Assignment 2 Quiz

Crash Course in Causality Quiz Questions

1. What is the primary focus of causality?
    a. Understanding correlations
    b. Identifying cause-and-effect relationships
    c. Analyzing observational data
    d. Conducting randomized controlled trials

    Answer: b. Identifying cause-and-effect relationships
    Explanation: Causality involves understanding how changes in one variable directly influence changes in another variable, emphasizing cause-and-effect relationships.

2. What distinguishes causation from correlation?
    a. Causation involves statistical associations
    b. Correlation focuses on mechanisms behind observed phenomena
    c. Causation directly influences another variable
    d. Correlation requires randomized controlled trials

    Answer: C) Causation directly influences another variable
    Explanation: Unlike correlation, which identifies statistical associations, causation involves a direct influence of one variable on another.

3. What does the formula $E[Y(1)-Y(0)]$ represent?
    a. Difference in treatment and control outcomes
    b. Average of potential outcomes under treatment
    c. Comparison of observational and experimental data
    d. Calculation of correlation coefficients

    Answer: Difference in treatment and control outcomes
    Explanation: The formula $E[Y(1)-Y(0)]$ calculates the difference between the average outcomes when treatment is applied and when it is not, representing the treatment effect.

4. What is a confounder?
    a. A variable that influences both treatment and outcome
    b. A tool used in experimental designs
    c. An unobservable factor

d. A measure of association

Answer: A variable that influences both treatment and outcome

Explanation: A confounder is a variable associated with both the treatment and the outcome, potentially leading to biased conclusions if not accounted for.

5. What is the purpose of randomized controlled trials (RCTs)?
    a. To analyze observational data
    b. To identify potential outcomes
    c. To address confounding variables
    d. To randomly assign participants to treatment groups

    Answer: D) To randomly assign participants to treatment groups

    Explanation: RCTs involve randomly assigning participants to treatment and control groups to ensure unbiased comparisons and establish causal relationships.

6. What concept emphasizes the independence of treatment assignment from potential outcomes?
    a. Ignorability
    b. Propensity score matching
    c. Randomized controlled trials
    d. Association vs. causation

    Answer: A) Ignorability

    Explanation: Ignorability emphasizes that the assignment to treatment is independent of potential outcomes given observed variables, a crucial assumption in causal inference.

7. What distinguishes association from causation?
    a. Association implies a direct cause-and-effect relationship
    b. Association involves statistical connections between variables
    c. Causation requires randomized controlled trials
    d. Causation examines observational data

    Answer: B) Association involves statistical connections between variables

    Explanation: Association indicates statistical connections between variables, while causation implies a direct cause-and-effect relationship.

8. How does propensity score matching help in observational studies?
    a. By randomly assigning participants to treatment groups
    b. By estimating treatment effects directly
    c. By creating comparable treatment and control groups based on characteristics
    d. By analyzing potential outcomes

    Answer: C) By creating comparable treatment and control groups based on characteristics

    Explanation: Propensity score matching helps create comparable treatment and control groups based on similar characteristics, mimicking the random assignment in controlled experiments.

9. What is a challenge in understanding causality?
    a. Randomized controlled trials
    b. Identifying confounding variables
    c. Analyzing potential outcomes
    d. Assessing correlation patterns

    Answer: B) Identifying confounding variables

    Explanation: Identifying and addressing confounding variables, which can influence both treatment and outcome, poses a challenge in understanding causality.

10. In which field does causal inference play a vital role?
    a. Public health
    b. Astronomy
    c. Architecture
    d. Fashion design

    Answer: A) Public health

    Explanation: Causal inference is crucial in public health for evaluating interventions, understanding disease causation, and informing policy decisions.
