

# What are the conclusions of a hypothesis test and can you provide examples?

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July 2, 2024

## RECOMMENDED CITATION

stats writer (2024). *What are the conclusions of a hypothesis test and can you provide examples?*. PSYCHOLOGICAL SCALES. Retrieved from <https://scales.arabpsychology.com/?p=165603>

A hypothesis test is a statistical method used to determine whether there is enough evidence to support or reject a hypothesis about a population. The conclusions of a hypothesis test are based on the analysis of sample data and can be either acceptance or rejection of the null hypothesis (the initial assumption) in favor of the alternative hypothesis. For example, if a researcher wants to test the hypothesis that students who study for longer hours score higher on exams, they would collect data from a sample of students and perform a hypothesis test. The conclusion of this test could be that there is enough evidence to support the hypothesis, or that there is not enough evidence to reject the null hypothesis. In this case, the researcher would conclude that there is a significant relationship between studying hours and exam scores, or that there is no significant difference between the two. The conclusions of a hypothesis test are crucial in determining the validity of a hypothesis and can help guide future research and decision-making.

## Write Hypothesis Test Conclusions (With Examples)

**A is used to test whether or not some hypothesis about a is true.**

**To perform a hypothesis test in the real world, researchers obtain a from the population and perform a hypothesis test on the sample data, using a null and alternative hypothesis:**

**Null Hypothesis (H<sub>0</sub>): The sample data occurs purely from chance. Alternative Hypothesis (H<sub>A</sub>): The sample data is influenced by some non-random cause.**

**If the of the hypothesis test is less than some significance level (e.g.  $\alpha = .05$ ), then we reject the null hypothesis.**

**Otherwise, if the p-value is not less than some significance level then we fail to reject the null hypothesis.**

**When writing the conclusion of a hypothesis test, we typically include:**

**Whether we reject or fail to reject the null hypothesis. The significance level. A short explanation in the context of the hypothesis test.**

**For example, we would write:**

**We reject the null hypothesis at the 5% significance level.**

**There is sufficient evidence to support the claim that...**

**Or, we would write:**

**We fail to reject the null hypothesis at the 5% significance level.**

**There is not sufficient evidence to support the claim that...**

**The following examples show how to write a hypothesis test conclusion in both scenarios.**

**Example 1: Reject the Null Hypothesis Conclusion**

**Suppose a biologist believes that a certain fertilizer will cause plants to grow more during a one-month period than they normally do, which is currently 20 inches. To test this, she applies the fertilizer to each of the plants in her laboratory for one month.**

**She then performs a hypothesis test at a 5% significance level using the following hypotheses:**

**$H_0: \mu = 20$  inches (the fertilizer will have no effect on the mean plant growth)  
 $H_A: \mu > 20$  inches (the fertilizer will cause mean plant growth to increase)**

**Suppose the p-value of the test turns out to be 0.002.**

**We reject the null hypothesis at the 5% significance level.**

**There is sufficient evidence to support the claim that this particular fertilizer causes plants to grow more during a one-month period than they normally do.**

### Example 2: Fail to Reject the Null Hypothesis Conclusion

Suppose the manager of a manufacturing plant wants to test whether or not some new method changes the number of defective widgets produced per month, which is currently 250. To test this, he measures the mean number of defective widgets produced before and after using the new method for one month.

He performs a hypothesis test at a 10% significance level using the following hypotheses:

$H_0: \mu_{\text{after}} = \mu_{\text{before}}$  (the mean number of defective widgets is the same before and after using the new method)  
 $H_A: \mu_{\text{after}} \neq \mu_{\text{before}}$  (the mean number of defective widgets produced is different before and after using the new method)

Suppose the p-value of the test turns out to be 0.27.

Here is how he would report the results of the hypothesis test:

We fail to reject the null hypothesis at the 10% significance level.

**There is not sufficient evidence to support the claim that the new method leads to a change in the number of defective widgets produced per month.**

#### **Additional Resources**

**The following tutorials provide additional information about hypothesis testing:**

ARABPSYCHOLOGY.COM