

**Quiz**

Your answers: shade in the cell that best completes the statement or answers the question

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
a															
b															
c															
d															
e															

Does the herb Echinacea help the common cold? A study by researchers at the University of Wisconsin-Madison published a study in the *Annals of Internal Medicine* that found that Echinacea was no better than a placebo. The researchers randomly assigned 142 college students who recently came down with colds to receive either Echinacea in capsule form or a placebo in capsule form. The students did not know if they were getting the herb or the placebo and took their treatment for 10 days. The researchers reported that there was no statistically significant difference in the duration of the cold between these groups.

**Quiz**

1. The purpose of randomization into the Echinacea and placebo groups was

- a. to make the two groups similar.
- b. mitigate the impact of lurking variables.
- c. avoid bias in the assignment of the treatments.
- d. all of the above.

2. An experiment on the effect of vitamin A on cancer uses two randomly chosen groups of 200 men each, one given vitamin A and the other a placebo. An estimate from a similar experiment using two groups of 1000 men each would have

- a. less bias.
- b. more bias.
- c. more variability.
- d. less variability.

**Quiz**

Do doctors in managed care plans give less charity care? Researchers chose 60 communities at random, then chose doctors at random in each community. In all, they interviewed 10,881 doctors. Overall, 77.3% of the doctors said they had given some care free or at reduced rates because of the patient's financial need in the month before the interview. Doctors who received at least 85% of their practice income from managed care plans were significantly less likely than other doctors to provide charity care.

3. The phrase "significantly less likely" means that, when we compare the charity work of doctors with more than 85% of their practice in managed care with other doctors,
- a. the difference in charity work is very large.
  - b. the difference in charity work is so large that it would rarely occur just by chance in choosing a sample.
  - c. the difference in charity work is large enough to affect doctors' incomes.
  - d. the difference in charity work is less than we would expect just by chance in choosing a sample.

Quiz

4. An important reason for the use of *randomization* in designing experiments is that it tends to

- a. reduce confounding.
- b. allow double-blinding.
- c. eliminate response error.
- d. reduce the placebo effect.

5. Were the extinctions that occurred in the last ice age more frequent among species of animals with large body sizes? A researcher gathers data on the average body mass (in kilograms) of all species known to have existed at that time.

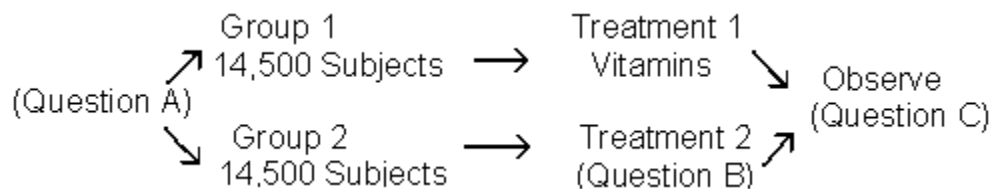
What are the explanatory and response variables?

- a. There is no explanatory-response distinction in this situation.
- b. Explanatory: body mass of a species. Response: whether the species went extinct.
- c. Explanatory: the ice age. Response: whether a species went extinct.
- d. Explanatory: whether a species went extinct. Response: the body mass of the species.
- e. Explanatory: the ice age. Response: the body mass of a species.

Quiz

Does taking large amounts of vitamins protect against cancer? To study this question, researchers enrolled 29,000 Finnish men, all smokers over the age of 50. Half of the men, selected at random, took vitamin supplements, and others took a dummy pill that has no active ingredient. The researchers followed all the men for eight years. At the end of the study, men in the vitamin group were no less likely to have cancer than men in the other group. This study cast doubt on the popular idea that taking lots of vitamins can reduce the risk of cancer.

The study design looked like this:



The flow chart shows (Question A) that depicts two arrow marks; one arrow points toward the Group 1 with 14,500 subjects, and the second arrow points toward the Group 2 with 14,500 subjects. The Group 1 further shows an arrow sign that points toward the Treatment 1 Vitamins, which means subjects who took vitamin supplements. The Group 2 shows an arrow sign that points toward the Treatment 2 (Question B), which means subjects who took a dummy pill that has no active ingredient. Both Treatment 1 and

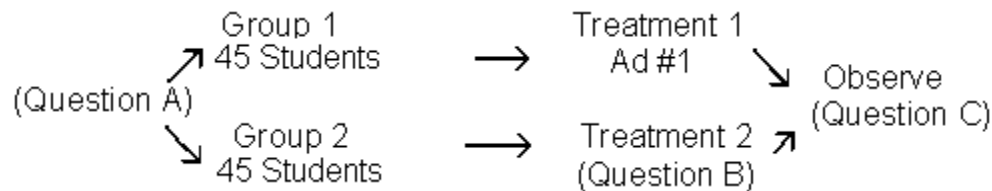
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Treatment 2 show arrow marks pointing toward the last step Observe (Question C), which means researchers observed all the men for years to determine the study design objective.

6. The statistical name for this study design is
- a. simple random sample.
  - b. stratified random sample.
  - c. randomized comparative experiment.
  - d. multistage sample.
  - e. observational study.
7. Which of the following are the three principles of experimental design?
- a. confound, randomize, small samples
  - b. confound, randomize, large samples
  - c. control, randomize, small samples
  - d. control, randomize, large samples

**Quiz**

A study compares the effect on college students of two different TV advertisements for spring break in Gulf Shores, Alabama. Call the ads "Ad #1" and "Ad #2." We want to know which ad makes more students want to visit Gulf Shores during spring break. The subjects are 90 students taking a course in hotel management. The design of the study looks like this:



The flow chart image shows (Question A) that depicts two arrow marks; one arrow points toward the Group 1 with 45 students, and the second arrow points toward the Group 2 with 45 students. The Group 1 further shows an arrow sign that points toward the Treatment 1 Ad # 1, which means students who watched advertisement 1. The Group 2 further shows an arrow sign that points toward the Treatment 2 (Question B), which means students who have seen an advertisement other than Ad #1. Both Treatment 1 and Treatment 2 further show arrow marks that point toward the last step Observe (Question C), which means researchers observed all the students to determine the study design objective.

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8. A weakness of this study is that
- a. this is an observational study, so we can't conclude that the ad viewed causes the response.
  - b. the design is biased in favor of Ad #1.
  - c. the design is biased against Ad #1.
  - d. because the students all come from one course, the findings may not extend to all college students.
  - e. there is no placebo group.

A magazine article on preventing cancer says, "Eating one serving of tofu a week may cut your risk of breast cancer 15%, recent research suggests."

9. The data come from an observational study; therefore,
- a. the results must be false.
  - b. the results must be true.
  - c. there may be lurking variables.
  - d. perhaps those who chose to eat more tofu are, for some reason, less susceptible to breast cancer than those who didn't.
  - e. both C and D are correct.



### Quiz

Does St. John's wort have a significant effect in treating major depression? A study looked at 340 adult outpatients suffering from major depression as measured by their HAM-D score, randomly assigning each subject to either a placebo, St. John's wort, or a second active treatment for comparison.

10. The St. John's wort study doesn't show that St. John's wort is *equivalent* to a placebo. If the researchers still believe in the effectiveness of St. John's wort in treating depression, how might they change their study?

- a. They should carefully choose which patients get the placebo and which get St. John's wort to guarantee significant results.
- b. They should increase the sample size.
- c. They should decrease the sample size.
- d. They shouldn't have a placebo group; they should give all the subjects the St. John's wort so they can measure its effect more precisely.

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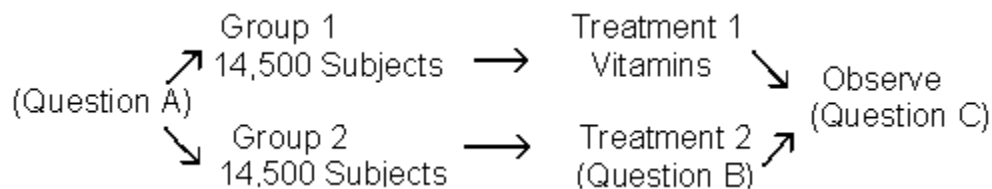
A researcher claims that the mean resting pulse rate of all college basketball players in the United States is less than the mean resting pulse rate of all professional basketball players in the United States. The resting pulse rates of a random sample of 115 college basketball players were measured as were the resting pulse rates of a random sample of 80 professional basketball players. The mean resting pulse rates of the two groups were compared.

11. In this study, the explanatory variable is
- a. the level of basketball played (college or professional).
  - b. the number of players studied in each group.
  - c. the resting pulse rate.
  - d. confounded with the placebo effect.

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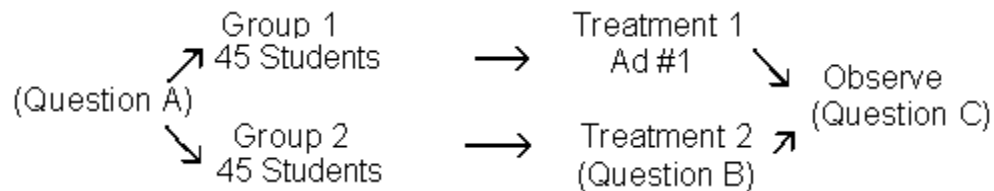
Treatment 2 show arrow marks pointing toward the last step Observe (Question C), which means researchers observed all the men for years to determine the study design objective.

12. The method used to form the groups should appear in the outline at the point marked "Question A." What is this method?

- a. random allocation
- b. voluntary response
- c. first come, first served
- d. divide and conquer
- e. stratified sampling

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13. The method used to form the groups appears in the diagram above at the point marked "Question A." This method is

- a. men in Group 1, women in Group 2.
- b. students choose which group they want.
- c. voluntary response.
- d. randomization.
- e. the first students to appear go to Group 1.

14. Hearing loss is more common among premature infants than among full-term infants. This was thought to be an effect of premature birth. It has recently been suggested that hearing loss may be caused by the high noise level of the incubators in which the premature infants are placed. This is an example of

- a. statistical significance.
- b. confounding between two variables.
- c. a designed experiment.
- d. nonrandom sampling error.
- e. matching.

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15. The no statistically significant difference in the results means

- a. the study was designed poorly.
- b. the study has no practical importance.
- c. the difference in duration of colds between the Echinacea and placebo groups was large enough that it would rarely occur by random chance.
- d. the difference in duration of colds between the Echinacea and placebo groups was small enough to explain by random chance.

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

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**Answer Key**

1. d

2. d

3. b

4. a

5. b

6. c

7. d

8. d

9. e

10. b

11. a



Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

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12. a

13. d

14. b

15. d