# SPARCC DAY 2 QUIZ: Concepts and Causal Diagrams

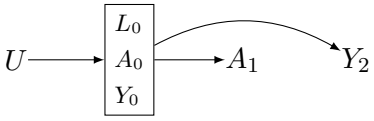
2025-AUG-12

**Answer by circling 'True' or 'False' (1pt $\times$ 10)**

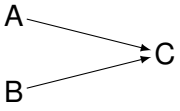
1. Association can never be causation: **TRUE** / **FALSE**.

2. Measurement error in the exposure variable will always threaten to bias a causal effect estimate, even if the outcome is measured without error: **TRUE** / **FALSE**

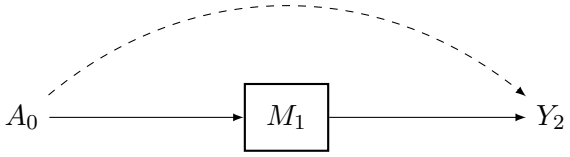
3. According to this causal diagram, any association between $A_1$ on $Y_2$ would be an unbiased causal effect estimate: **TRUE** / **FALSE**



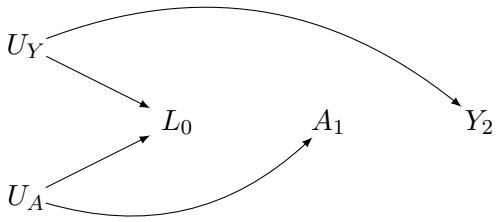

4. According to this causal diagram, $A \coprod B|C$: **TRUE** / **FALSE**



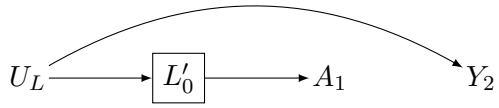

5. According to this causal diagram, if we were to condition on $\boxed{M_1}$, the total effect of $A_0 \rightarrow Y_2$ is guaranteed to be equal to the direct effect of $A_0 \rightarrow Y_2$: **TRUE** / **FALSE**



6. According to this causal diagram, there is no way to avoid bias when estimating the causal effect of $A_1$ on $Y_2$: **TRUE** / **FALSE**




7. According to this causal diagram, if we were to condition on $\boxed{L_0'}$ then we would block all backdoor paths between $A_1$ and $Y_2$: **TRUE** / **FALSE**




8. If the sample at baseline differs from the target population, and no further adjustment is made, we say the study lacks external validity: **TRUE** / **FALSE**

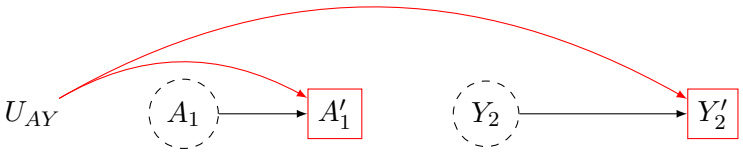
9. If a study lacks internal validity, then it will also lack external validity, but if a study lacks external validity, it will not necessarily lack internal validity **TRUE** / **FALSE**

10. According to the rules of d-separation, if a variable $L'$ is a descendant of an immediate parent variable $L$, then $L'$ functions as a proxy for $L$ such that conditioning on $\boxed{L'}$ is akin to conditioning on $\boxed{L}$: **TRUE** / **FALSE**

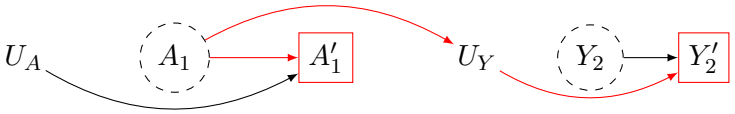
**Answer *only three* of the five following questions (5 pt each). Attempt *two* short paragraphs for each answer. For each graph, assume that that we are interested in estimating the causal effect of $A_1$ on $Y_2$. (5pts $\times$ 3)**

**1. Briefly explain why we cannot estimate a causal effect of $Y_1$ on $A_2$ if the following causal diagram describes our data; give an example.**


**2. Briefly explain the threat of Measurement Error Bias in this causal graph; give an example.**

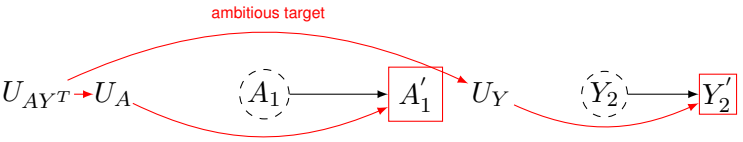



**3. Briefly explain the threat of Measurement Error Bias in this causal graph; give an example.**




This graph presents a bias of directed measurement error. Here, the treatment affects the error in measuring the outcome. There are no further biases. This may lead to an association in the absence of causation.

**4. Briefly explain the threat of External Validity in this causal graph; give an example.**




**5. Briefly explain the threat of External Validity in this causal graph; give an example.**