simulation summary

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Simulation study

Investigate bias from model misspecification when estimating NDE and NIE.

Simulation scenarios

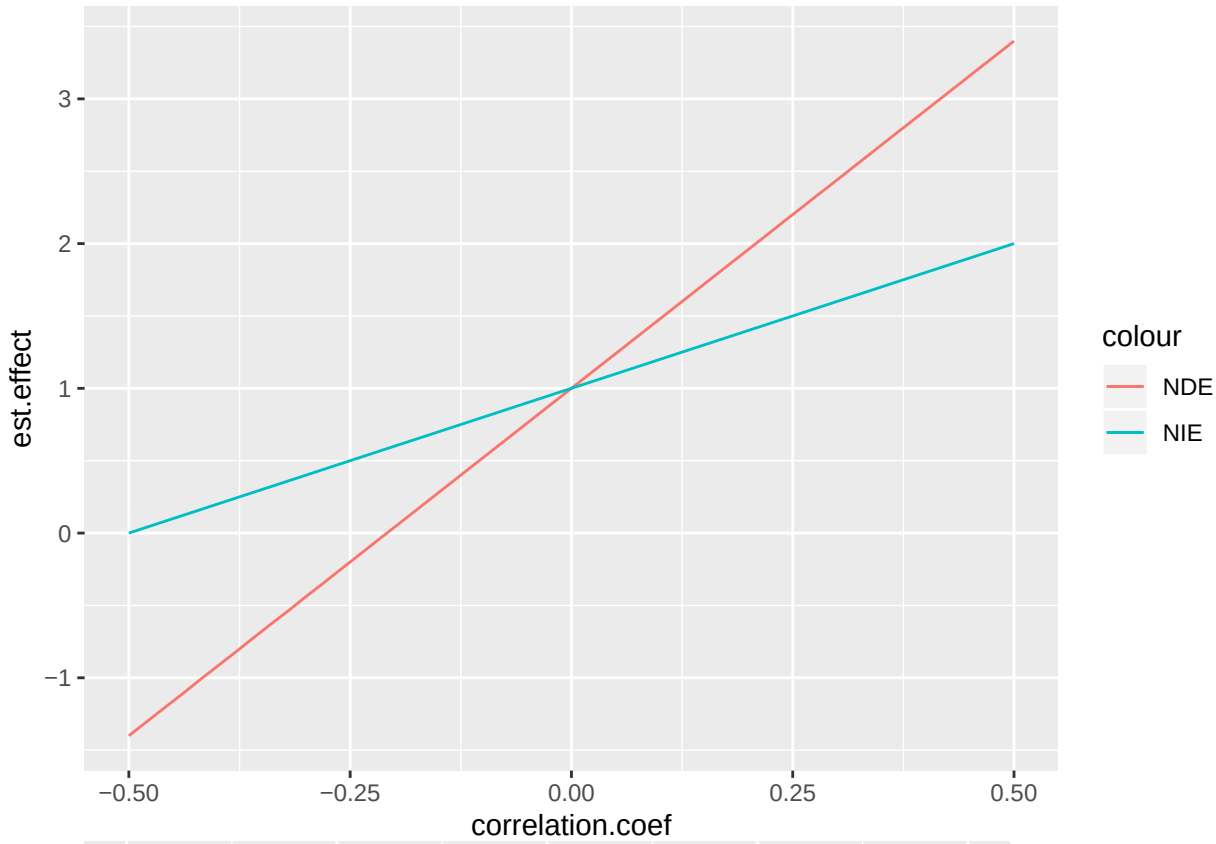
Table 1: Variables used for simulations

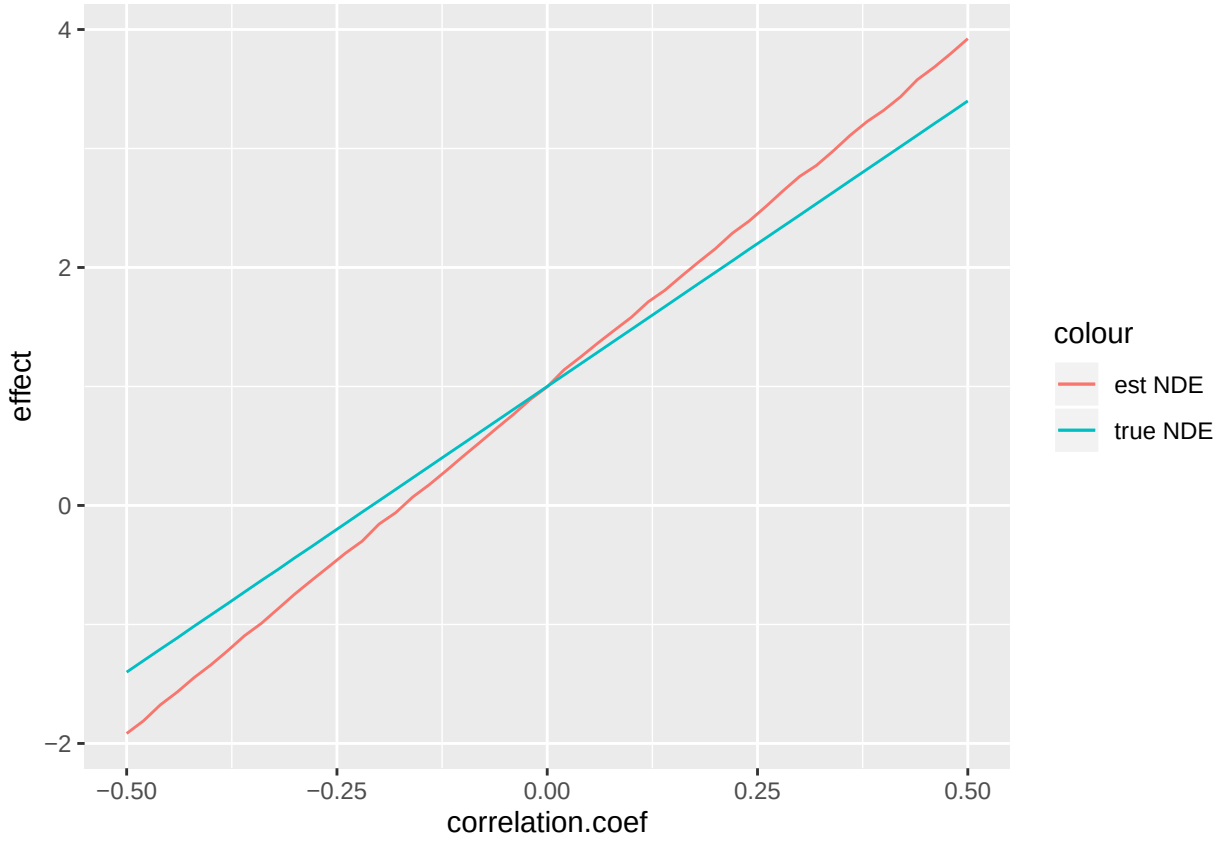
variable	type	true model
X(additional covariate)	continous	$X \sim gamma(8, 4.5)$
Z(exposure)	binary	$Z = I(Y* > 0)$ where $Z* \sim U_0 + U_1 X + N(0,1)$
M(mediator)	continous	$M \sim B_0 + B_1 Z + B_2 X + N(0,1)$
Y(outcome)	continous	$Y \sim \theta_0 + \theta_1 Z + \theta_2 M + \theta_3 ZM + \theta_4 X + N(0,1)$

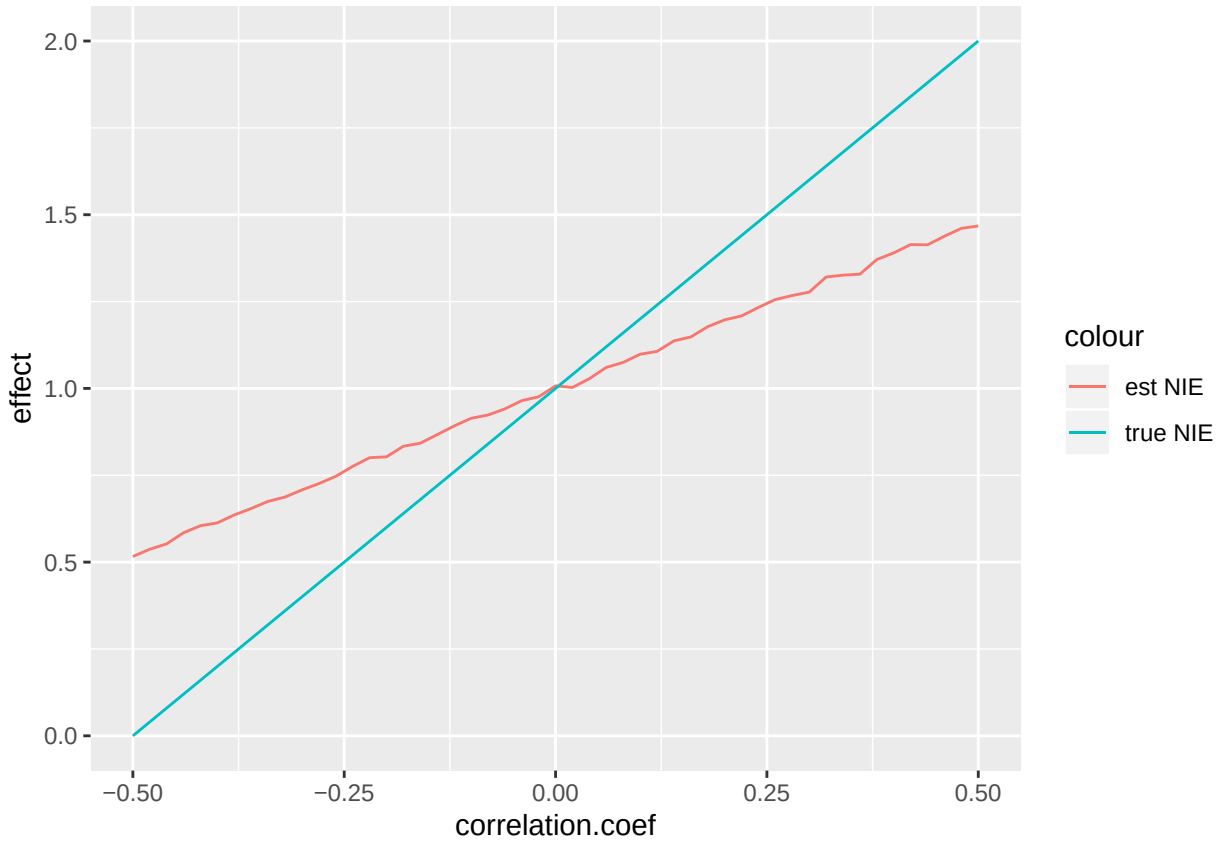
Coefficient values used(Only positive effects. Maybe test with negatives?):

- $U_0 = -0.4$
- $U_1 = 0.01$
- $B_0 = 3$
- $B_1 = 2$
- $B_2 = 0.05$
- $\theta_0 = 5$
- $\theta_1 = 1$
- $\theta_2 = 0.5$
- $\theta_3 =$ varied[-0.5, 0.5]
- $\theta_4 = 0.05$

Estimated mediator model was set to the correct one. Estimated outcome model was linear but misspecified without ZM interaction: $Y \sim Z + M + X$.


est.effect
3
2
1
0
−1
−0.50
−0.25
0.00
0.25
0.50
correlation.coef
colour
NDE
NIE


effect
4
2
0
−2
−0.50
−0.25
0.00
0.25
0.50
correlation.coef
colour
est NDE
true NDE


2.0
1.5
1.0
0.5
0.0
effect
−0.50
−0.25
0.00
0.25
0.50
correlation.coef
colour
est NIE
true NIE