


Lecture 2a: Practice Problem Solutions: John McGready

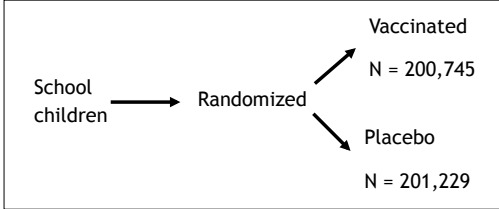


Lecture 2a: Practice Problem Solutions

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Practice Problems

2. Consider a large, randomized study such as the Salk polio vaccine trial



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graph LR; A[School children] --> B[Randomized]; B --> C[Vaccinated  
N = 200,745]; B --> D[Placebo  
N = 201,229]
```

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Practice Problems

2. How does randomization help to ensure that the outcome /treatment group relationship observed is not confounded by any factors known or unknown? More specifically, what part of the necessary conditions for confounding does randomization eliminate?

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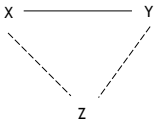
Practice Problems

- Remember, a necessary condition for a variable to be a confounder is that it must be related to both the outcome and the predictor of interest
- In randomized studies, the “treatment” is the predictor of interest
- Randomization with a large number of potential subjects eliminates the association between the predictor of interest and any other variable besides (potentially) the outcome
- In other words, randomization allows the only difference between the “treatment” groups to be the treatment of interest

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Practice Problems

- In the “confounding conditions” diagram with outcome Y, predictor of interest X, and potential confounder Z:

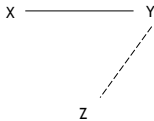


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graph TD; X --- Y; X -.- Z; Z -.- Y
```

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Practice Problems

- Randomization eliminates the necessary link between X and Z



```
graph TD; X --- Y; Z -.- Y
```

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Practice Problems

3. Suppose a study were performed to assess the relationship between a diet choice (vegan, lacto-ovo vegetarian, neither) and cholesterol level. Subjects were not randomized to a dietary group. Before interpreting the relationship, can you name some potential factors for which it would be advisable to control?

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Solutions

- Remember, for a factor to be a confounder, it must be associated with both cholesterol level and with being vegetarian

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Solutions

- Some candidates include the following:
 - Sex—females are more likely to be vegetarian and have lower cholesterol
 - Smoking—vegetarians are less likely to smoke and smoking is associated with higher cholesterol
 - Income—vegetarians are wealthier and increased wealth associated with lower cholesterol

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