

Typical study

Hypothesis: What you predict.

Null hypothesis: Assuming your prediction is not true.

Data: A single sample. Maybe more.

Test statistic:

Question

- Assuming the null hypothesis, how unusual is the test statistic?
- **Statistical question:** Assuming the null hypothesis, what is the probability of obtaining the sample mean, or higher?

Typical study

Hypothesis: What you predict.

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Test statistic:

Question

- Assuming the null hypothesis, how unusual is the test statistic?
- **p-value:** Assuming the null hypothesis, what is the probability of obtaining the sample mean, or higher?

Typical study

Hypothesis:

Null hypothesis:

Data:

Test statistic:

Question

- Assuming the null hypothesis, how unusual is the _____?
- **p-value:** Assuming the null hypothesis, what is the probability of obtaining the _____, or higher?

Typical study

Hypothesis: Extra time improves mean test score.

Null hypothesis: Scores are the same as before.

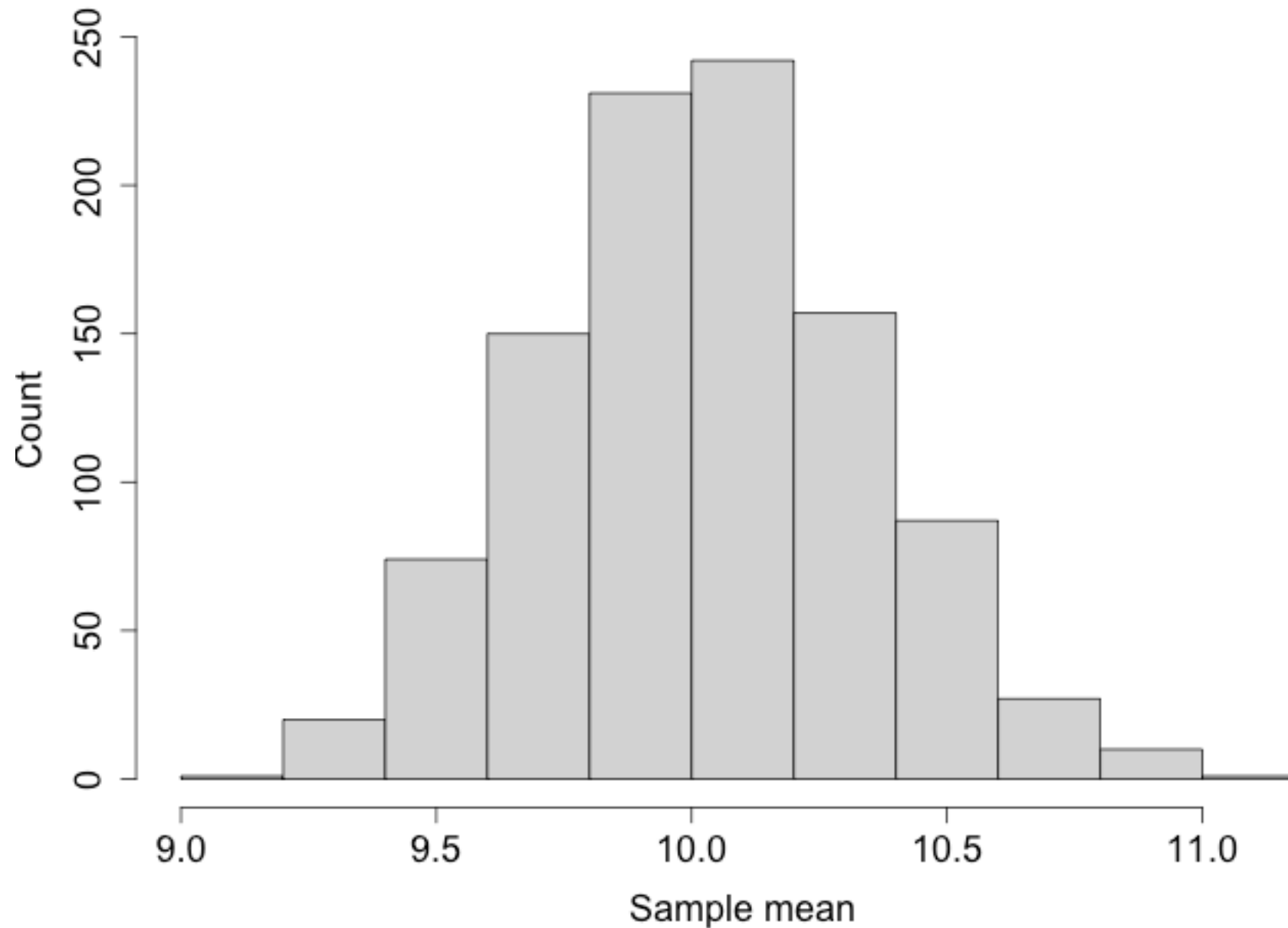
Data: A single sample of 1000 students

Test statistic: Sample mean

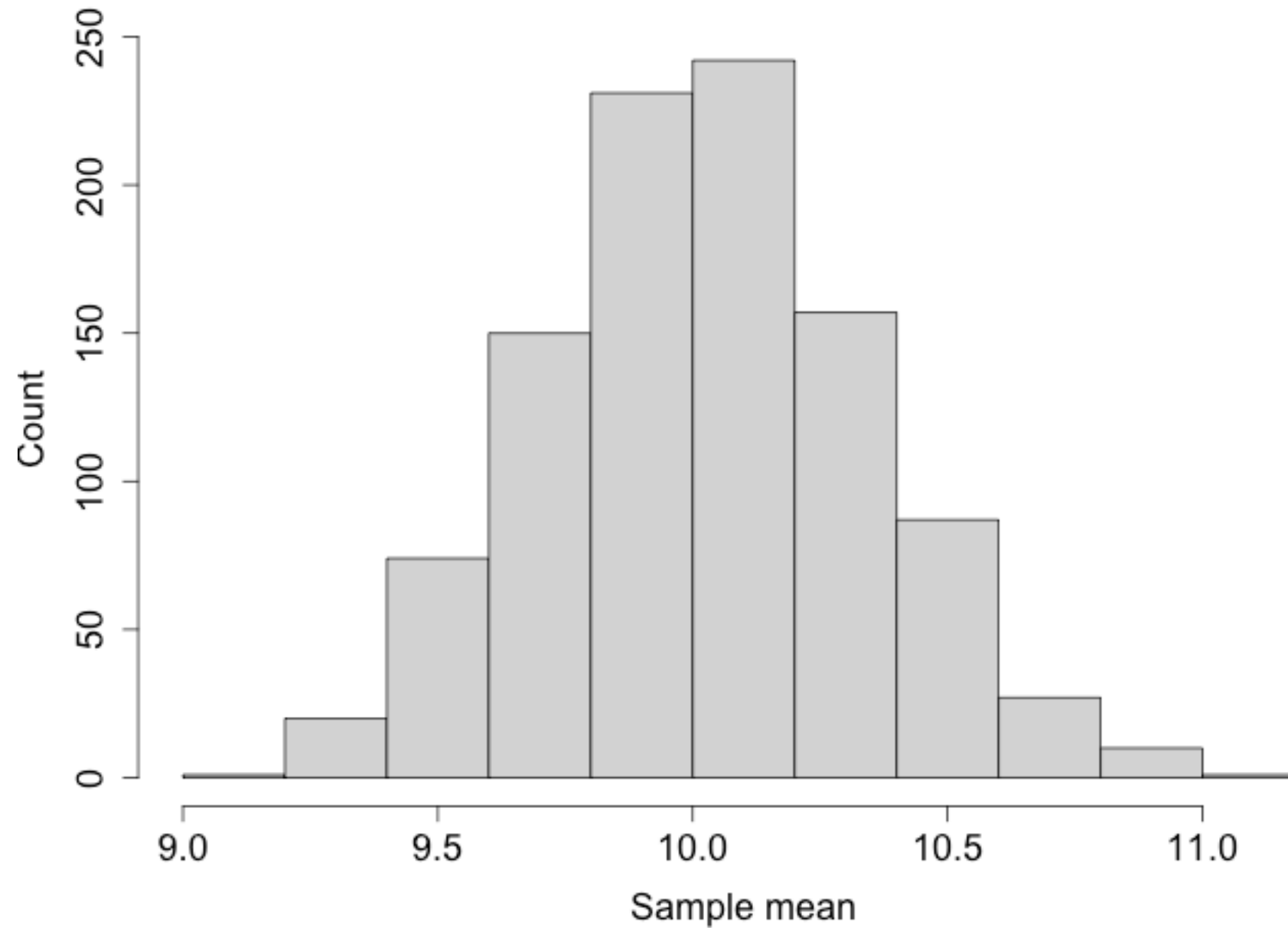
Question

- Assuming the null hypothesis, how unusual is the sample mean?
- **p-value:** Assuming the null hypothesis, what is the probability of obtaining the sample mean or higher?

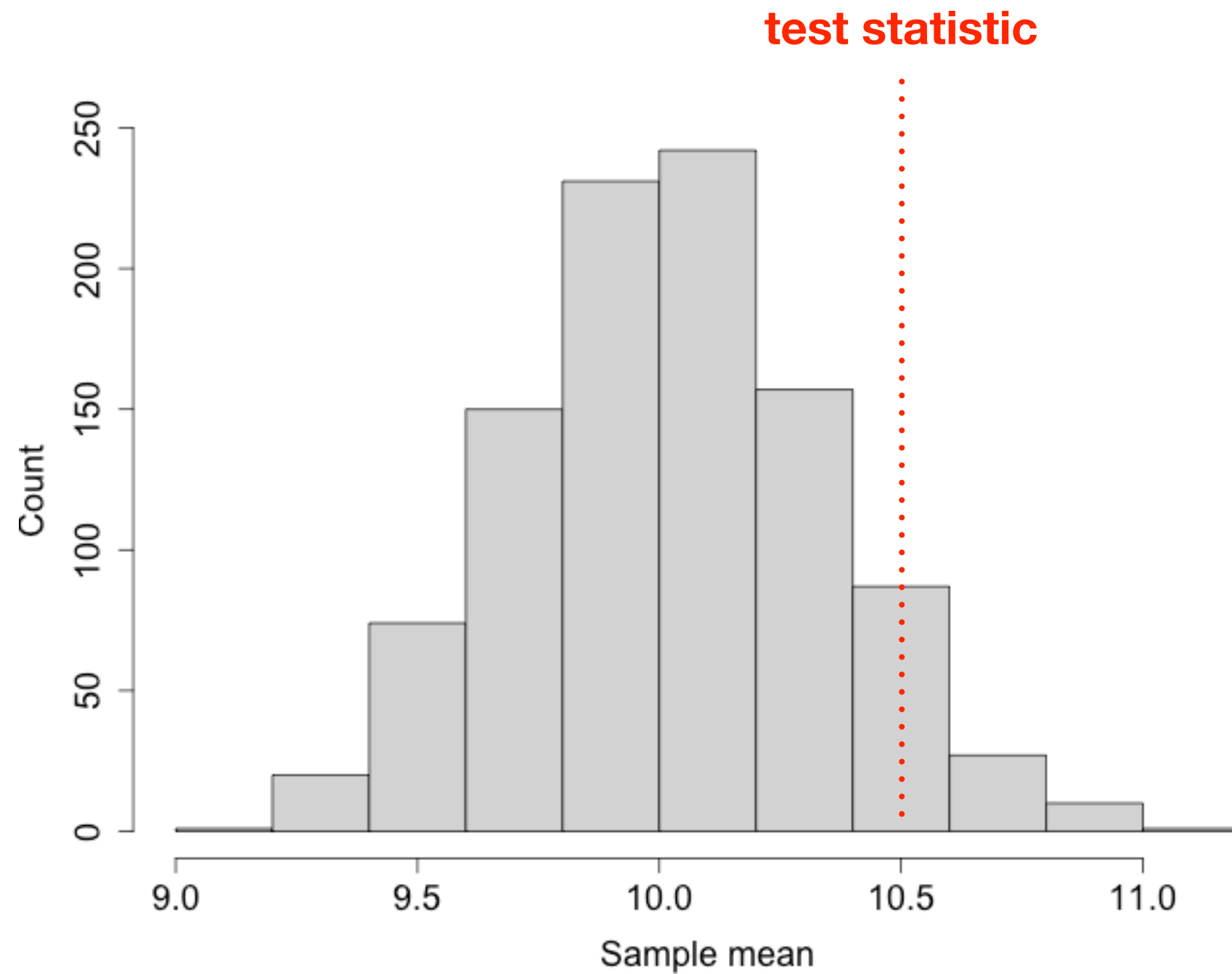
Sampling distribution assuming no change



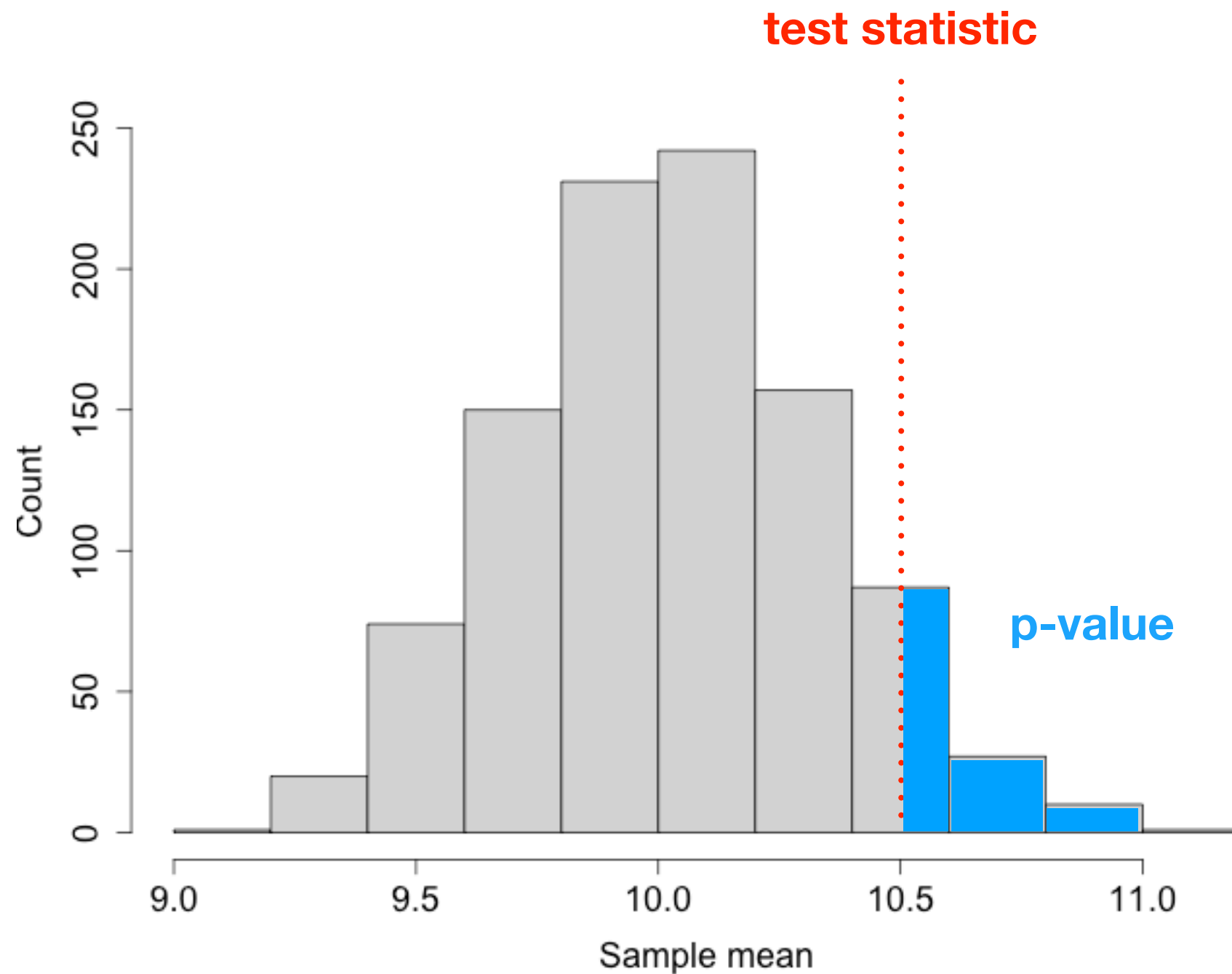
Null distribution



Null distribution



Null distribution



Now what?

In statistical terms

- If the p-value is very low, then we reject the null hypothesis.
- Perhaps the hypothesis is true ...

How low does the p-value need to be?

- Typically less than 0.05
- If that seems arbitrary, that's because it is.

What do you report?

We haven't gotten there yet.

This example is to show you what a p-value means.

We would actually perform a one-sample t-test and report something like this:

- *Students given extra time scored higher ($M = 10.5$, $SD = \underline{\hspace{1cm}}$) than found normally, $t(\underline{\hspace{1cm}}) = \underline{\hspace{1cm}}$, $p = \underline{\hspace{1cm}}$.*

What p-value do we write here?

But we never have the null distribution

