# Power Analysis using Stata

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# Power Analysis and Sample Size Calculations

**Power Analysis:** Power analysis tells you the statistical power you have to detect a given effect size for a fixed sample size and a given level of statistical significance ($\alpha$).

**Sample Size Calculations:** Sample size calculations tell you the number of sampling units you need to detect a given effect size for a given level of statistical significance ($\alpha$) and fixed power.

## Example:

A clinical dietician wants to compare two different diets, A and B, for diabetic patients. She hypothesizes that diet A (Group 1) will be better than diet B (Group 2), in terms of lower blood glucose. She plans to get a random sample of diabetic patients and randomly assign them to one of the two diets. At the end of the experiment, which lasts 6 weeks, a fasting blood glucose test will be conducted on each patient.

- She also expects that the average difference in blood glucose measure between the two groups will be about 10 mg/dl.
- Furthermore, she also assumes the standard deviation of blood glucose distribution for diet A to be 15 and the standard deviation for diet B to be 17.

The dietician wants to know the number of subjects needed in each group assuming equal sized groups.

# Stata Command to Compute Sample Size

## Syntax

power twomeans *m1 m2* [, power(*numlist*) sd1(*sigma1*) sd2(*sigma2*) *options*]

where *m1* is the control-group mean, *m2* is the experimental-group mean, *sigma1* is the standard deviation in the control-group, and *sigma2* is the standard deviation in the experimental group.

# Sample Calculations for Two-Sample Means Test

## Syntax

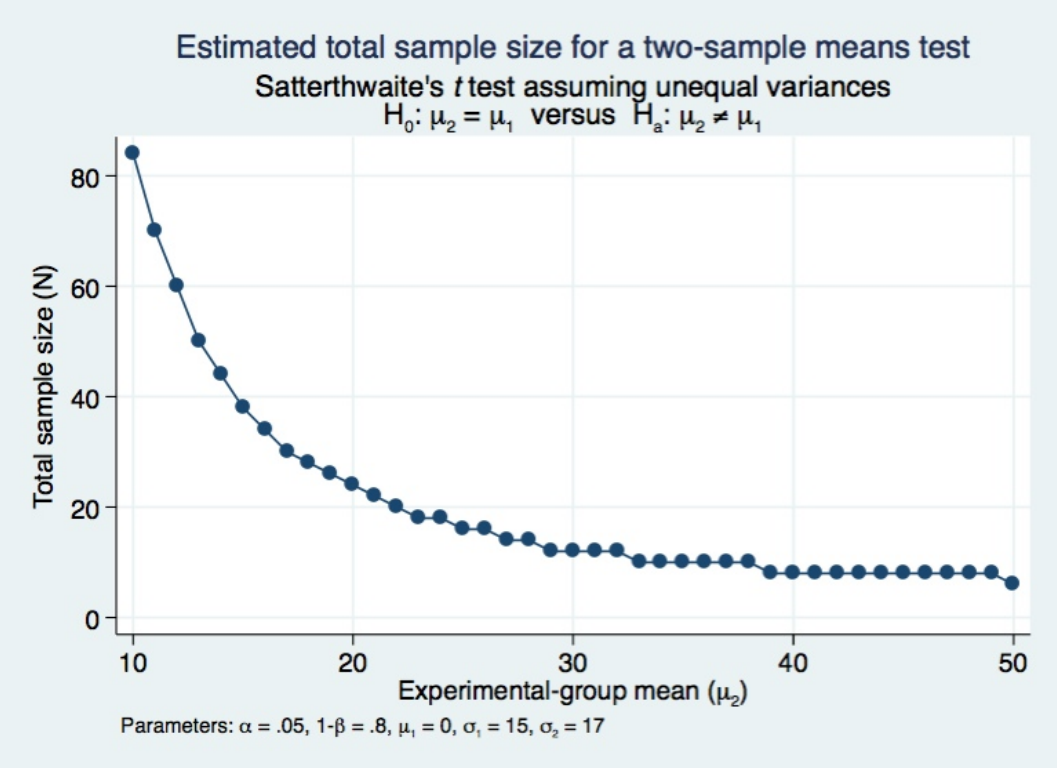
power twomeans 0 10, power(0.80) sd1(15) sd2(17)

```
. power twomeans 10 20, power(0.80) sd1(15) sd2(17)

Performing iteration ...

Estimated sample sizes for a two-sample means test
Satterthwaite's t test assuming unequal variances
Ho: m2 = m1  versus  Ha: m2 != m1

Study parameters:

        alpha =    0.0500
        power =    0.8000
        delta =   10.0000
           m1 =   10.0000
           m2 =   20.0000
          sd1 =   15.0000
          sd2 =   17.0000

Estimated sample sizes:

            N =        84
  N per group =        42
```

# Sample Calculations for Two-Sample Means Test

## Syntax

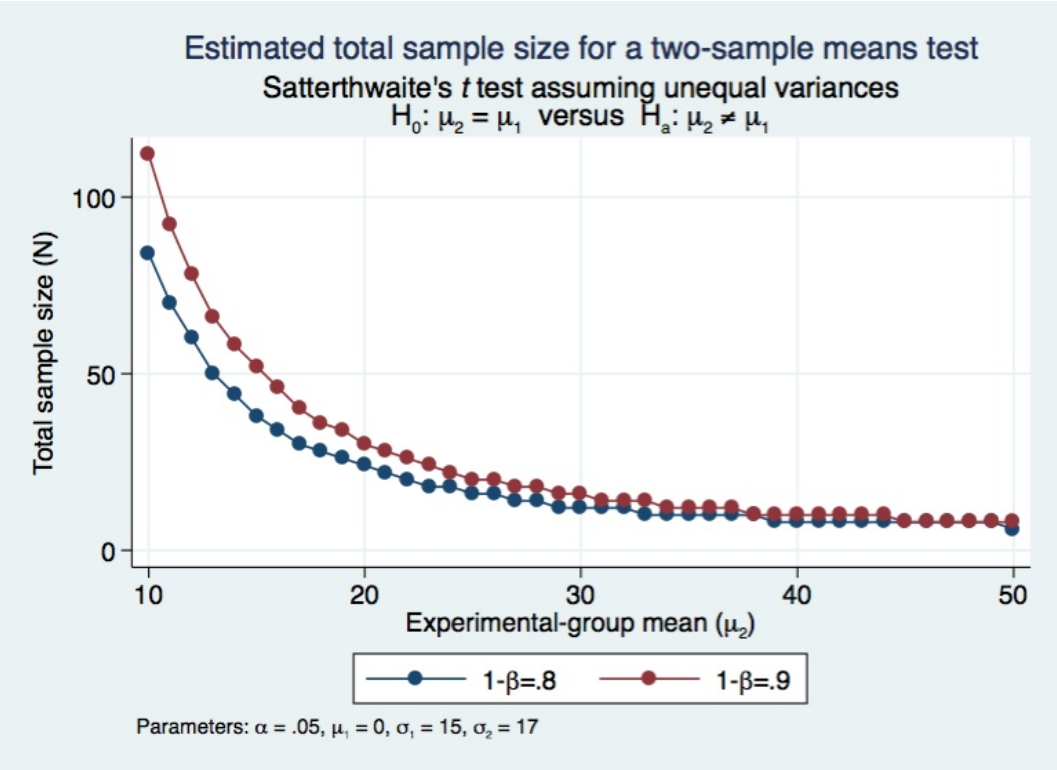
power twomeans 0 (10(1)50), power(0.80) sd1(15) sd2(17) graph



# Sample Calculations for Two-Sample Means Test

## Syntax

power twomeans 0 (10(1)50), power(0.80(0.1)0.90) sd1(15) sd2(17) graph(nosimplelabels legend(title("")))



# Power Analysis for Two-Sample Means Test

## Syntax

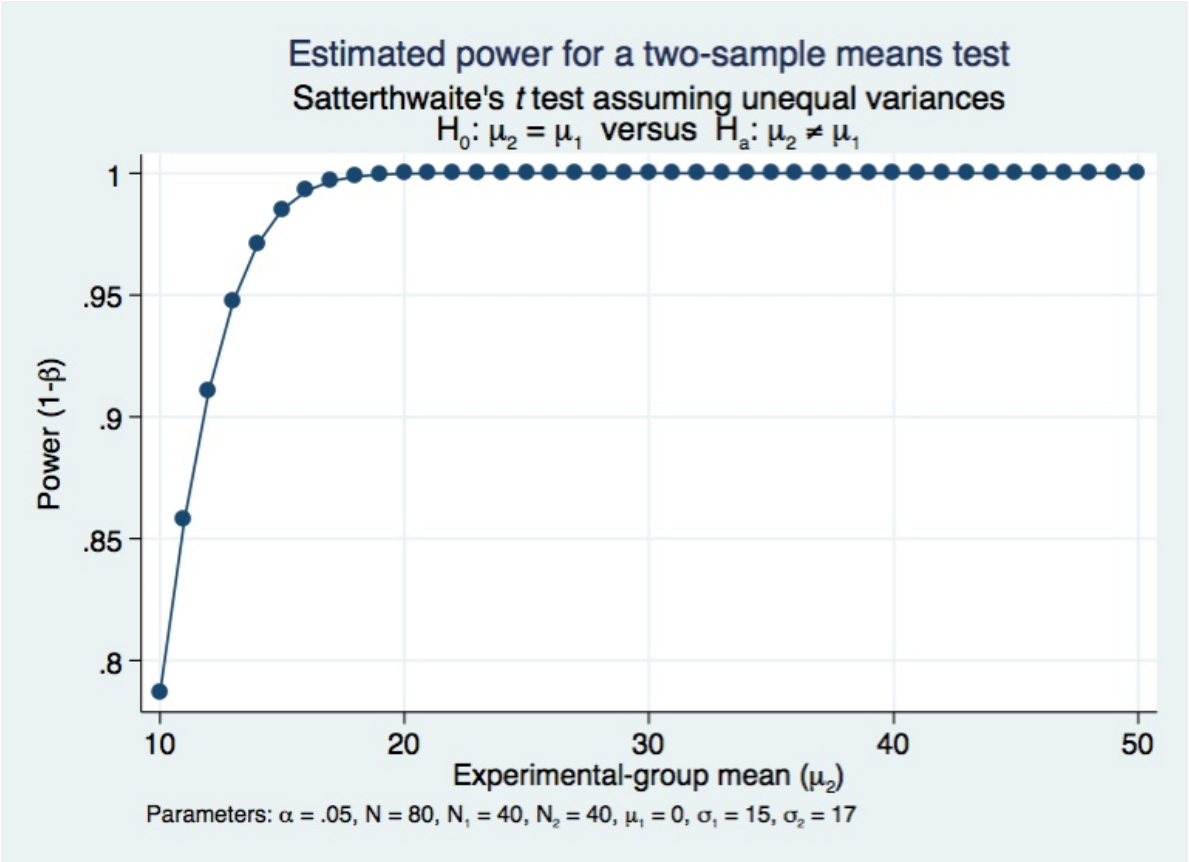
power twomeans 0 10, sd1(15) sd2(17) n(80)

```
. power twomeans 0 10, sd1(15) sd2(17) n(80)

Estimated power for a two-sample means test
Satterthwaite's t test assuming unequal variances
Ho: m2 = m1  versus  Ha: m2 != m1

Study parameters:

        alpha =    0.0500
            N =        80
  N per group =        40
        delta =   10.0000
           m1 =    0.0000
           m2 =   10.0000
          sd1 =   15.0000
          sd2 =   17.0000

Estimated power:

        power =    0.7866
```

# Power Analysis for Two-Sample Means Test

## Syntax

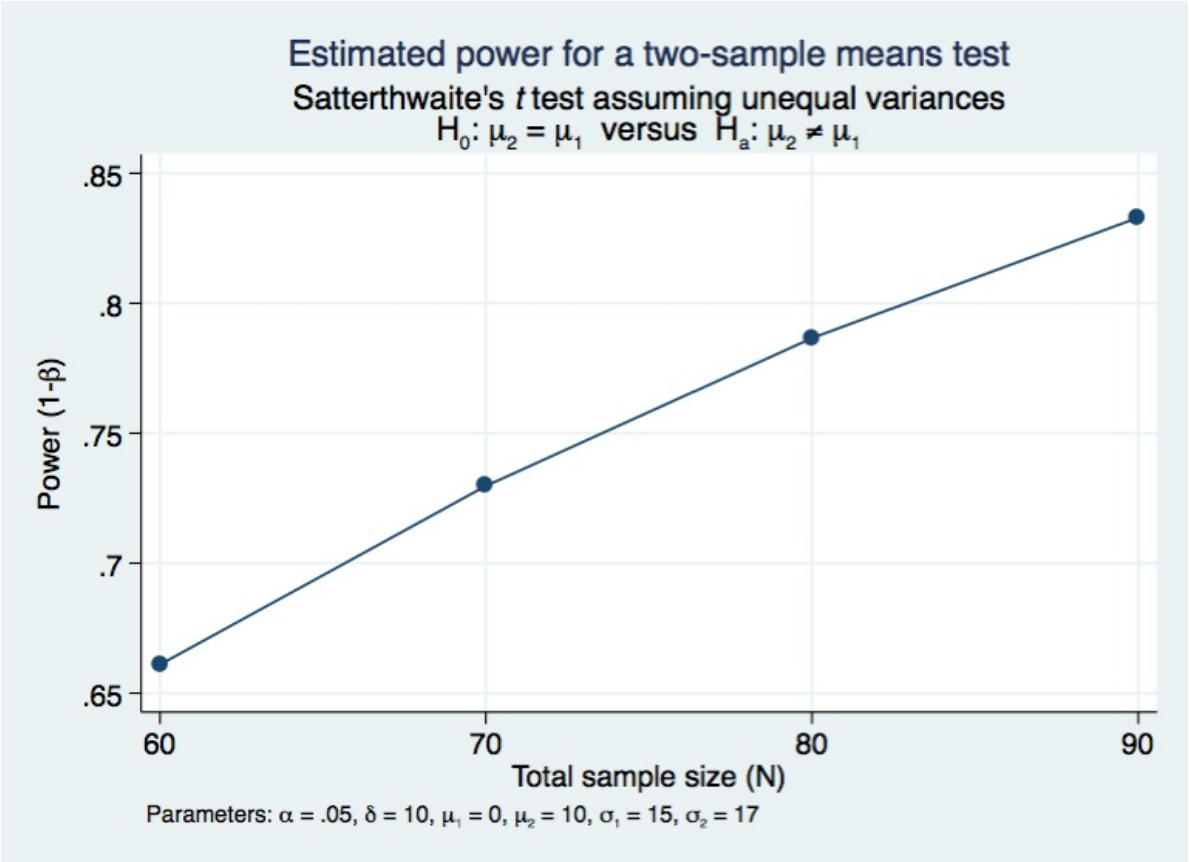
power twomeans 0 (10(1)50), sd1(15) sd2(17) n(80) graph



# Power Analysis for Two-Sample Means Test

## Syntax

power twomeans 0 10, sd1(15) sd2(17) n(60(10)90) graph



# For More Information:

- Stata Power and Reference Manual
  `http://www.stata.com/manuals13/pss.pdf`
- Stata Power and Sample Size website
  `http://www.stata.com/stata13/power-and-sample-size/`