

Hypothesis Testing

Hypothesis tests are an important tool to analyze data and make some inferences from it.

Hypothesis Testing

All Hypothesis tests follow a basic logic...

1. An assumption or a claim is made.
2. If your data contradicts this assumption or claim then you conclude that the claim or assumption made must be wrong.

Hypothesis Testing

Example

As I drove to work one day recently, I assumed that the road that I normally take to school would, as usual, take me to school.

There is the assumption, part 1 of the hypothesis.

But I reached a construction barricade, the road was closed.

There is the data.

It contradicts my assumption. So my original assumption or hypothesis was wrong.

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Another Example

You are the production manager at a beverage manufacturer and you receive a bottling unit that has been recently re-adjusted so that it puts 200 milliliter of beverage in disposable plastic bottles.

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Next, rather than accepting this assumption, you decide to test it using data. You fill out 10 bottles using the unit at different times so as to obtain a random sample and very carefully measure the amount of beverage inside each bottle.

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Next, rather than accepting this assumption, you decide to test it using data. You fill out 10 bottles using the unit at different times so as to obtain a random sample and very carefully measure the amount of beverage inside each bottle.

This is your data. A random sample of 10 observations on the amount of beverage in the bottles.



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again, the conclusion seems easy given this evidence.

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- if the average amount of beverage per bottle across these 10 bottles is 199.9 milliliter or 200.1 milliliter?

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again, the conclusion seems easy given this evidence.

- if the average amount of beverage per bottle across these 10 bottles is 199.9 milliliter or 200.1 milliliter?

perhaps, giving benefit of doubt you would conclude that the unit is properly adjusted.



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What would you conclude...

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198ml? 202 ml? ... ?

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at what point would you start rejecting the assumption
that the unit puts in 200 ml of beverage?

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What would you conclude...

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- ❑ Use your 'gut feeling'.

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- ❑ It takes into account...
 - *size of the sample*
 - *variability in the sample*
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- ❑ It takes into account...
 - *size of the sample*
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 - *level of 'significance' you desire in your conclusion*
- ❑ Hypothesis Test is a scientific tool to aid your decision making.

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testing the fuel efficiency claim of a car manufacturer.

testing the claims of efficacy made by a new drug.

testing the claim that the defective rate in your production process is greater than the acceptable limit.

testing the claim by an educational website that enrolling in its courses leads to higher school scores.

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