

Formulation of Hypotheses and Models

I Informal models

Informal models are

- developed inductively
- based on narrative elements
- focused on empirical phenomena
- not assumption-laden
- based on a idealization of the real world
- graphically presentable

What are the advantages of informal models?

- Serve as an intermediate step in theory formulation
- Faciliate the search for empirical regularities or patterns

II Formal models

Formal Models

- are developed deductively
- consist of abstract elements
- are inferred from assumptions about reality
- are „solvable“ (analytically or numerically) \Rightarrow if x, then y.
- should be parsimoniously formulated

Assumptions need not be empirically testable - they may even be evidently wrong in empirical terms!

Example: utility function of voters from the election of a candidate by Enelow and Hinich (1982):

$$u_{ij} = n_{ij} - a_i(p_j - x_i)^2$$

What are the advantages of formal models?

- Make their assumptions explicit
 - Applicable to dynamic processes
 - Allow the detection of logical inconsistencies.
 - Open to unexpected and counterintuitive results
- ▶ even if formal models are less reality-based than informal ones, they may be superior as regards empirical research.

Types of formal models

- **Rational choice models**
- **Strategic models = standard game theory**
- **Prospect theory (Kahneman and Tversky):**
Diversification of subjective and mathematical risk assessment
- **Behavioural game theory**
- **Psychological process models**

behavioural assumption/ interaction assumption	individual decision making	game theory	aggregated decision making
strong rationality assumption	Standard-Werterwartungstheorie = subjective expected utility (SEU) theory	standard game theory	
bounded rationality assumption (= acting under risk and/or under uncertainty)	non-linear subjective expected utility theory, prospect theory	behavioural game theory	
no rationality assumption	information heuristics, psychological process theory		aggregate Markov chain models (probability theory)

Empirical-statistical models: Systems of equations used to empirically test an (in)formal model's hypotheses

Informal and formal models can be cross-fertilizing, e.g. strategic voting behaviour