

PROB STAT HONORS

Name _____

5.5 – EXPERIMENTS, PART 2

1. A study conducted by Norman Hollenberg, professor of medicine at Brigham and Women's Hospital and Harvard Medical School, involved 27 healthy people aged 18 to 72. Each subject consumed a cocoa beverage containing 900 milligrams of flavonols (a class of flavonoids) daily for five days. Using a finger cuff, blood flow was measured on the first and fifth days of the study. After five days, researchers measured what they called "significant improvement" in blood flow and the function of the cells that line the blood vessels. What flaw in the design of this experiment makes it impossible to say whether the cocoa really caused the improved blood flow? Explain.

2. An experiment was conducted to compare traditional prostate surgery with a new non-surgical method of treatment. The patients' doctors chose which method the patients would receive. The study found that patients treated by the new method were significantly more likely to die within eight years. What flaw in the design of this experiment makes it impossible to say whether the new method is better (or worse) than traditional surgery? Explain.

Researchers in Japan conducted an experiment on 13 individuals who were extremely allergic to poison ivy. On one arm, each subject was rubbed with a poison ivy leaf and told the leaf was harmless. On the other arm, each subject was rubbed with a harmless leaf and told it was poison ivy. All the subjects developed a rash on the arm where the harmless leaf was rubbed. Of the 13 subjects, 11 did not have any reaction to the real poison ivy leaf.

3. What was the placebo in this experiment?

4. Explain how the results of this study support the idea of a placebo effect.

5. An experiment that claimed to show that meditation lowers anxiety proceeded as follows. The experimenter interviewed the subjects and rated their level of anxiety. Then the subjects were randomly assigned to two groups. The experimenter taught one group how to meditate and they meditated daily for a month. The other group was simply told to relax more. At the end of the month, the experimenter interviewed all the subjects again and rated their anxiety level. The meditation group now had less anxiety. Psychologists said that the results were suspect because the ratings were not **blind**.

Explain what this means and how lack of blindness could bias the reported results.

6. As men age, their testosterone levels gradually decrease. This may cause a reduction in lean body mass, an increase in fat, and other undesirable changes. Do testosterone supplements reverse some of these effects? A study in the Netherlands assigned 237 men aged 60 to 80 with low or low-normal testosterone levels to either a testosterone supplement or a placebo. The report in the Journal of the American Medical Association described the study as a “double-blind, randomized, placebo-controlled trial.” Explain each of these terms.

7. Nurse-practitioners are nurses with advanced qualifications who often act much like primary-care physicians. Are they as effective as doctors at treating patients with chronic conditions? An experiment was conducted with 1316 patients who had been diagnosed with asthma, diabetes, or high blood pressure. Within each condition, patients were randomly assigned to either a doctor or a nurse-practitioner. The response variables included measures of the patients’ health and of their satisfaction with their medical care after 6 months. Is this a completely randomized design, a randomized block design, or a matched pairs design?

8. Cardiologists at Athens Medical School in Greece wanted to test whether chocolate affected blood flow in the blood vessels. The researchers recruited 17 healthy young volunteers, who were each given a 3.5-ounce bar of dark chocolate, either bittersweet or fake chocolate. On another day, the volunteers were switched. The subjects had no chocolate outside the study, and investigators didn’t know whether a subject had eaten the real or the fake chocolate. An ultrasound was taken of each volunteer’s upper arm to see the functioning of the cells in the walls of the main artery. The investigators found that blood vessel function was improved when the subjects ate bittersweet chocolate, and that there were no such changes when they ate the placebo (fake chocolate). Is this a completely randomized design, a randomized block design, or a matched pairs design?