Power and Sample Size in Stata

Power and Sample size in Stata
`sampsi` - Sample size and power for means and proportions

Power
```
sampsi 18.4 20.4, sd1(2.8) n1(20) onesample
```

Sample Size
```
sampsi 18.4 20.4, sd1(2.8) power(.90) onesample
```

The notation changes slightly for two-sample or one-sided tests. Type `db sampsi` to see all options available within the `sampsi` command or select from the drop-down menus: Statistics / Power and sample size / Tests of means and proportions.

Example: Suppose we aim to implement a new physical activity program among school-aged children between 6 and 11 years old at high risk for obesity. We define high-risk children as those children who do less than 2 hours of physical activity per week. According to Ogden (2012), mean BMI among children 6-11 years old in the United States was 18.4 between 2009 and 2010, with standard deviation 2.8. Before implementing this program, we want to perform a baseline survey, to evaluate the state of the obesity epidemic among the high risk children. We plan to design the survey to test whether the mean BMI in the high risk children is equal to the mean BMI among 6-11 year olds in the United States at the $\alpha = 0.05$ level. To design the study, assume the standard deviation of BMI is equal in the general population and the high risk children.

Ogden C.L., Carroll M.D., Kit B.K., and Flegal K.M. (2012). Prevalence of Obesity and Trends in Body Mass Index Among US Children and Adolescents, 1999-2010. JAMA: The Journal of the American Medical Association. 307 (5). 483–490.

1. State the null and alternative hypothesis for the test above.

$$H_0 : \mu = 18.4$$
$$H_A : \mu \neq 18.4$$

2. Fill in the table below:

Sample Size	μ_A	Power
100	19.4	
200	18.9	
10,000	18.4	
	20.4	0.9
	19.4	0.8
	19.4	0.9

Now, suppose we powered our study for the one-sided test that the mean BMI is equal to 18.4 versus the alternative that the mean is higher in the high risk children. Repeat the calculations above and compare to the two-sided calculations.

Power: `sampsi 18.4 20.4, sd1(2.8) n1(20) onesample onesided`
Sample Size: `sampsi 18.4 20.4, sd1(2.8) power(.90) onesample onesided`

1. State the null and alternative hypothesis for the test above.

$$H_0 : \mu = 18.4$$

$$H_A : \mu > 18.4$$

2. Fill in the table below:

Sample Size	μ_A	Power
100	19.4	
200	18.9	
10,000	18.4	
	20.4	0.9
	19.4	0.8
	19.4	0.9

Suppose we also wanted to investigate whether the BMI among high risk children differed between boys and girls. Let us assume that the standard deviations of BMI among

high risk children are both equal to 2.8.

Power: `sampsi 18.4 20.4, sd1(2.8) sd2(2.8) n1(20) n2(20)`
Sample Size: `sampsi 18.4 20.4, sd1(2.8) sd2(2.8) power(.90)`

1. State the null and alternative hypothesis for the test above.

$$H_0 : \mu_B = \mu_G$$

$$H_A : \mu_B \neq \mu_G$$

2. Let μ_G and μ_B denote the mean BMI in boys and girls, respectively; let n_B and n_G denote the sample size required for boys and girls. Fill in the table below:

n_B	n_G	μ_B	μ_G	Power
20	20	20.4	18.4	
20	20	19.4	18.4	
		20.4	19.4	0.9
		22.4	18.4	0.8