Hypothesis Testing

What is Hypothesis?

An idea or explanation of something that is based on a few known facts but that has not yet been proved to be true or correct.

-- Oxford Dictionary

What is Hypothesis?

Testing a known assumption that is generally accepted as the truth.

Testing a claim that is supposed to change the current facts.

Null Vs Alternate Hypothesis

$$H_o$$

$$H_a$$

- There is no change from the stated facts.

- Chocolate bars weigh 100 gms or more

- The stated facts are incorrect

- Chocolate bars weigh less than 100 gms

$$=$$

$$\leq$$

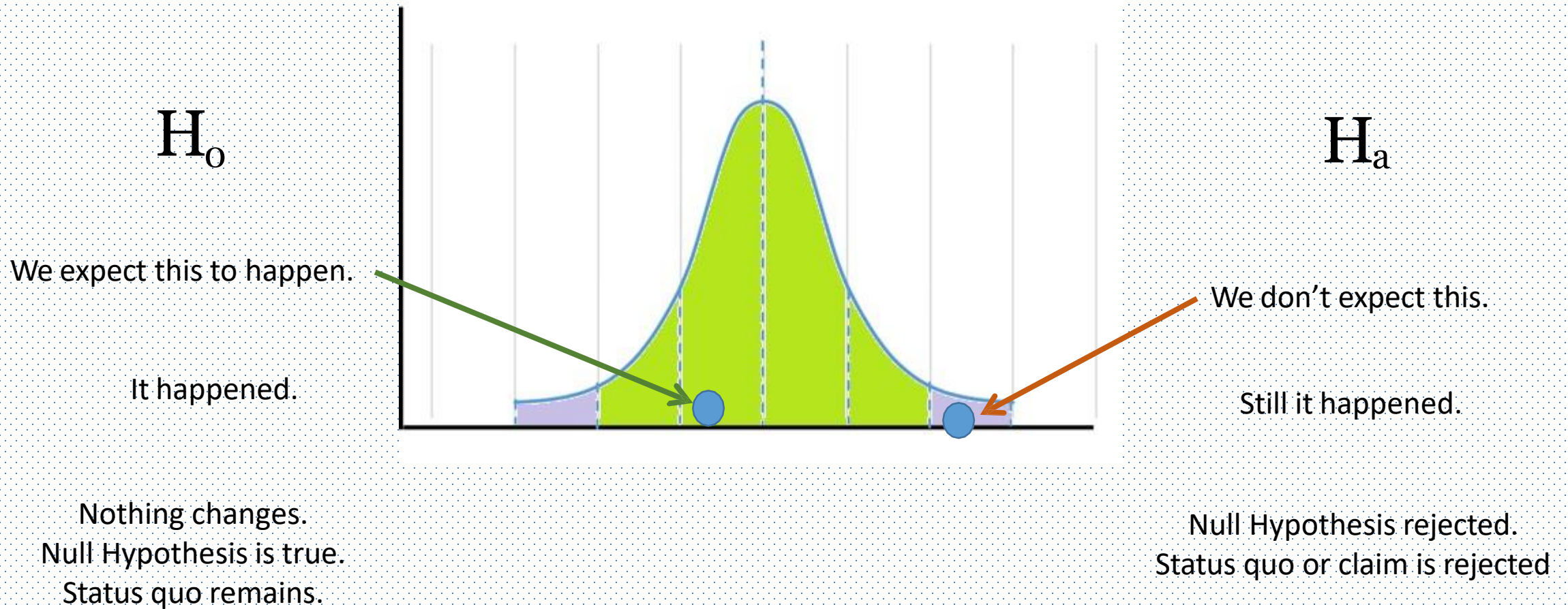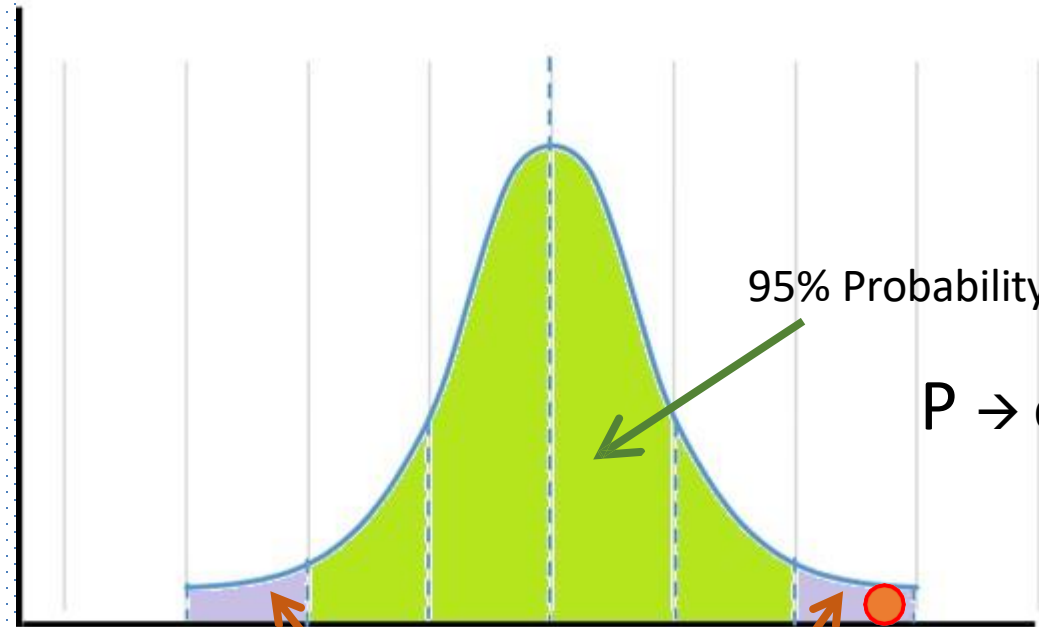$$\geq$$

$$\neq$$

$$<$$

$$>$$

Statistical Significance

Statistical Significance

H_o

We expect this to happen.

It happened.

Nothing changes.
Null Hypothesis is true.
Status quo remains.

H_a

We don't expect this.

Still it happened.

Null Hypothesis rejected.
Status quo or claim is rejected

Important terms – Statistical Significance

95% Probability

P → Observed or seen Probability of the sample

P < α

Rejection Region
Probability of rejection region → α

Reject Null Hypothesis

Hypothesis Testing

Current average waiting period for the customers who call the customer service helpline is 100 seconds with a standard deviation of 20 seconds. Certain changes were recently done to the IVR menu options as well as the overall customer service processes. After a week, the management picked-up a sample of 100 calls and found that the average waiting period was 95 seconds. Have the process implementations resulted in the waiting period reduction?

H_O : null hypothesis : There is no change in the waiting period.

H_a : alternate hypothesis : The waiting period has reduced.

Significance Level; α = 0.05 or 5%

1. State Population parameters and Sample statistics

μ = 100; σ = 20;   N = 100; $\bar{X}$ = 95;

2. Compute Sample Standard Deviation and Z-Value

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} \qquad Z = \frac{\bar{x} - \mu}{\sigma_{\bar{x}}}$$

3. Compute ρ using Z-Score for the Z-value

$$\rho = 0.62\%$$

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Thank You!