

# Study Types: Controlled Experiments vs. Observational Studies

The screenshot shows a web-based exercise interface for a statistics course. On the left, a sidebar contains the title 'Study types', a paragraph explaining the difference between controlled experiments and observational studies, and instructions for the exercise. The main area is divided into two columns: 'Controlled experiment' and 'Observational study'. A purple box at the top center says 'Drag the items into the correct bucket' with a 'Drop items here' area. Three study descriptions are listed in the 'Controlled experiment' column, each with a green checkmark indicating it has been correctly classified. The 'Observational study' column is currently empty. A 'Submit Answer' button is at the bottom right.

**Study types**

While controlled experiments are ideal, many situations and research questions are not conducive to a controlled experiment. In a controlled experiment, causation can likely be inferred if the control and test groups have similar characteristics and don't have any systematic difference between them. On the other hand, causation cannot usually be inferred from observational studies, whose results are often misinterpreted as a result.

In this exercise, you'll practice distinguishing controlled experiments from observational studies.

**Instructions** 100XP

- Determine if each study is a controlled experiment or observational study.

**Take Hint (-30 XP)**

**Controlled experiment**

- Subjects are randomly assigned to a diet and weight loss is compared. ✓
- Purchasing rates are compared between users of an e-commerce site who are randomly directed to a new version of the home page or an old version. ✓
- Asthma symptoms are compared between children randomly assigned to receive professional home pest management services or pest management education. ✓

**Observational study**

- A week ago, the home page of an e-commerce site was updated. Purchasing rates are compared between users who saw the old and new home page versions. ✓
- Prevalence of heart disease is compared between veterans with PTSD and veterans without PTSD. ✓

**Submit Answer**

## Question:

While controlled experiments are ideal, many situations and research questions are not conducive to a controlled experiment. In a controlled experiment, causation can likely be inferred if the control and test groups have similar characteristics and don't have any systematic difference between them. On the other hand, causation cannot usually be inferred from observational studies, whose results are often misinterpreted as a result.

Determine if each study is a controlled experiment or observational study.

## Explanation of the Question:

This question requires identifying whether a study involves random assignment of participants to groups, which characterizes a controlled experiment, or if it observes existing conditions without intervention, which defines an observational study.

## Answer:

Controlled Experiments:

- Subjects are randomly assigned to a diet and weight loss is compared.

- Purchasing rates are compared between users of an e-commerce site who are randomly directed to a new version of the home page or an old version.
- Asthma symptoms are compared between children randomly assigned to receive professional home pest management services or pest management education.

Observational Studies:

- A week ago, the home page of an e-commerce site was updated. Purchasing rates are compared between users who saw the old and new home page versions.
- Prevalence of heart disease is compared between veterans with PTSD and veterans without PTSD.

Explanation:

Controlled experiments involve random assignment, enabling researchers to infer causation. Observational studies, on the other hand, observe existing variables without intervention, which only allows for correlation analysis but not causation inference.