HYPOTHESIS TESTING
INFERENTIAL STATISTICS

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Hypothesis Testing Roadmap

START

Type of Y ?

Discrete Data

Attribute

Levels of interest for X ?

1 — **1 Proportion Test**
$H_o: P_1 = P_o$
$H_a: P_1 \neq P_o$

2 — **2 Proportion Test**
$H_o: P_1 = P_2$
$H_a: P_1 \neq P_2$

> 2 — **ANOM**
$H_o: P_1 = P_2 = P_3 \ldots$
$H_a:$ at least 1 $\neq$

No. of factors for X ?

1

2

> 2

DOE, Logistic Regression
$H_o: P_1 = f(x)$
$H_a: P_1 < or > f(x)$

Contingency Table
(Chi Sq Test)
$H_o: F_1$ independent of F_2
$H_a: F_1$ dependent of F_2

Variable

No. of X ?

> 1 — DOE

1

Is Y normal for each level of X ?

Non-Normal

Normal

Continuous Data (Non-Normal)

Proceed w/ caution

Kruskal-Wallis or Mood's Median Test
$H_o: M_1 = M_2 = M_3 \ldots$
$H_a:$ at least 1 $\neq$

no

yes

Are $\boldsymbol{\sigma}$'s equal?

Levene's Test
$H_o: \sigma_1 = \sigma_2 = \sigma_3 \ldots$
$H_a:$ at least 1 $\neq$

Mann-Whitney Test
$H_o: M_1 = M_2$
$H_a: M_1 \neq M_2$

yes

Are $\boldsymbol{\sigma}$'s equal?

no

Proceed w/ caution

Levene's Test
$H_o: \sigma_1 = \sigma_2$
$H_a: \sigma_1 \neq \sigma_2$

2

Levels of interest for X ?

> 2

1

Test Median or $\boldsymbol{\sigma}$?

M

σ

1-Sample Wilcoxon or 1-Sample Sign Test
$H_o: M_1 = M_o$
$H_a: M_1 \neq M_o$

Chi Sq Test
$H_o: \sigma_1 = \sigma_o$
$H_a: \sigma_1 \neq \sigma_o$

Continuous Data (Normal)

> 2

Levels of interest for X ?

1

$\boldsymbol{\mu}$ or $\boldsymbol{\sigma}$?

$\boldsymbol{\mu}$

1-Sample t-Test
$H_o: \mu_1 = \mu_o$
$H_a: \mu_1 \neq \mu_o$

σ

Chi Sq Test
$H_o: \sigma_1 = \sigma_o$
$H_a: \sigma_1 \neq \sigma_o$

Bartlett's Test
$H_o: \sigma_1 = \sigma_2 = \sigma_3 \ldots$
$H_a:$ at least 1 $\neq$

2

F-Test
$H_o: \sigma_1 = \sigma_2$
$H_a: \sigma_1 \neq \sigma_2$

no

Are $\boldsymbol{\sigma}$'s equal?

yes

Are $\boldsymbol{\sigma}$'s equal?

yes

no

Stuck data

Welch's ANOVA
$H_o: \mu_1 = \mu_2 = \mu_3$
$H_a:$ at least 1 $\neq$

One-Way ANOVA
$H_o: \mu_1 = \mu_2 = \mu_3$
$H_a:$ at least 1 $\neq$

equal_var = False

2-Sample t-Test
$H_o: \mu_1 = \mu_2$
$H_a: \mu_1 \neq \mu_2$