Research hypothesis

Research hypothesis

1. Basic form

H: Hypothesis

H_n: Null hypothesis, the statement which is contrary to the hypothesis

2. Level of significance

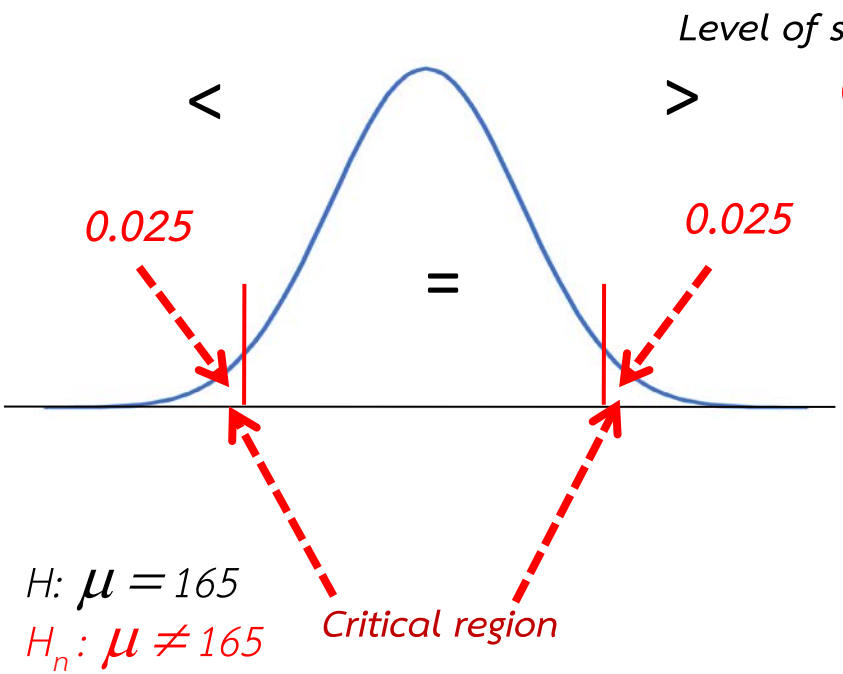
0.05 (5%)*, *0.01 (1%)

3. Level of confidence

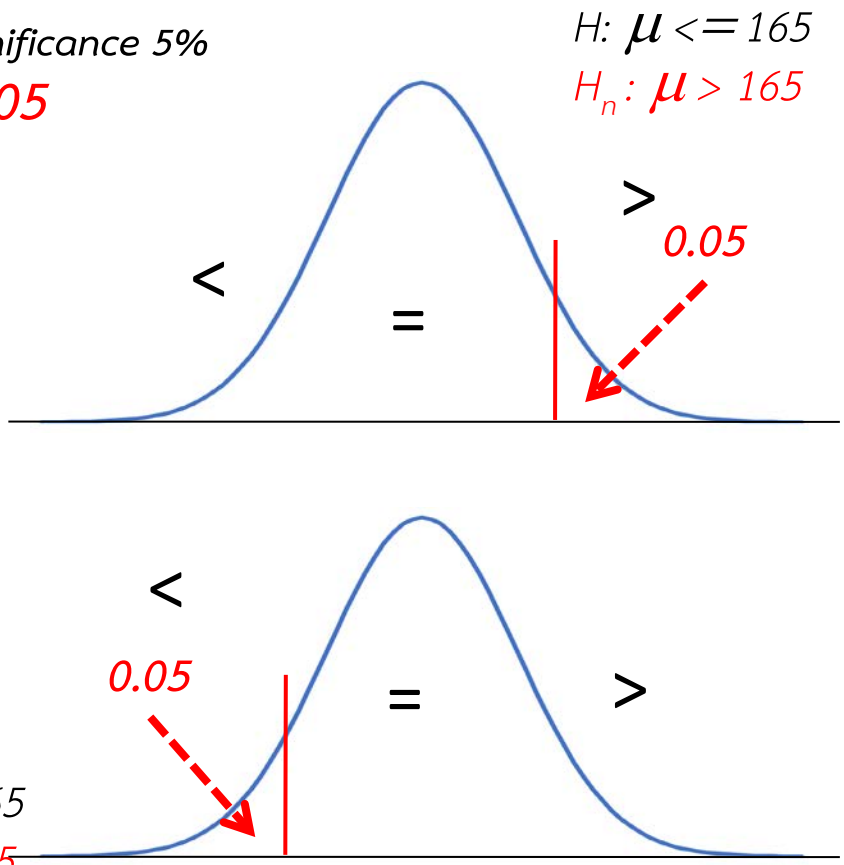
0.95 (95%)*, *0.99 (99%)

Hypothesis

Two-tail Hypothesis



One-tail Hypothesis



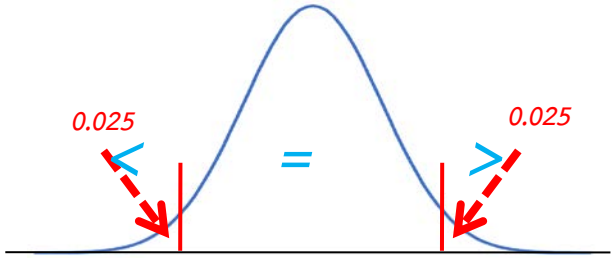
Example of Hypotheses

Two-tail Hypothesis

Question: *Do fresh graduates receive an average salary of 15,000 baht?*

$H: \mu = 15{,}000$

$H_n: \mu \neq 15{,}000$

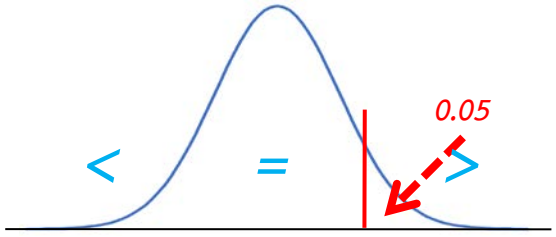


One-tail Hypothesis

Question: *Do fresh graduates receive an average salary greater than 15,000 baht?*

$H: \mu \leq 15{,}000$

$H_n: \mu > 15{,}000$



Mean comparison

Data analysis

	Nominal	Ordinal	Interval	Ratio
	sex	education	temperature	salary
ordered		✓	✓	✓
frequency	✓	✓	✓	✓
Mode	✓	✓	✓	✓
Median		✓	✓	✓
Mean			✓	✓
calculation			✓	✓

Mean comparison

$\neq$ = < + >

- One sample test

  compare a mean with a standard value

  $H: \mu = 165$

  $H_n: \mu \neq 165$

- Independent samples test

  compare means between two independent groups

  $H: \mu 1 = \mu 2$

  $H_n: \mu 1 \neq \mu 2$

- Paired sample test

  compare two means of a sample group

  $H: \mu 1 = \mu 2$

  $H_n: \mu 1 \neq \mu 2$

- ANOVA (Analysis of variance)

  compare means between three or more independent groups

  $H: \mu 1 = \mu 2 = \mu 3 \ldots\ldots$

  $H_n: \mu 1 \neq \mu 2 \neq \mu 4 \ldots\ldots$

One sample test

compare a mean with a standard value

Example:

1. *Question: Are Thai men's average-height equal to 165 cm?*

   H: $\mu = 165$

   H_n: $\mu \neq 165$

2. *Question: Are Thai men's average-height greater than 165 cm?*

   H: $\mu \leq 165$

   H_n: $\mu > 165$

3. *Question: Are Thai men's average-height less than 165 cm?*

   H: $\mu \geq 165$

   H_n: $\mu < 165$

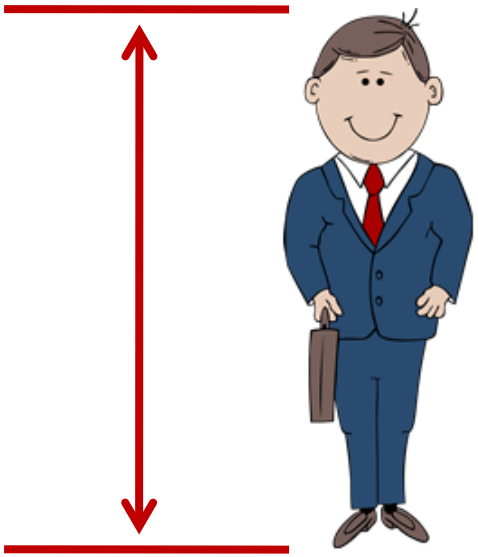
One sample test

compare a mean with a standard value

Question: Are Thai men's average-height equal to 165 cm?

$H: \mu = 165$

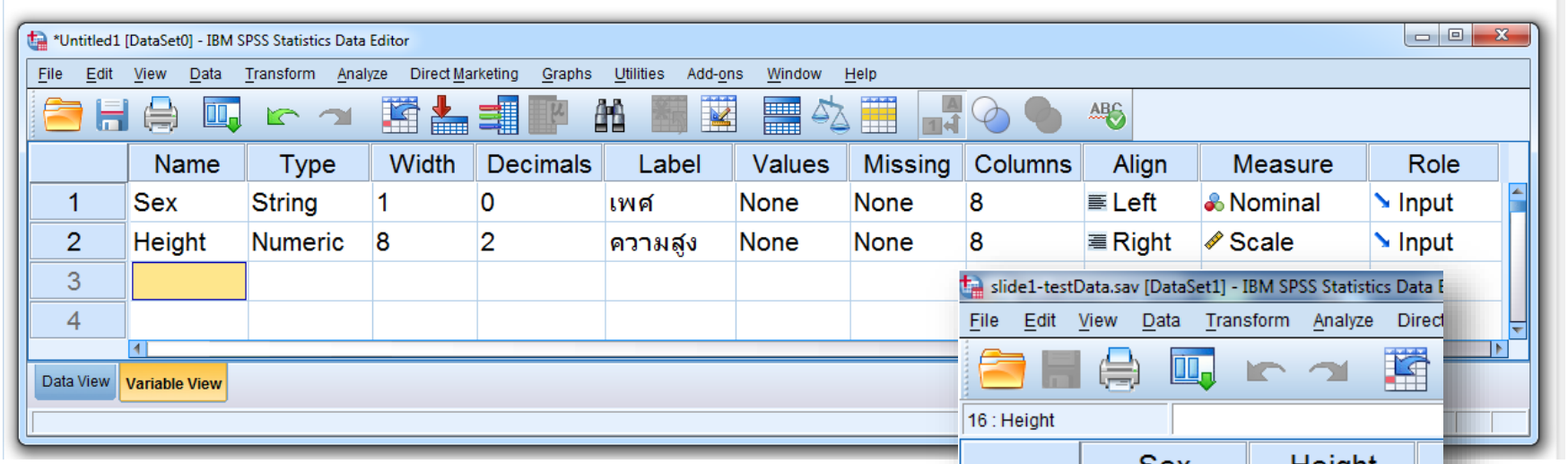
$H_n: \mu \neq 165$



#	sex	height
1	m	167
2	m	162
3	m	168
4	m	162
5	m	162
6	m	165
7	m	166
8	m	166
9	m	160
10	m	165

One sample test

SPSS



1. Set variables

- Sex
- Height

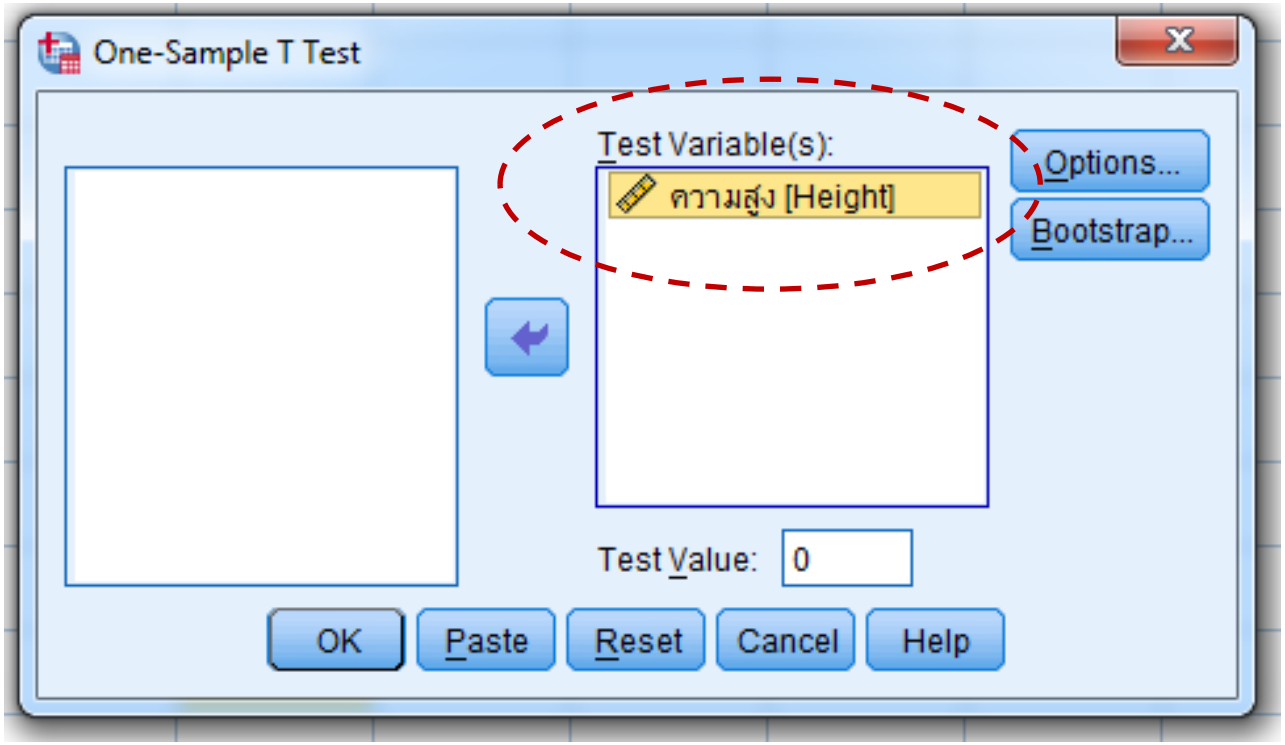
2. Input data

One sample test

SPSS

3. Click Analyze > Compare Means > One-Sample T Test

Then select Height as a Test Variable



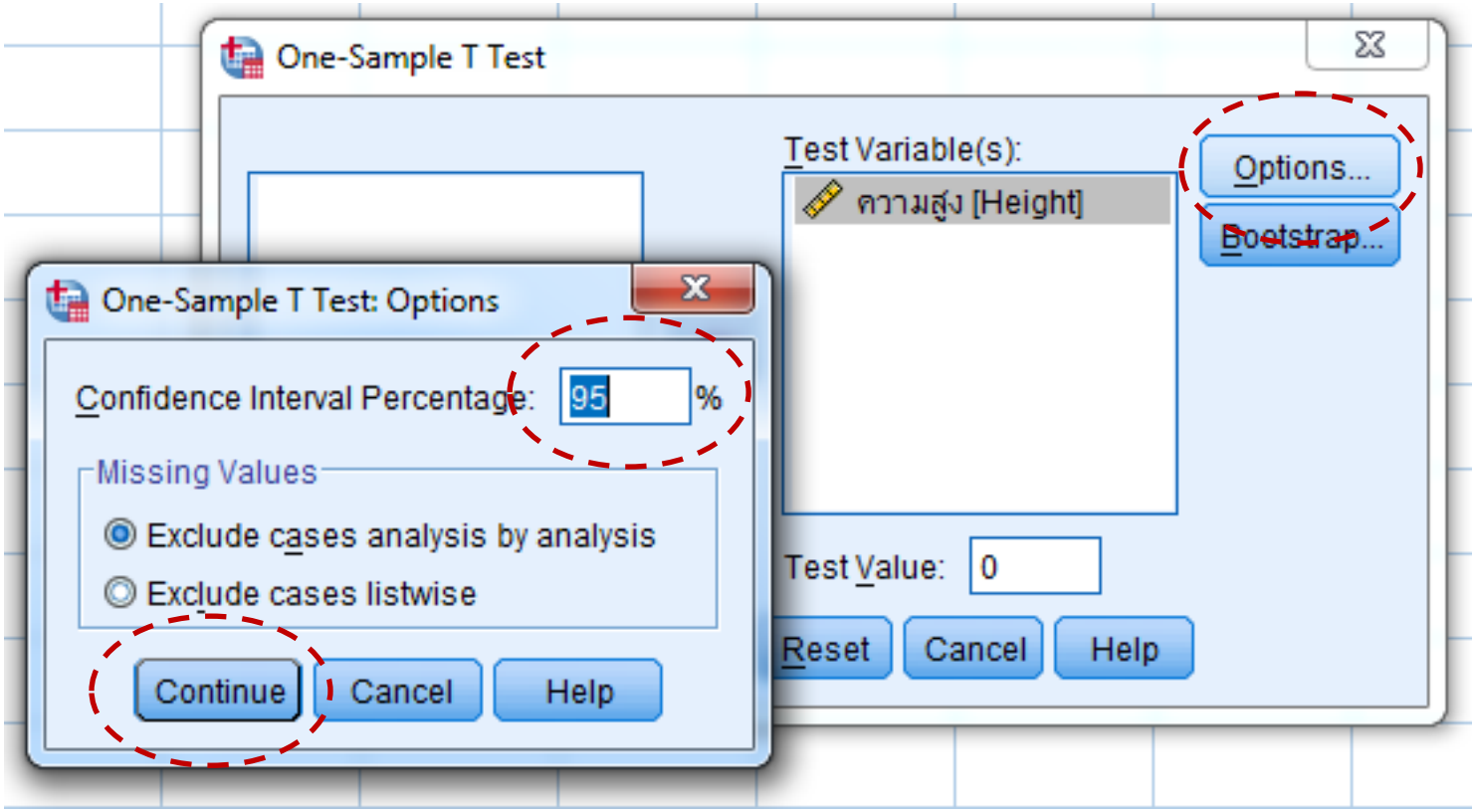
One sample test

SPSS

4. Click Options...

   Set Confidence Interval Percentage 95%

   click Continue

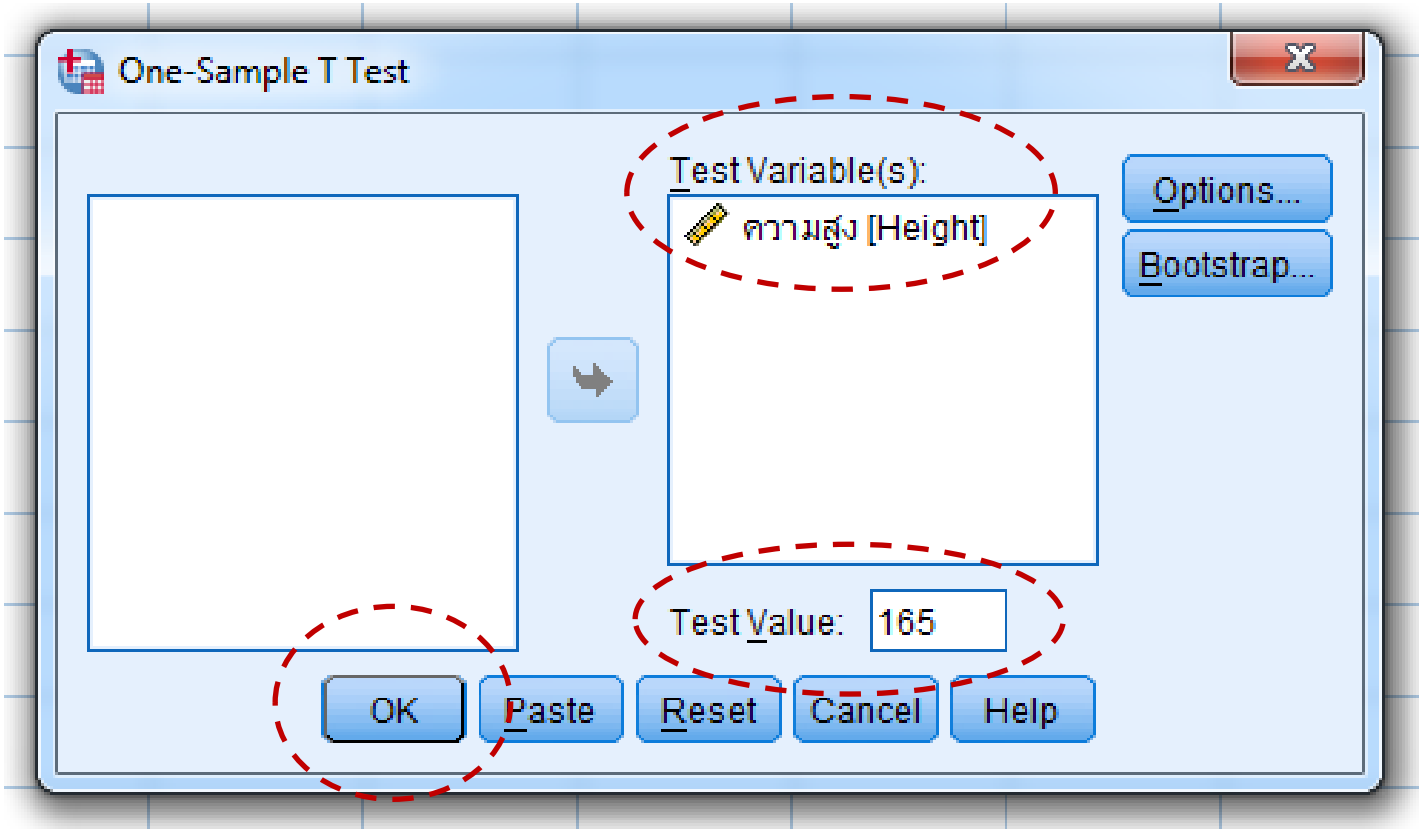


One sample test

SPSS

5. Define Test Value 165

click OK



Results

```
T-TEST
  /TESTVAL=165
  /MISSING=ANALYSIS
  /VARIABLES=Height
  /CRITERIA=CI(.95).
```

T-Test

```
[DataSet1] C:\Users\Administrator\Documents\slide1-testData.sav
```

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
ความสูง	10	164.3000	2.62679	.83066

One-Sample Test

	Test Value = 165					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
ความสูง	-.843	9	.421	-.70000	-2.5791	1.1791

Results

```
T-TEST
  /TESTVAL=165
  /MISSING=ANALYSIS
  /VARIABLES=Height
  /CRITERIA=CI(.95).
```

Test value = **165**

$H: \mu = 165$

$H_n: \mu \neq 165$

T-Test

[DataSet1] C:\Users\Administrator\Documents\slide1-testData.sav

significance level = 0.05

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
ความสูง	10	164.3000	2.62679	.83066

Sig (2-tailed) = 0.421
== Less than 0.05
>>>> Reject H >>Accept Hn (significant)

One-Sample Test

	Test Value = 165					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
ความสูง	-.843	9	.421	-.70000	-2.5791	1.1791

conclusion

Hypotheses:

$H: \mu = 165$

$H_n: \mu \neq 165$

Sig (2-tailed) = 0.421 that is greater than 0.05

Therefore, accept $H: \mu = 165$

Thai men's average-height is equal to 165 cm