

# How to Perform a Kolmogorov-Smirnov Test in SPSS

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January 7, 2026

## RECOMMENDED CITATION

mohammed looti (2026). *How to Perform a Kolmogorov-Smirnov Test in SPSS*.  
PSYCHOLOGICAL SCALES. Retrieved from <https://scales.arabpsychology.com/?p=124786>

The Kolmogorov-Smirnov Test can be performed in SPSS by first importing the data set into the software. Then, the user can navigate to the "Analyze" menu and select "Nonparametric Tests." From there, they can choose "One-Sample K-S" and specify the variable they want to test. The results will include the Kolmogorov-Smirnov statistic, p-value, and critical values, which can be used to determine if the data follows a specific distribution. Additionally, SPSS also allows for the visualization of the data distribution and comparison with the expected distribution. This test is useful for assessing the goodness-of-fit of a sample to a theoretical distribution.

The **Kolmogorov-Smirnov (K-S) test** is a statistical that is used to determine whether or not a sample comes from a certain distribution.

In most cases, the K-S test is used to check if a given distribution follows a .

The K-S test uses the following hypotheses:

**H0:** The data **is** normally distributed.

**HA:** The data **is not** normally distributed.

If the that results from the test is less than your chosen significance level (e.g. 0.05) then you can reject the null hypothesis and conclude that the data is not normally distributed.

The easiest way to perform a Kolmogorov-Smirnov test in SPSS is by using **Analyze > Descriptive Statistics > Explore**.

The following example shows how to perform this test in practice.

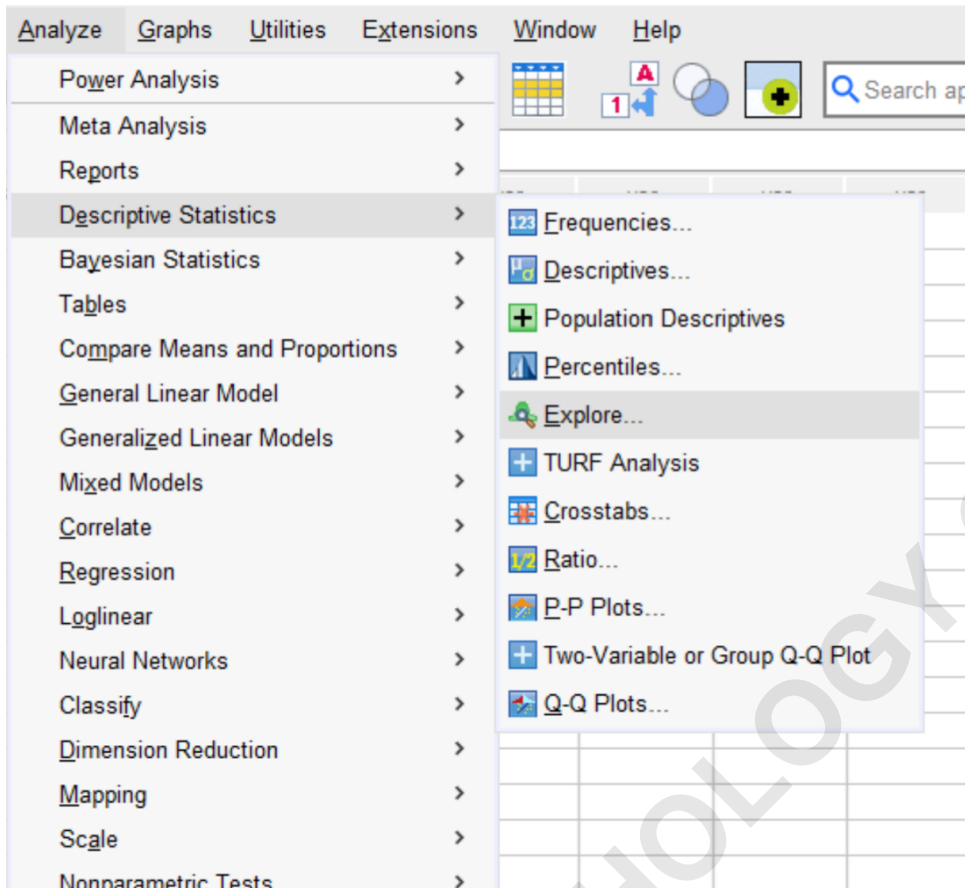
## Example: How to Perform a Kolmogorov-Smirnov Test in SPSS

Suppose we have the following dataset in SPSS that contains information about the final exam scores received by 25 different students in some class:

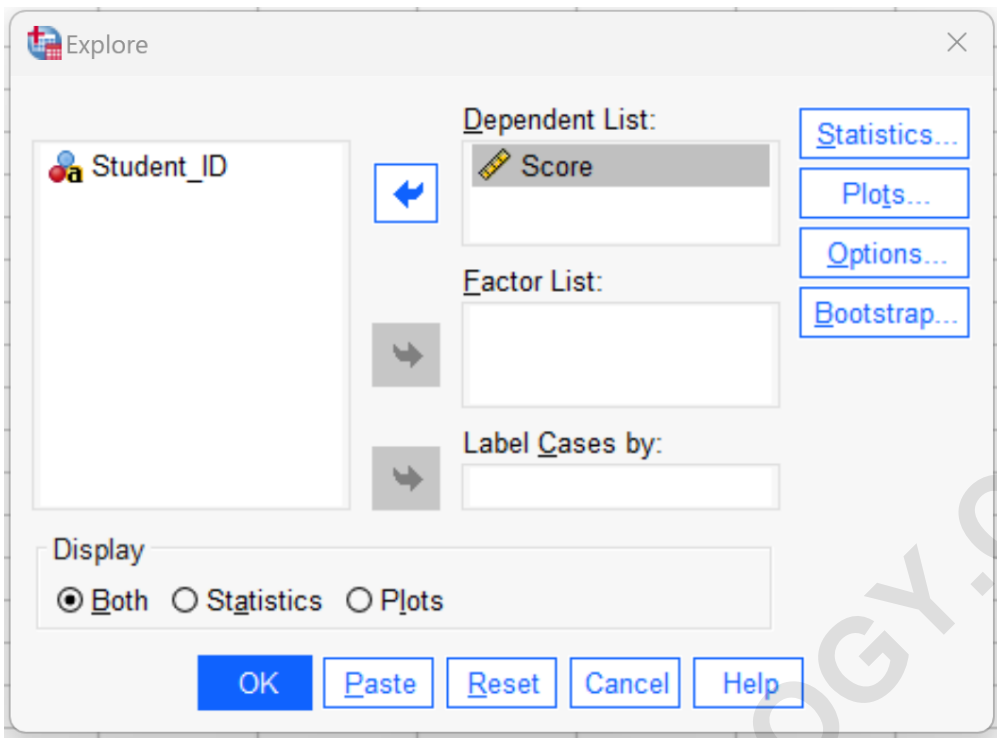
|    | Student_ID | Score | var | var | v |
|----|------------|-------|-----|-----|---|
| 1  | 1          | 88    |     |     |   |
| 2  | 2          | 95    |     |     |   |
| 3  | 3          | 92    |     |     |   |
| 4  | 4          | 97    |     |     |   |
| 5  | 5          | 96    |     |     |   |
| 6  | 6          | 97    |     |     |   |
| 7  | 7          | 94    |     |     |   |
| 8  | 8          | 86    |     |     |   |
| 9  | 9          | 91    |     |     |   |
| 10 | 10         | 95    |     |     |   |
| 11 | 11         | 97    |     |     |   |
| 12 | 12         | 88    |     |     |   |
| 13 | 13         | 85    |     |     |   |
| 14 | 14         | 76    |     |     |   |
| 15 | 15         | 68    |     |     |   |
| 16 | 16         | 65    |     |     |   |
| 17 | 17         | 87    |     |     |   |
| 18 | 18         | 82    |     |     |   |
| 19 | 19         | 77    |     |     |   |
| 20 | 20         | 70    |     |     |   |
| 21 | 21         | 90    |     |     |   |
| 22 | 22         | 59    |     |     |   |
| 23 | 23         | 68    |     |     |   |
| 24 | 24         | 90    |     |     |   |
| 25 | 25         | 92    |     |     |   |
| 26 |            |       |     |     |   |
| 27 |            |       |     |     |   |
| 28 |            |       |     |     |   |

Suppose that we would like to perform a Kolmogorov-Smirnov test to determine if the exam scores are normally distributed.

To do so, click the **Analyze** tab, then click **Descriptive Statistics**, then click **Explore**:

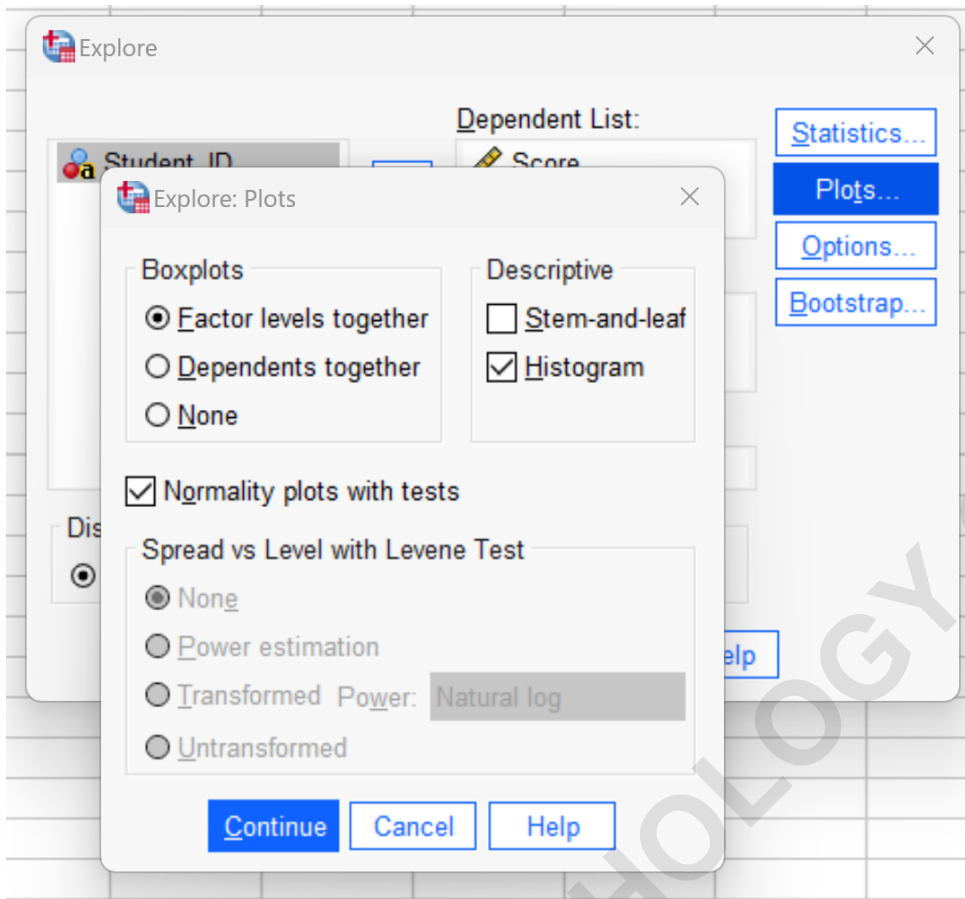


In the new window that appears, drag the **Score** variable into the **Dependent List** panel:



Then click the **Plots** button.

Check the box next to **Histogram** and **Normality plots with tests**:



Then click **Continue**. Then click **OK**.

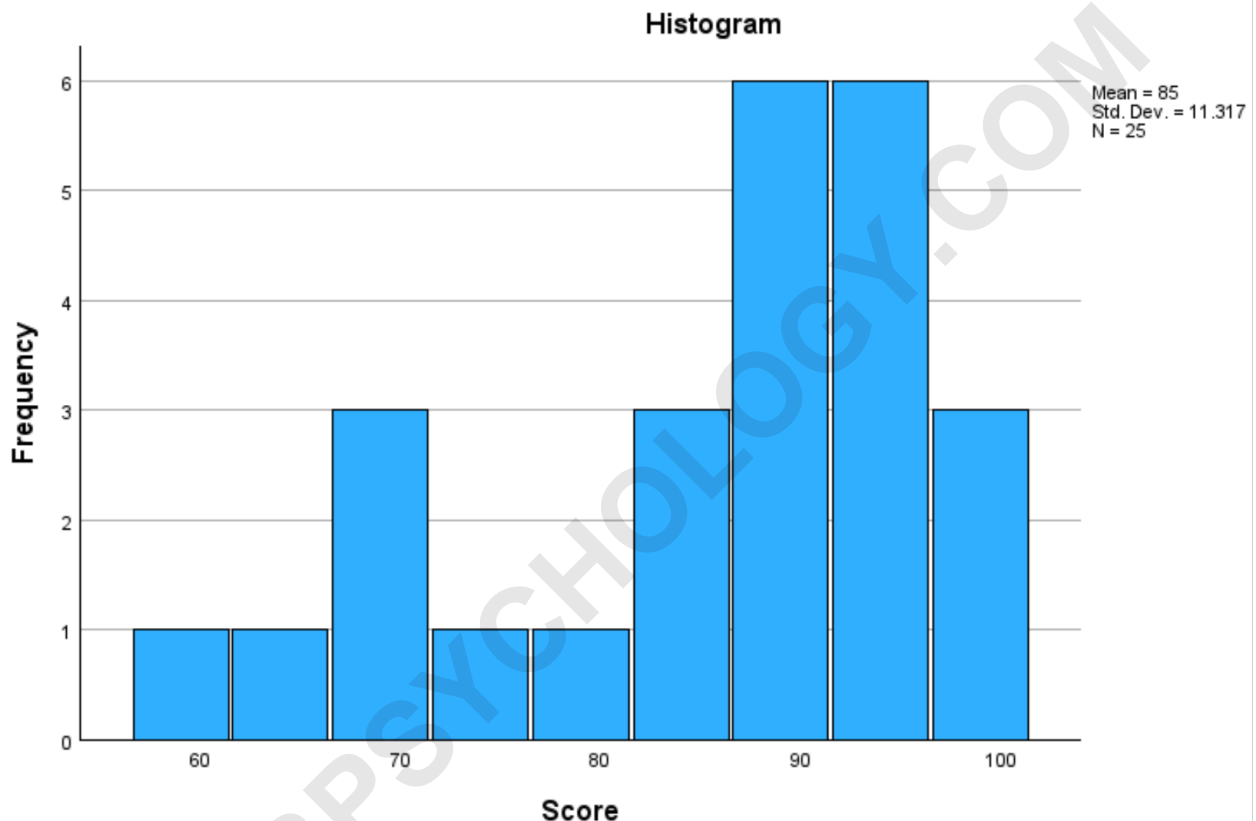
The following output will be generated that shows the results of the Kolmogorov-Smirnov test along with a histogram to help us visualize the distribution of exam scores:

### Tests of Normality

| Score | Kolmogorov-Smirnov <sup>a</sup> |    |      | Shapiro-Wilk |    |      |
|-------|---------------------------------|----|------|--------------|----|------|
|       | Statistic                       | df | Sig. | Statistic    | df | Sig. |
| Score | .180                            | 25 | .036 | .877         | 25 | .006 |

a. Lilliefors Significance Correction

### Score



From the output we can see that the p-value of the K-S test is **.036**.

Recall that the K-S test uses the following hypotheses:

**H<sub>0</sub>**: The data **is** normally distributed.

**H<sub>A</sub>**: The data **is not** normally distributed.

Since the p-value of the test is less than .05, we have sufficient evidence to the null hypothesis.

We would conclude that the distribution of exam scores **is not** normally distributed.

The histogram seems to agree with this conclusion.

The distribution of exam scores in the histogram do not follow a "bell curve" that is typical of a

normal distribution.

The following tutorials explain how to perform other common operations in SPSS:

ARABPSYCHOLOGY.COM