What are five examples of a null hypothesis?

Authored by

stats writer

April 26, 2024

A null hypothesis is a statement that assumes there is no significant relationship or difference between two or more variables. It serves as a baseline for comparison in an experiment or study. Here are five examples of a null hypothesis:

1. There is no significant difference in test scores between students who study for 2 hours and students who study for 4 hours.

2. There is no significant relationship between caffeine consumption and heart rate.

3. There is no significant difference in job satisfaction between employees who work 40 hours per week and employees who work 60 hours per week.

4. There is no significant difference in weight loss between individuals who follow a low-carb diet and individuals who follow a low-fat diet.

5. There is no significant correlation between hours of television watched and academic performance in high school students.

Write a Null Hypothesis (5 Examples)

A hypothesis test uses sample data to determine whether or not some claim about a is true.

Whenever we perform a hypothesis test, we always write a null hypothesis and an alternative hypothesis, which take the following forms:

H0 (Null Hypothesis): Population parameter =, ≤, ≥ some value

HA (Alternative Hypothesis): Population parameter <, >, ? some value

Note that the null hypothesis always contains the equal sign.

We interpret the hypotheses as follows:

Null hypothesis: The sample data provides no evidence to support some claim being made by an individual.

Alternative hypothesis: The sample data *does* provide sufficient evidence to support the claim being made by an individual.

For example, suppose it's assumed that the average height of a certain species of plant is 20 inches tall. However, one botanist claims the true average height is greater than 20 inches.

To test this claim, she may go out and collect a of plants. She can then use this sample data to perform a hypothesis test using the following two hypotheses:

H0: $\mu \leq 20$ (the true mean height of plants is equal to or even less than 20 inches)

HA: $\mu > 20$ (the true mean height of plants is greater than 20 inches)

If the sample data gathered by the botanist shows that the mean height of this species of plants is significantly greater than 20 inches, she can reject the null hypothesis and conclude that the mean height is greater than 20 inches.

Read through the following examples to gain a better understanding of how to write a null hypothesis in different situations.

Example 1: Weight of Turtles

A biologist wants to test whether or not the true mean weight of a certain species of turtles is 300 pounds. To test this, he goes out and measures the weight of a random sample of 40 turtles.

Here is how to write the null and alternative hypotheses for this scenario:

HA: μ ? 300 (the true mean weight is not equal to 300 pounds)

Example 2: Height of Males

It's assumed that the mean height of males in a certain city is 68 inches. However, an independent researcher

believes the true mean height is greater than 68 inches. To test this, he goes out and collects the height of 50 males in the city.

Here is how to write the null and alternative hypotheses for this scenario:

H0: $\mu \leq 68$ (the true mean height is equal to or even less than 68 inches)

HA: $\mu > 68$ (the true mean height is greater than 68 inches)

Example 3: Graduation Rates

A university states that 80% of all students graduate on time. However, an independent researcher believes that less than 80% of all students graduate on time. To test this, she collects data on the proportion of students who graduated on time last year at the university.

Here is how to write the null and alternative hypotheses for this scenario:

H0: $p \geq 0.80$ (the true proportion of students who graduate on time is 80% or higher)

HA: μ < 0.80 (the true proportion of students who graduate on time is less than 80%)

Example 4: Burger Weights

A food researcher wants to test whether or not the true mean weight of a burger at a certain restaurant is 7 ounces. To test this, he goes out and measures the weight of a random sample of 20 burgers from this restaurant.

Here is how to write the null and alternative hypotheses for this scenario:

H0: μ = 7 (the true mean weight is equal to 7 ounces)

HA: μ ? 7 (the true mean weight is not equal to 7 ounces)

Example 5: Citizen Support

A politician claims that less than 30% of citizens in a certain town support a certain law. To test this, he goes out and surveys 200 citizens on whether or not they support the law.

Here is how to write the null and alternative hypotheses

for this scenario:

H0: p ≥ .30 (the true proportion of citizens who support the law is greater than or equal to 30%)

HA: μ < 0.30 (the true proportion of citizens who support the law is less than 30%)