When Standard Methods Succeed

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when correlation is causation









randomized controlled trials A/B testing

Even in these cases, using the methods you will learn here can help!

- 1 Adjusting for baseline confounders can make an estimate more efficient
- 2 Propensity score weighting is more efficient that direct adjustment
- 3 Sometimes we are more comfortable with the functional form of the propensity score (predicting exposure) than the outcome model

simulated data (100 observations)

simulated data (100 observations)

Treatment is randomly assigned

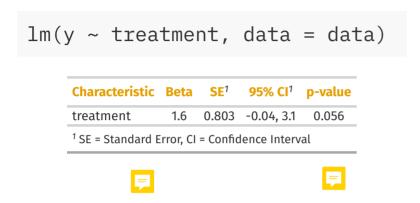
simulated data (100 observations)

Treatment is randomly assigned

There are two baseline covariates: age and weight

Unadjusted model

Adjusted model



lm(y ~ trea	tme	nt -	+ weig	ht +	age,
	Characteristic	Beta	SE ¹	95% Cl ¹	p-value	
F	treatment	1.5	0.204	1.1, 1.9	<0.001	
	weight	0.18	0.103	-0.03, 0.38	0.087	
	age	0.20	0.005	0.19, 0.21	<0.001	
	¹ SE = Standard Error, CI = Confidence Interval					

Propensity score adjusted model

Characteristic	Beta	SE	95% CI	p-value
treatment	1.5	0.197	1.1, 1.9	< 0.001



simulated data (10,000 observations)

Treatment is randomly assigned

There are two baseline covariates: age and weight

Unadjusted model

Adjusted model

lm(y	/ ~	trea	tmen	t,	data	=	data)
	Char	acteristic	Beta	SE ¹	95% CI ¹	p-v	alue

Characteristic	Beta	SE ¹	95% CI ¹	p-value			
treatment	0.89	0.082	0.73, 1.1	<0.001			
¹ SE = Standard Error, CI = Confidence Interval							

<pre>lm(y ~ treatment</pre>	+	weight	+	age,
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Characteristic	Beta	SE ¹	95% CI ¹	p-value
treatment	1.0	0.020	1.0, 1.0	<0.001
weight	0.19	0.010	0.17, 0.21	<0.001
age	0.20	0.001	0.20, 0.20	<0.001
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¹ SE = Standard Error, CI = Confidence Interva

Propensity score adjusted model

Characteristic	Beta	SE	95% CI	p-value
treatment	1	0.02	1, 1	<0.001

time-varying confounding