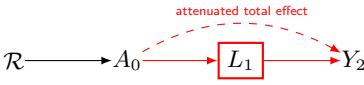
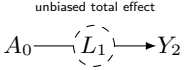
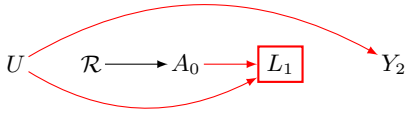
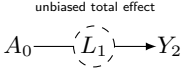

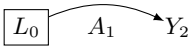
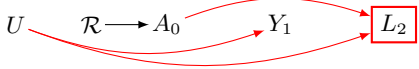
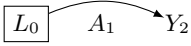

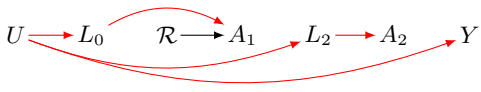
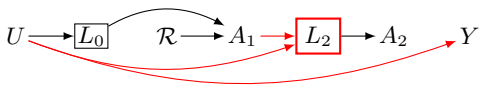
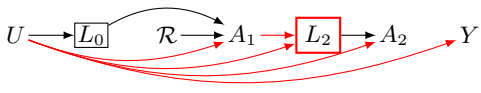


Examples of Bias in Experiments

Bias	Problem	Response
Post-randomisation adjustment		
1	Post-treatment adjustment blocks treatment effect 	unbiased total effect 
2	Post-treatment adjustment induces collider stratification bias 	unbiased total effect 
3	Demographic measures at the end of study condition on a collider that opens a back-door path. 	
4	Demographics measured post-outcome 	
Directed measurement error		
5	Treatment affects measurement error of the outcome 	Sensitivity analyses
Confounding of the per-protocol effect		
6	Per protocol effect in a sustained treatment is lost because a confounder affects adherence 	Condition on L_0 and L_1
7	Per protocol effect lost in sustained treatment because treatment affects confounder of adherence 	Use special estimators
8	Per protocol effect lost in sustained treatment because both measured and unmeasured confounders affect treatment adherence 	Use special estimators: stronger assumptions

Key: A denotes the treatment, sequential in G6-8; Y denotes the outcome; \mathcal{R} denotes randomisation; U denotes an unmeasured confounder. Note there is no arrow into treatment assignment at baseline because treatment assignment is randomised; L denotes a common cause of treatment and outcome or a proxy of such a common cause or mediator along the path between treatment and outcome. Whether L should be conditioned upon depends on structural features of context; L **black box** denotes conditioning on variable L ; \longrightarrow **black arrow** assumes causality; \longrightarrow **red arrow** denotes a path of bias; \dashrightarrow indicates a path for bias separating A and Y ; L **red box** denotes a case when conditioning on X induces bias; (L) **Dashed circle:** Latent variable, not adjusted (assumed for U).