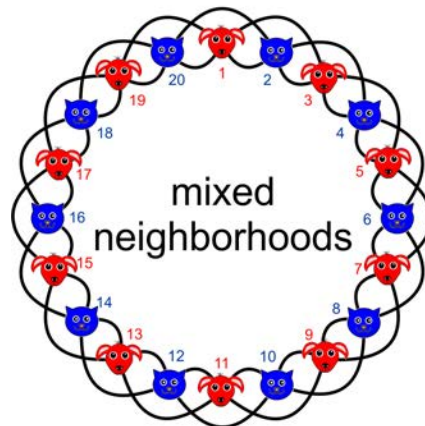
- 2 x 2 design (between subjects/populations)
 - Reward for choosing a specific color (1 ECU vs. 3 ECU)
 - Neighborhood composition (mixed vs. heterophilous)



- 13 sessions with 20 participants
- Average payoff: 33 CHF
- Duration < 45 min

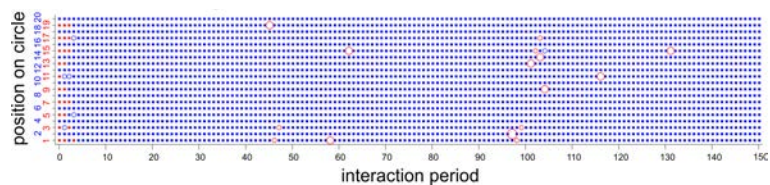
Condition 1

Mixed neighborhoods, $P(\text{type})=1$

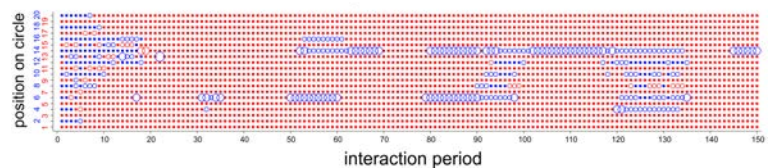


Mixed neighborhoods, $P(\text{type})=1$

- Prediction without deviations: anomie
- Typical prediction with deviations:

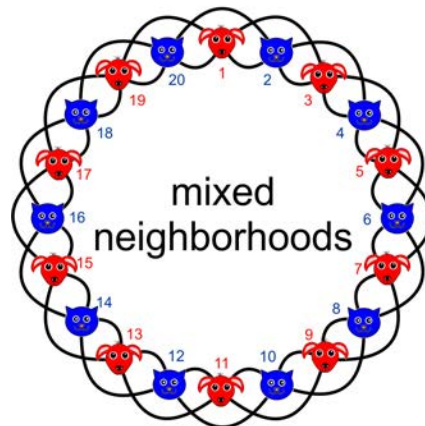


- Typical dynamic found in the experiment:



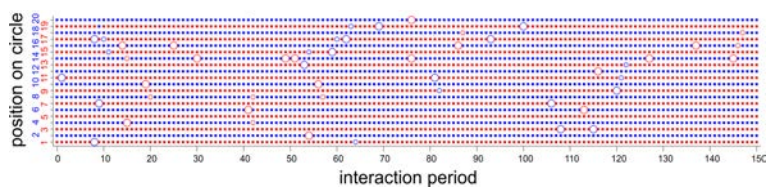
Condition 2

Mixed neighborhoods, $P(\text{type})=3$

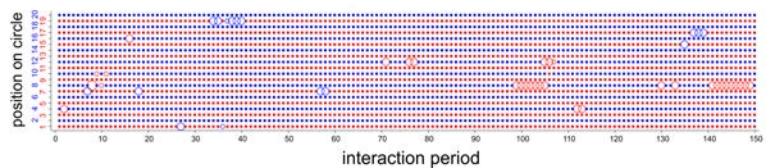


Mixed neighborhoods, $P(\text{type})=3$

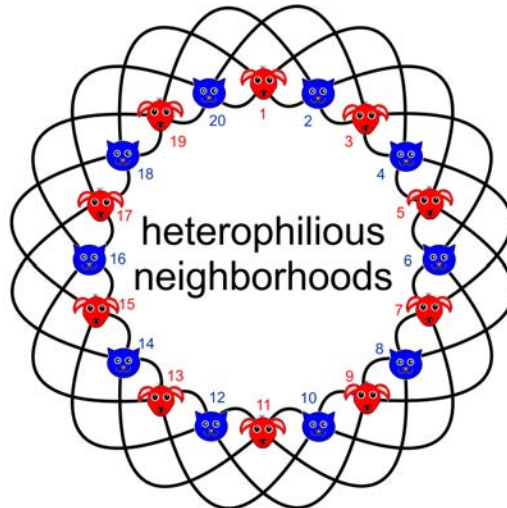
- Prediction without deviations: anomie
- Typical prediction with deviations:



- Typical dynamic found in the experiment:

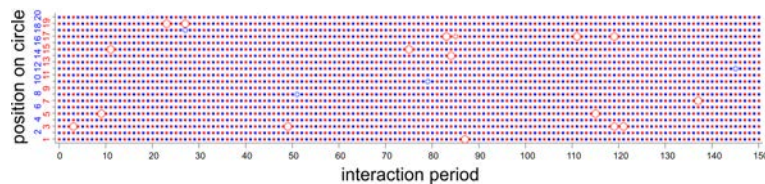


Predictions: Heterophilous neighborhoods, $P(\text{type})=1$

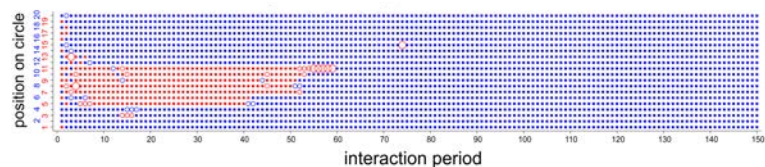


Heterophilous neighborhoods, $P(\text{type})=1$

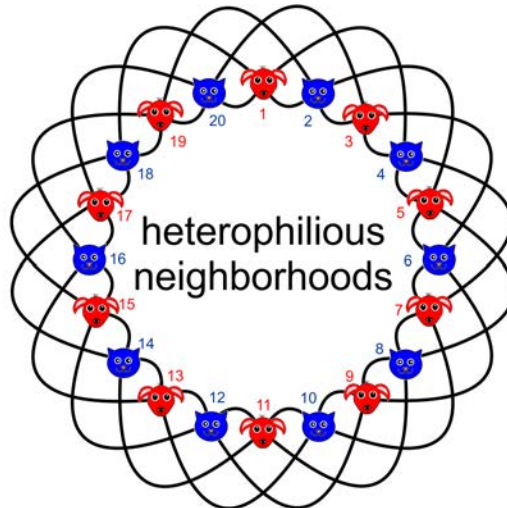
- Prediction without deviations: oscillation
- Typical prediction with deviations:



- Typical dynamic found in the experiment:

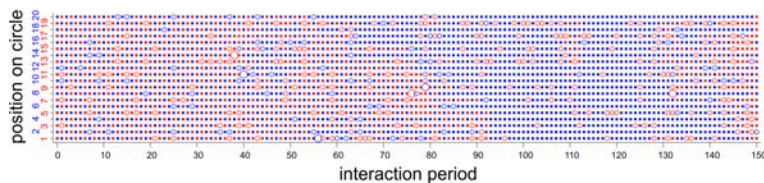


Predictions: Heterophilous neighborhoods, $P(\text{type})=3$

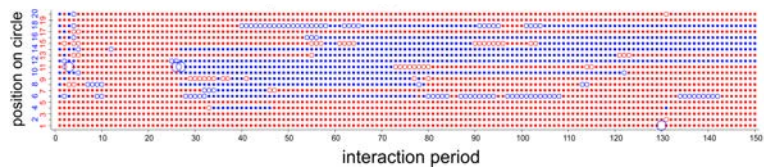


Heterophilous neighborhoods, $P(\text{type})=3$

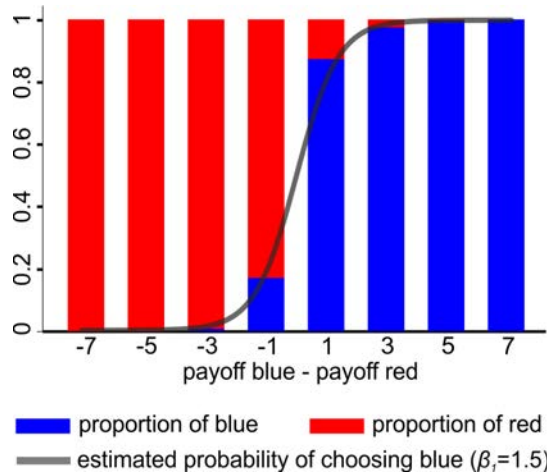
- Prediction without deviations: oscillation
- Typical prediction with deviations:



- Typical dynamic found in the experiment:

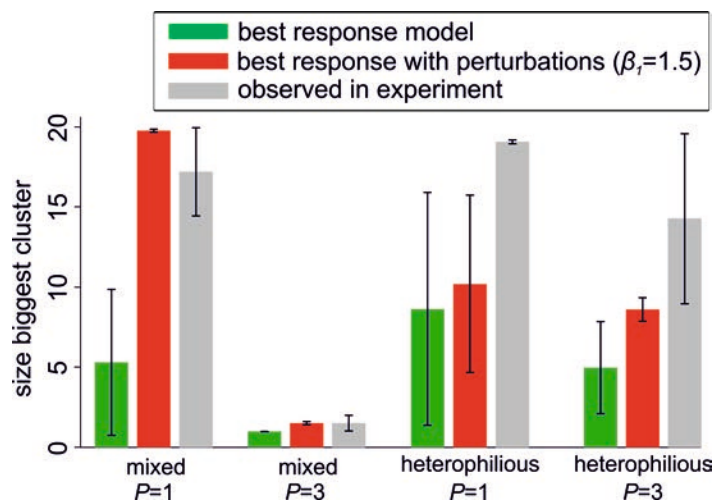


Empirical results: Micro decisions



- 95.95% of decisions were best responses
- Estimated responsiveness to rationality: $\beta_i=1.5$

Empirical results: Macro outcomes



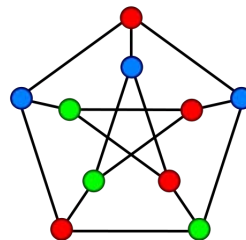
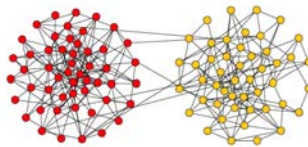
Take-home messages

- Under certain conditions, even a micro-model that is able to explain the vast majority of individual decisions fails to explain macro-phenomena.
- Integrating random deviations on the micro-level improves macro-predictions.
- To predict macro-phenomena, we need to identify conditions under which social systems are not stochastically stable. Statistical mechanics offers methods for this!
- Deviations are not entirely random. We need theories of deviations from dominant patterns of decision making.

Presuming that there are no deviations from dominant patterns of behavior is not an innocent assumption.

- Differences to other theoretical and empirical studies
 - Individuals have opposite preferences
 - Possible norms (all red, all blue) are not Pareto ranked
 - Individuals are not informed about global distribution of behavior
 - Formation of a collective pattern is not rewarded
 - Network is fixed

		Column Player	
		R	S
Row Player	R	1000, 1000	0, 900
	S	900, 0	700, 700



Tomassini, and Pestelacci 2010, Games