

# Causal Inference

Sheng-Hsuan Lin

## 1. 导读

### 1. 因果经济学导论

## 2. 必备知识

### 1. 因果推论分类

### 4. 辛普森悖论

### 2. 统计模型分类

### 5. 干扰因子

### 3. 流行病学的基本定义与测量

### 6. 分层分析与模型

## 3. 因果推论

### 1. Introduction of causal inference 1

### 10. Counterfactual outcome model

### 2. Introduction of causal inference 2

### 11. Identification: exchangeability and RCT

### 3. Framework of causal inference

### 12. Estimation: g-formula, IPW, and MSM

### 4. Causal structure: DAGs

### 13. Estimation: g-estimation and SNM

### 5. Variable in causal inference

### 14. Estimation: doubly robust estimator

### 6. Causal structure: D-separation rule

### 15. Efficiency theorem: Why EIF

### 7. Causal structure: NPSEM

### 16. Efficiency theorem: What is EIF

### 8. Causal structure: NPSEM for d-separation 1

### 17. Efficiency theorem: How to derive EIF 1

### 9. Causal structure: NPSEM for d-separation 2

### 18. Efficiency theorem: How to derive EIF 2,3

## 4. 因果推论架构与概念

### 1. 常见名词

### 7. Exchangeability

### 2. 绪论

### 8. 其它两种 assumptions

### 3. Causal Diagram

### 9. 因果研究中 assumption 的重点

### 4. Counterfactual model

### 10. Sensitivity analysis

### 5. 常见 causal effects

### 11. Identification

### 6. Positivity and consistency

### 12. Statistical Inference

## 5. Data analysis DEMO

1. [Demo 1](#)
2. [Demo 2](#)
3. [Demo 3](#)

## 6. NDE and NIE

1. [Introduction of causal mediation analysis](#)
2. [Definition for causal mediation analysis \(NDE and NIE\)](#)
3. [Identification for NDE and NIE 1](#)
4. [Identification for NDE and NIE 2](#)
5. [Identification for NDE and NIE 3: recanting witness and NPSEM](#)
6. [Review framework](#)
7. [Identification for NDE and NIE 4: when M is continuous](#)
8. [Estimation for NDE and NIE 1](#)
9. [Estimation for NDE and NIE 2](#)
10. [Estimation for NDE and NIE 3](#)
11. [Estimation for NDE and NIE 4](#)
12. [Estimation for NDE and NIE 5: regression with interaction term](#)
13. [Estimation for NDE and NIE 6: Monte-Carlo simulation and software \(mediation.R\)](#)
14. [Estimation for NDE and NIE 7: IPW](#)

## 7. Binary outcome

1. [Causal mediation analysis with binary outcome 1](#)
2. [Causal mediation analysis with binary outcome 2: Counterfactual OR and PM](#)
3. [Causal mediation analysis with binary outcome 3: Estimation A](#)
4. [Causal mediation analysis with binary outcome 4: Estimation B](#)

## 8. Alternative definition

1. [3 diff. def. for causal mediation analysis](#)
2. [CDE 1](#)
3. [CDE 2](#)
4. [Interventional approach 1: Introduction](#)

- 5. [Interventional approach 2: Definition](#)
- 6. [Interventional approach 3: Identification](#)
- 9. 中介效应分析
  - 1. [Mediation analysis 基本概念常见的错误解读](#)
  - 2. [传统 Mediation analysis 的做法以及 causal mediation](#)
  - 3. [Mediation analysis 三种常见的定义及 interpretation](#)
  - 4. [Mediation analysis 三种常见的定义在辨识中需要的假设及意义](#)
  - 5. [Mediation analysis identification and estimation](#)
- 10. 交互作用分析
  - 1. [Introduction](#)
  - 2. [三种 interaction](#)
  - 3. [Additive vs multiplicative interaction](#)
  - 4. [RERI 1](#)
  - 5. [RERI 2](#)
  - 6. [Effect modification](#)
- 11. 多重中介效应
  - 1. [DAGs](#)
  - 2. [Counterfactual 1](#)
  - 3. [Counterfactual 2](#)
  - 4. [Difficulty of identification](#)
  - 5. [Introduction of different strategy](#)
- 12. 时变系统的因果推论
  - 1. [Introduction of time-varying system](#)
  - 2. [DAGs of time-varying system](#)
  - 3. [Why regression fail and g-formula in simple case](#)
  - 4. [g-formula 1](#)
  - 5. [g-formula 2: definition and notation](#)
  - 6. [g-formula 3: assumptions](#)
  - 7. [g-formula 4: identification 1](#)
  - 8. [g-formula 5: identification 2](#)
  - 9. [g-formula 6: identification 3](#)
  - 10. [g-formula 7: identification \(Y's pdf\)](#)
  - 11. [gf joint density of outcome and confounder](#)

October 10, 2025