Panel Surveys

POLSCI 4SS3

Winter 2023

Announcements

- Lab 2 deadline extended to Friday, January 27 `(no new lab today)`

- Sign up for groups!

- By 9 AM tomorrow or I will put you wherever 😠

Last week

- Overview of **MIDA** approach to research design as programming

- **Representative surveys** as the gold standard of public opinion research

- Challenging to decide:

  - What to ask

  - Who to ask

- **Lab:** Get to know R, practice simulating a survey with random sampling

Today

- Start thinking about **cause and effect**

- **Panel surveys:** Survey the same sample multiple times

- **Lab:** Revisit last week's lab

Cause and Effect

Elements of a model 📕

1. Signature

2. Functional relations

3. Probability distribution over exogenous variables

Part 1: Signature

- 📖: Describes variables and their ranges

- Two kinds of variables

- **Endogenous:** Generated from *within* the model

- **Exogenous:** Generated from *without* the model

Types of exogenous variables

1. Anything explicitly (or assumed as) **randomized**

    - Mostly experimental treatment assignment

    - Denoted by Z

2. Anything **unobserved** by the model

    - Otherwise we would be in trouble!

    - Denoted by U

Types of endogenous variables

- Anything else

- **Outcomes:** The things we ultimately want to understand (Y)

- **Moderators:** Variables that modify effects (X)

- **Mediators:** How or why something has an effect (X)

- **Confounders:** Introduce non-causal dependence (X)

# Part 2: Functional relations

- 📘**:** Set of **functions** that produce endogenous variables
- Two ways to express functional relations

1. **Structural causal models** `(today)`

2. **Potential outcomes framework** `(next week)`

Structural causal models

- Use **D**irected **A**cyclic **G**raphs (DAGs)

- **Directed:** Connected by arrows

- **Acyclic:** Not cyclical, usually end in outcomes

- **Graphs:** Visual representation as *nodes* and *edges*

- They represent **nonparametric** causal models

Example
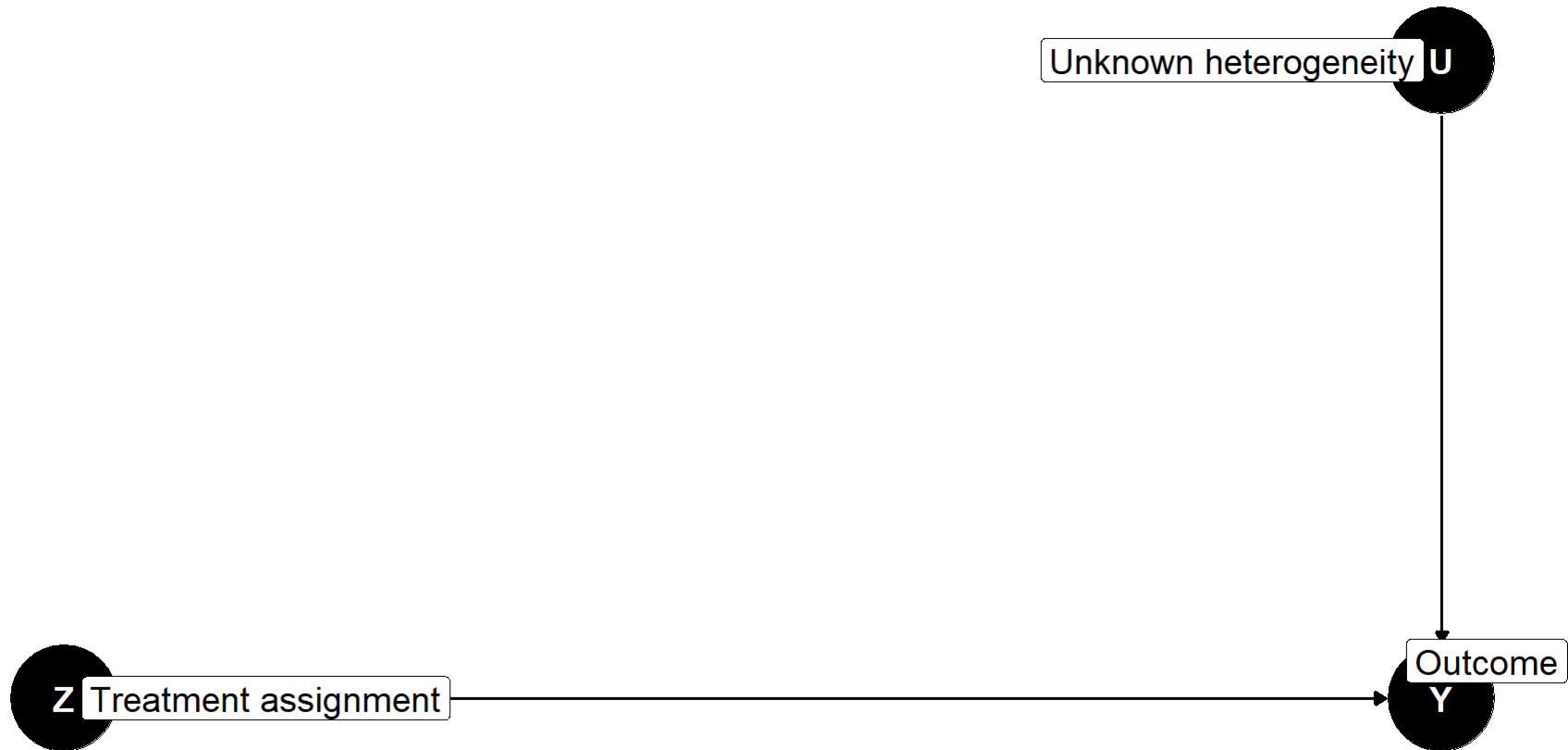
DAG for $Y = f_y(Z, U)$

Part 3: Probability distribution over exogenous variables

- An explanation of how exogenous variables are generated

Examples

- $Z \sim \mathrm{Bern}(p)$ with $p = 0.1$

- $U \sim N(\mu, \sigma)$ with $\mu = 0$ and $\sigma = 1$

Panel Surveys

What are panel surveys?

- Surveys where the same participants are asked questions at multiple points in time

- Usually measure **outcomes** at every time `(but not necessary)`

- More common among *convenience samples* `(e.g. students, twins)`

- The name comes from their **data structure**

Panel data

Balanced panel

ID	year	income	age	sex
1	2016	1300	27	M
1	2017	1600	28	M
1	2018	2000	29	M
2	2016	2000	38	F
2	2017	2300	39	F
2	2018	2400	40	F

Panel data

Unbalanced panel

ID	year	income	age	sex
1	2016	1600	23	M
1	2017	1500	24	M
2	2016	1900	41	F
2	2017	2000	42	F
2	2018	2100	43	F
3	2017	3300	34	M

What are panel surveys for?

1. To measure attitudes in a population over time

2. To understand the effect of events occurring between waves

Challenge

- **Panel attrition:** Participants may drop out from follow up waves

- It may offset the benefit of conducting a panel survey

- It may depend on factors relevant to the study

Example 1

Does Studying Political Science Affect Civic Attitudes?: A Panel Comparison of Students of Politics, Law, and Mass Communication

PETER ESAIASSON
MIKAEL PERSSON

University of Gothenburg

Table 1. Study 1: Trust, virtue of voting, and conception of democracy among students

	T1 mean	T2 mean	Difference	n
Trust (Politicians) – Political Science	0.467	0.553	0.086***	50
Trust (Politicians) – Communication	0.444	0.431	−0.013	24
Trust (Politicians) – Law	0.481	0.457	−0.024	54
Trust (Citizens in general) – Political Science	0.649	0.732	0.083***	53
Trust (Citizens in general) – Communication	0.652	0.642	−0.010	31
Trust (Citizens in general) – Law	0.606	0.606	0.000	53
Virtue of voting – Political Science	0.820	0.869	0.049*	51
Virtue of voting – Communication	0.865	0.884	0.019	31
Virtue of voting – Law	0.891	0.857	−0.034	54
Conception of democracy – Political Science	0.723	0.628	−0.095***	47
Conception of democracy – Communication	0.680	0.660	−0.020	25
Conception of democracy – Law	0.656	0.628	−0.028	45

*$p < .1$. **$p < .05$. ***$p < .01$.

Example 2

The Effect of Political Science Education on Political Trust and Interest: Results from a 5-year Panel Study

Ellen Claes and Marc Hooghe

University of Leuven (KU Leuven)

Table 2. Mean and standard deviations for political trust, interest in politics, and forms of citizenship education.

	Wave I (2006)			Wave II (2008)			Wave III (2011)		
	Mean	Standard Deviation	*n*	Mean	Standard Deviation	*n*	Mean	Standard Deviation	*n*
Political Trust	5.38	1.79	2015	5.51	1.76	2084	5.13	1.66	2057
Political Interest	2.06	0.78	2097	2.25	0.82	2104	2.40	0.86	2096
Classroom Instruction	1.70	0.54	2000	2.25	0.61	2059	na	na	na
Classroom Climate	2.74	0.54	2030	2.70	0.54	2078	na	na	na
School Council	0.07	0.25	2094	0.10	0.31	2110	na	na	na

Note. Entries are average scores on level of political trust, political interest, topics covered in classroom instruction, presence of an open-classroom climate, and being a member of school council (BPPS, 2006–2011; Hooghe et al. 2011). Only respondents that were in the same school during Wave I and Wave II are included.

Table 5. Multilevel model with citizenship-education-specific growth curves.

	Political Trust		Political Interest	
	Estimate	Standard error	Estimate	Standard error
Constant	3.586***	0.164	1.557***	0.074
Time	−0.051	0.049	0.073***	0.022
Classroom Instruction	0.334***	0.046	0.223***	0.0210
Classroom Climate	0.464***	0.051	0.011	0.023
School Council	0.232*	0.092	0.247***	0.04
ICC (time/individual)	0.48		0.46	
IGLS Deviance	14679.581		14293.713	
N	6341		6341	

Note. Multilevel analyses with observation nested in individual respondent. Dependent variable is the group-specific growth curve for political trust and political interest. Analyses performed in MLwiN. IGLS = Iterative Generalized Least Squares.

Next Week

Sensitive Questions

Focus on: Which research design seems more appropriate to elicit honest answers?

Break time!

Lab