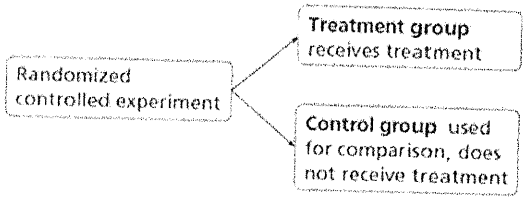
Lesson 8.3

**Data Collection Methods**

| TERM | EXAMPLE |
|---|---|
| An **experiment** imposes a treatment on individuals to collect data on their response to the treatment. | A researcher adds acetone to gasoline to measure its effect on fuel efficiency. |
| An **observational study** observes individuals and measures variables without controlling the individuals or their environment in any way. | A researcher wants to find out if poor nutrition affects eyesight, but it would be unethical to deliberately subject some individuals to poor nutrition. |




Explain whether each situation is an experiment or an observational study.

A researcher wants to know if a soil additive makes a fern grow more quickly. He grows one specimen in treated soil and one in untreated soil.

Experiment - applies a treatment

To find out whether car accidents are more likely on rainy days, a researcher records the weather conditions during 50 randomly selected accidents for the past year.

Observational Study - gathers data

A scientist measures the height of 20 birds' nests, and counts the number of eggs to see if there is a relationship. Is this experiment or an observational study? Explain.

Observational Study - gathers data w/o controlling the environment

Researchers measure the cholesterol of 50 subjects who report that they eat fish regularly and 50 subjects who report that they do not eat fish regularly.

Observational Study - gathers data w/o controlling environment

Researchers have 100 subjects with high cholesterol take fish oil pills daily for two months. They monitor the cholesterol of the subjects during that time.

Experiment - applies a treatment

**The study described in the report is a randomized comparative experiment. Describe the treatment, the treatment group, and the control group.**

One hundred arthritis sufferers reported the severity of their symptoms daily for a month. Fifty of the subjects were given Epsom salt to bathe in at least every other day. At the end of the month, 30% of the subjects who used Epsom salt reported a decrease in severity of their symptoms, compared to 5% in the other group.

Treatment: Bathing in Epsom Salt
Treatment gp: 50 who bathed in Epsalt
Control gp: 50 who did not.

To test the redesign of its Web site, an online bookseller assembled 96 users of the site and randomly divided them into two groups. One group used the new Web site to make an online purchase and one group used the old Web site to do the same transaction. Users of the new site were able to complete the purchase 22% faster.

Treatment: old & New website
Treat. gp: users using new site
Control gp: users using old site.

To see whether zinc has an effect on the duration of a cold, half the subjects took tablets containing zinc at the onset of cold symptoms, and half took tablets without any zinc. The durations of the colds were then recorded.

Control gp: subjects that took tablets w/o zinc.

Treat. gp: subjects that took tablets w/ zinc.

To see whether reviewing for a test with a classmate improves test scores, half the subjects studied with a classmate prior to taking a test, and half studied for the test alone. The test scores were then recorded.

Control gp. studied for test alone

Treat. gp.: studied for the test w/ a classmate.

Explain whether the research topic is best addressed through an experiment or an observational study. Then explain how you would set up the experiment or the observational study.

| | |
|---|---|
| Does using tanning beds at least twice a month affect the likelihood of developing skin diseases?<br>Observational Study - Random. choose a gp. of people that already use tanning beds & another gp that does not. | Do people who consume 1000 milligrams of vitamin C each day as a dietary supplement have lower cholesterol levels than people who do not consume vitamin C supplements?<br>Experiment - NO NONE Neg. effects. Random. choose 1 gp. to take Vit C & another gp. to NOT. |

How does using a control group help a researcher interpret the results of an experiment? How does using randomization help?

A control gp. provides a basis for comparison. Randomization assures that any observed diff. is due to the manipulated variable & not something else.

Classify each method as a survey, an experiment, or observational study, and explain which would be most reliable

| Method A | Method B | Method C |
|---|---|---|
| Randomly choose 50 people to exercise 3 hours a week, and 50 people to participate in another activity, and monitor their health. | Randomly choose 100 people. Ask how many hours a week they exercise, and how healthy they are. | Choose 50 people who exercise regularly and 50 who do not, and monitor their health. |
| Experiment - members of each gp. are randomly selected, so Method A is most reliable. | Survey | Observational Study |