

## **Formulation of Hypotheses and Models**

### **Game Theory**

- Interaction assumption of game theoretical models:  
Actors take others' behaviour and the effects of their own behaviour into account
- Varying behavioural assumptions
- Aim: identify patterns of interaction to analyze causal mechanisms by modelling the “logic of the situation”
- Matrix of a game contains the strategies and payoffs (valuations) of the actors.

## Archetypical games

Motives	Pay Off Sum
pure coordination	positive
pure conflict	zero
mixed motive	variable

- Common interest in avoiding maximal conflict
- Symmetric preferences (assurance, battle of the sexes, prisoners' dilemma, chicken)
- Common interest in non-cooperation (deadlock game)
- Common interest in non-cooperation and asymmetric preferences (rambo game: preferences of ego as in chicken, preferences of alter as in deadlock)

## **Presentation**

- **Matrix:** simultaneous decision-making, no communication
- **Decision tree:** first mover, communication, i.e. other player decides on the basis of information about first mover decision

## **Strategies to grasp complex real-world applications**

(1) Decoupling (split up in single interactions)

(2) Aggregation (aggregate individual preferences of corporate/collective actors)

## **Simulation**

Game theory simplifies complex actor constellations; simulation models dynamic processes.

State of the system at the macro level sometimes can not be derived directly from preferences of individual actors but is the result of long causal chains (Emergence).

Construction of simulations:

- assumption about actor behaviour on the input side
- procedural rules

## **Types of simulation models**

- Agent based models:
  - actors with fixed behavioural patterns
  - interaction rules
  - adaptive behaviour
  - emergence: result is partly the consequence of non-intentional behaviour
- Evolutionary models
- System dynamics models
- Micro-analytical models

## Designs: Experiments and Quasi-Experiments

Experiment: Systematic empirical test of causal relationships between variables in a setting/design fully controlling all other variables.

### **Types of experiments:**

- **Field experiments** (Example: the effects of information, of media; in shopping centres)
- **Quasi experiments** (non-experimental design where we compare groups with control groups).
- **Natural experiments** (study the effects of an event under quasi-controlled conditions with everything else constant. Example: electoral reform in New Zealand)
- **Lab experiments** (the real thing)

## **Characteristics of an experimental design**

- standardisation
- randomisation
- avoid possible Placebo-effect
- deal with problems of experimental bias  
(expectational bias of experimenter, design bias,  
expectational bias of participants)

## Measurement of findings

- Self-reporting by participants,
- observational data,
- measurement of (neuro-)physiological effects.

The „incentives“ theme. See rules in the Ockenfels lab



## **Internal/External validity**

**Internal validity:** Is the measurement instrument valid?

Does it measure the intended variable?

Problems in this regard:

- performance effects due to participants' experience with experiments
- self-selection effects
- mortality of participants effect

**External validity:** Are the findings transferable? Can we generalize?

Problems in this regard:

- representativeness of participant pool
- Hawthorne-effect
- professionalization effects (participants may guess the intention of an experiment)

## Advantages and disadvantages of experimental designs

Advantages	Disadvantages
<ul style="list-style-type: none"><li>- better testing of causal relationships</li><li>- better control</li><li>- more precise measurement of effects</li><li>- parsimonious testing</li><li>- more opportunities to match test and model</li></ul>	<ul style="list-style-type: none"><li>- artificial environment</li><li>- not all interesting questions can be tested in experimental designs</li><li>- non-representativeness of participant pool</li><li>- limits to generalization</li></ul>

Important: experiments are only part of the analysis. They are ideally combined with other designs and based on theories and models.

## Ethical rules in experimental designs

- Information and acceptance of participants,
- Risk reduction of participants,
- No deception of participants
- Debriefing
- Written consent to data usage

## **Experimental research in political science**

- Is just at its start, different from economics and psychology.
- Examples: electoral behaviour, media effects, decision-making in groups and committees, coordination and cooperation.
- Schelling's segregation model (Micromotives and Macrobehavior, 1978): ethnic groups and housing in an agent-based simulation model. Findings: social patterns emerge that individuals do not intend (collective tipping processes).
- Application to student behaviour in classrooms: Field experiment, in effect we find clear segregation patterns.