

# **Designs: Large N Studies and Mixed-** **Methods Designs**

Data Structures for Large N Studies:

(1) Cross-sectional designs

- One time point
- Used to analyze level differences in aggregates (such as countries)

(2) Time-series designs

- Repeated time points
- Used to analyze changes over time

## Subtypes of (2):

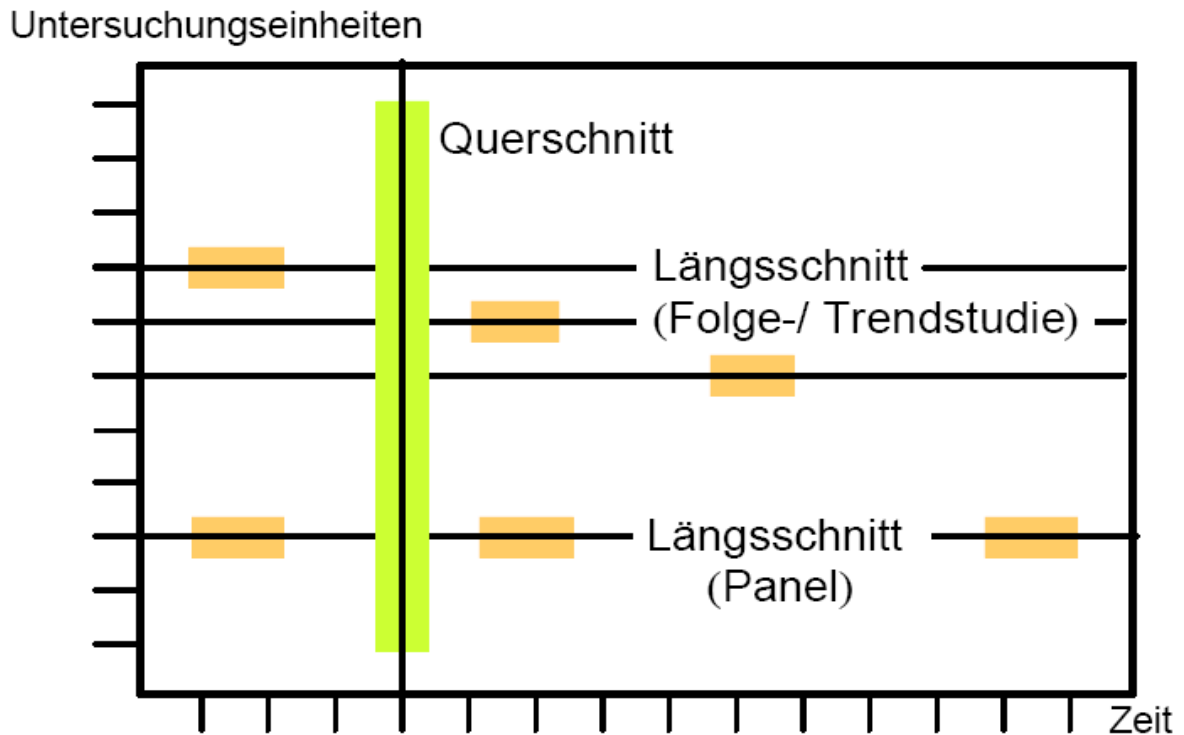
### (a) Panel designs

Variables are measured at different time points based on the same cases/the same sample to analyze individual changes over time

### (b) Trend designs

Variable are measured at different time points based on different cases/different samples from the same universe of cases to analyze aggregate changes over time (can be understood as a series of cross-section analyses)

## Visualization of different Data Structures



Clear hierarchy regarding amount of information between the three types of design:

panel designs > trend designs > cross-sectional designs

► Panel designs can do everything the other two can (e.g. aggregate changes and level differences) but not the other way round.

## Problems of Panel Data

- (1) Choice of design depends on the research question. Despite the hierarchy of information, panel data are not always a good choice (Illustration: research on the effects of institutions).
- (2) Also, measurement problems might „eat up“ the additional information:
  - (a) Panel designs are based on an original sample of cases. If the population changes over time, a trend design is advisable.
  - (b) Panel mortality may result in too few original cases over time.
  - (c) A cross-sectional design may be better (compared to panel and trend designs) when changes are very small and cannot be distinguished from measurement error.

## **Application**

- Panel and trend designs can most powerfully be employed with micro data for longer time spans
- Institutionally oriented country-comparing research is normally based on cross-sectional designs
- But multi-level analysis is increasingly used in political science, combining micro and macro-level data and related designs.

## Distinction between data structures in terms of designs and types of data

Usual usage of data:

Design type	Data used
Cross-sectional designs	cross-sectional
Trend designs	cross-sectional and trend data
Panel designs	panel data + cross-sectional data + trend data

- This need not be the case, only if time point of measurement = time point of survey.
  - They are not identical with regard to retrospective surveys.
  - Illustration: retrospective surveys in a cross-sectional design generates panel data (e.g. exit poll survey on voter volatility)
  - Problem: reliability of data.
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## Types of data

Data Type	N	T	example
Cross-sectional data	$>1$	$=1$	$a_{t1}, b_{t1}, c_{t1}$
Trend data	$=1$	$>1$	$a_{t1}, a_{t2}, a_{t3}$
Panel Data	$>1$	$>1$	$a_{t1}, a_{t2}, a_{t3}$ $b_{t1}, b_{t2}, b_{t3}$ $c_{t1}, c_{t2}, c_{t3}$
Event Data	$>1$	$>1$ , with varying intervals: time points not exogenously fixed but endogenously determined by events	An event is defined as a change of status of research objective.

## Practical guideline

1. formulation of hypothesis
2. type of data that fits the empirical test of hypothesis
3. type of design that fits the generation of reliable and valid data