

What is the interpretation of the two-tailed significance values in SPSS?

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The two-tailed significance values in SPSS represent the probability that the observed results of a statistical test are due to chance. This value is typically compared to a pre-determined significance level (usually 0.05) to determine if the results are statistically significant. A two-tailed significance value indicates the possibility of significance in both directions of the test, as opposed to a one-tailed significance value which only considers significance in one direction. In other words, it shows the likelihood that the observed results are not simply due to random chance, but rather have a true underlying significance.

Interpret Sig. (2-Tailed) Values in SPSS

Often when you perform statistical tests in SPSS, the output table will contain a Sig. (2-tailed) value.

This value represents the 2-tailed p-value of the test.

If this value is less than your significance level (common choices are .05 or .01), then you can of your test.

This tutorial provides examples of how to interpret the Sig. (2-tailed) value of different statistical tests.

Example 1: One Sample t-test

A one sample t-test is used to test whether or not the mean of a population is equal to some value.

For example, suppose a botanist wants to know if the mean height of a certain species of plant is equal to 15

inches. She collects a random sample of 12 plants and records each of their heights in inches.

She then uses this sample to perform a one sample t-test with the following null and alternative hypotheses:

$H_0: \mu = 15$ (the true population mean is equal to 15 inches)
 $H_A: \mu \neq 15$ (the true population mean is not equal to 15 inches)

She performs this one sample t-test in SPSS and gets the following results:

→ **T-Test**

One-Sample Statistics				
	N	Mean	Std. Deviation	Std. Error Mean
height	12	14.3333	1.37069	.39568

One-Sample Test						
Test Value = 15						
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
height	-1.685	11	.120	-.66667	-1.5376	.2042

The Sig. (2-tailed) value is 0.120.

This represents the two-sided p-value that corresponds to a t value of -1.685 with 11 degrees of freedom.

Since the p-value of the test (.120) is not less than 0.05, we fail to reject the null hypothesis.

In other words, we do not have sufficient evidence to say that the true mean height of this species of plant is different than 15 inches.

Example 2: Two Sample t-test

A two sample t-test is used to test whether or not the mean values of two populations are equal.

The researchers perform a two sample t-test with the following null and alternative hypotheses:

**H0: $\mu_1 = \mu_2$ (average mpg between the two populations is equal)
H1: $\mu_1 \neq \mu_2$ (average mpg between the two populations is not equal)**

They perform a two sample t-test in SPSS and get the following results:

T-Test**Group Statistics**

	group	N	Mean	Std. Deviation	Std. Error Mean
mpg	.00	12	21.0000	2.73030	.78817
	1.00	12	22.7500	3.25087	.93845

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
mpg	Equal variances assumed	.034	.855	-1.428	22	.167	-1.75000	1.22552	-4.29157	.79157
	Equal variances not assumed			-1.428	21.362	.168	-1.75000	1.22552	-4.29597	.79597

The Sig. (2-tailed) value is 0.167.

This represents the two-sided p-value that corresponds to a t value of -1.428 with 22 degrees of freedom.

Since the p-value of the test (.167) is not less than 0.05, we fail to reject the null hypothesis.

In other words, we do not have sufficient evidence to say that the true mean mpg is different between cars that receive treatment and cars that don't.

Additional Resources

The following tutorials explain how to perform various statistical tests in SPSS: