

Significance Levels vs. p-Values

You learned about two very important elements of hypothesis testing: significance levels (α) and p-values.

It is very common to get these two confused, especially when you are new to statistics! In this exercise, you have been provided with statements and need to match the definitions provided based on whether they accurately describe α or p-values.

The screenshot shows a web-based exercise interface. At the top, there's a navigation bar with 'Learn / Courses / Introduction to Statistics' and a 'Course Outline' button. A user profile section shows 'Daily XP 2800'. The main content area is titled 'Significance levels vs. p-values' and contains introductory text. Below the text is an 'Instructions' section with a '100XP' reward and a 'Take Hint (-30 XP)' button. The instructions state: 'Match the statements to the correct bucket.' Below this is an 'Incorrect' feedback section. The main exercise area has two columns: 'Significance level' and 'p-value'. Each column contains three statements with drag handles. A purple box at the top of the main area says 'Drag the Items Into the correct bucket' and 'Drop Items here'. At the bottom right, there is a 'Submit Answer' button.

Significance level

- This is a threshold assigned to represent the probability of falsely rejecting the null hypothesis.
- Also known as alpha.
- This is set before data collection.

p-value

- This metric is calculated after data has been collected.
- This describes the probability of obtaining results at least as extreme as those observed.
- To reject the null hypothesis this value must be less than or equal to alpha.

Answer

Significance level:

- This is a threshold assigned to represent the probability of falsely rejecting

the null hypothesis.

- Also known as alpha.
- This is set before data collection.

p-value:

- This metric is calculated after data has been collected.
- This describes the probability of obtaining results at least as extreme as those observed.
- To reject the null hypothesis, this value must be less than or equal to alpha.

Explanation of the Answer

1. **Significance Level (α):**

- This is a pre-determined threshold, set before data collection, that specifies how unlikely a result must be under the null hypothesis to reject it. Common values for α are 0.05 or 0.01.

2. **p-Value:**

- The p-value is calculated from the data collected and quantifies how extreme the observed data is under the assumption that the null hypothesis is true. A smaller p-value indicates stronger evidence against the null hypothesis.

3. **Relationship Between α and p-Value:**

- If the p-value is less than or equal to α , the null hypothesis is rejected; otherwise, it is not.