

Plan:

1. Define confounding & stratification
2. Understand why they're important to analysis


Inferential Analysis: Confounding

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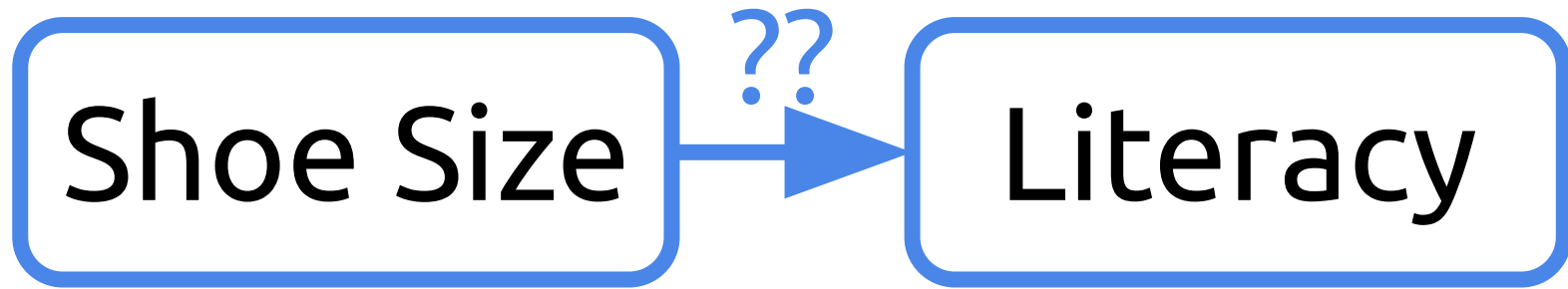
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Small shoes
Not literate

Big shoes
Literate





Small shoes
Not literate
Child

Big shoes
Literate
Adult

Shoe Size

Literacy

Age

```
graph TD; A[Shoe Size] --> C[Age]; B[Literacy] --> C;
```

The diagram illustrates a relationship where two variables, 'Shoe Size' and 'Literacy', are shown to point towards a third variable, 'Age'. 'Shoe Size' and 'Literacy' are each enclosed in a solid blue rounded rectangle. 'Age' is enclosed in a dashed blue rounded rectangle. Two blue arrows originate from the bottom of the 'Shoe Size' box and the bottom of the 'Literacy' box, converging at the top of the 'Age' box. This visualizes 'Age' as a common factor or a variable that is influenced by both 'Shoe Size' and 'Literacy'.

Variable1

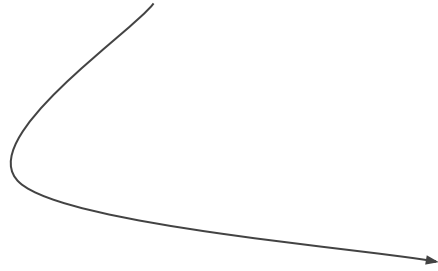
Variable2

Confounder

```
graph TD; V1[Variable1] --> C[Confounder]; V2[Variable2] --> C;
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The diagram illustrates a causal relationship where two variables, Variable1 and Variable2, are influenced by a common factor, the Confounder. Variable1 and Variable2 are represented by solid blue boxes with rounded corners, while the Confounder is represented by a dashed blue box with rounded corners. Two blue arrows point from the bottom of Variable1 and Variable2 to the top of the Confounder box, indicating that the confounder is the common cause of both variables.

We'll discuss additional approaches of how to account for confounding in your analysis in the next lecture.



Ignoring confounders will lead you to draw incorrect conclusions from your analyses

Spine Surgery Results

Sample: 400 patients with index vertebral fractures

Vertebroplasty	Conservative care	Relative risk (95% confidence interval)
30/200 (15%)	15/200 (7.5%)	2.0 (1.1–3.6)

subsequent fractures

Eek....looks like vertebroplasty was way worse for patients!

But wait...at time of initial fracture...

	Vertebroplasty N = 200	Conservative care N = 200
Age, y, mean \pm SD	78.2 \pm 4.1	79.0 \pm 5.2
Weight, kg, mean \pm SD	54.4 \pm 2.3	53.9 \pm 2.1
Smoking status, No. (%)	110 (55)	16 (8)

Age and weight are similar between groups. **Smoking Status** differs vastly.

So...let's stratify those results real quick

Smoke			No smoke		
Vertebroplasty	Conservative	RR (95% confidence interval)	Vertebroplasty	Conservative	RR (95% confidence interval)
23/110 (21%)	3/16 (19%)	1.1 (0.4, 3.3)	7/90 (8%)	12/184(7%)	1.2 (0.5, 2.9)

Risk of re-fracture is now similar within group