



Task 7 Analysis: measures of central tendency and dispersion with SPSS

Prepared by

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Research Skills (2)

Task 7

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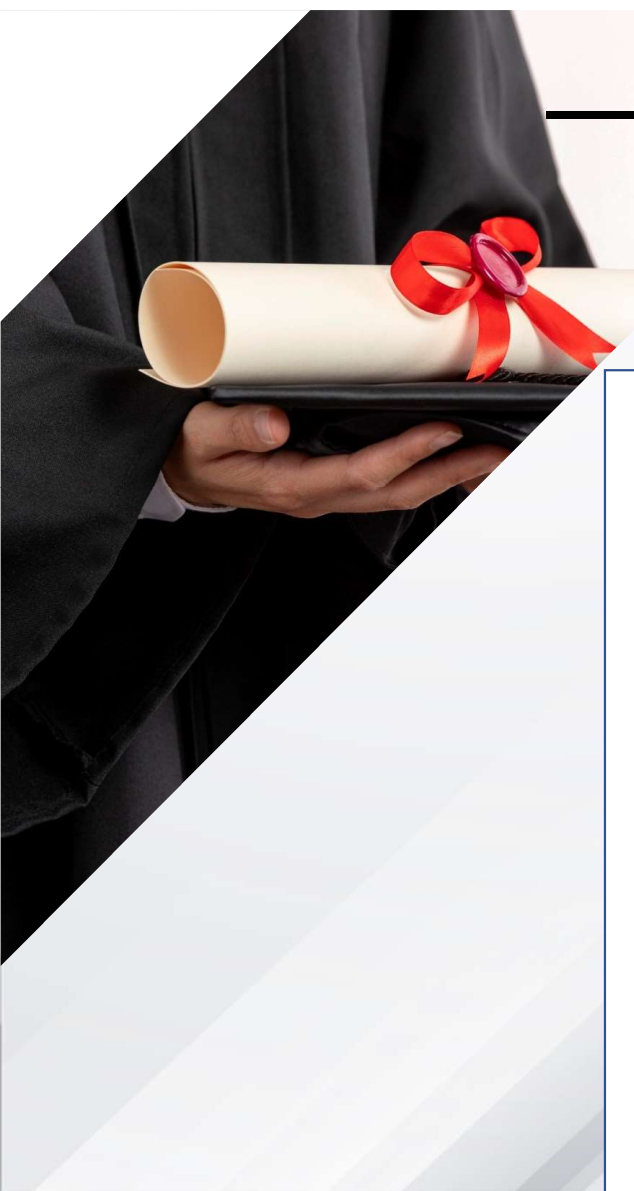
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1. Introduction

Hello. As part of our Task 7 in Research Skills, we will use SPSS software to calculate measures of central tendency and dispersion for three variables. The data we will analyze is presented in this table. I will guide you through the practical steps, from entering the data to obtaining the results, based on the methods we learned in class.

y	x1	x2
16607.7	275.5	17803.7
17511.3	274.4	18096.8
20171.2	269.7	18271.8
20932.9	267	19167.3
20406	267.8	19647.6
20831.6	275	20803.5
24806.3	283	22076.6
26465.8	300.7	23445.2
27403	307.5	24939
28628.7	303.7	26713.7
29904.5	304.7	29957.8
27508.2	298.6	31585.9
29035.5	295.5	33474.5
29281.5	299	34821.8
31535.8	288.1	41794.3



Step 1: Input and Definition of Variables

First of all, let's open SPSS. We will enter our three variables: Y,

- ☐ X1, and X2. In the Variable View tab, we define each variable.
- ☐ For the Name, we type Y, X1, X2.
- ☐ The Type is Numeric.
- ☐ We set the Decimals according to the data.
- ☐ In Label, we can add a full label if necessary, for example "Resulting Variable" for Y.
- ☐ For Measure, we choose Scale because these are quantitative data.

Once the variables are defined, we go to the Data View tab to enter the values from the table.

≡ Data View

	Y	X1	X2	X2
1	16607.7	275.5	17803.7	17803.7
2	17511.3	274.4	18096.8	18096.8
3	20171.2	269.7	18271.8	18271.8
4	20408.0	267.8	19167.3	19167.3
5	20831.6	267.8	19647.6	19647.6
6	20831.6	275.0	20803.5	20803.5
7	24806.3	260.0	22307.6	23906.5
8	26465.8	280.7	23445.2	23445.2
9	25406.8	300.7	25188.9	25997.8
10	28703.0	298.5	23976.6	29567.8
11	27403.3	254.7	22024.5	21574.5
12	29035.5	298.7	34774.5	41794.3

IBM SPSS Statistics - Data Editor [DataSet1] - □ X

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Graphs Utilities Extensions Window Help

Variable View

	Name	Type	Width	Decimals	Label	Values	Missing
1	Y	Numeric	8	1			Scale
2	X1	Numeric	6	1			Scale
3	X2	Numeric	8	1			Scale

Step 2: Calculating Descriptive Statistics

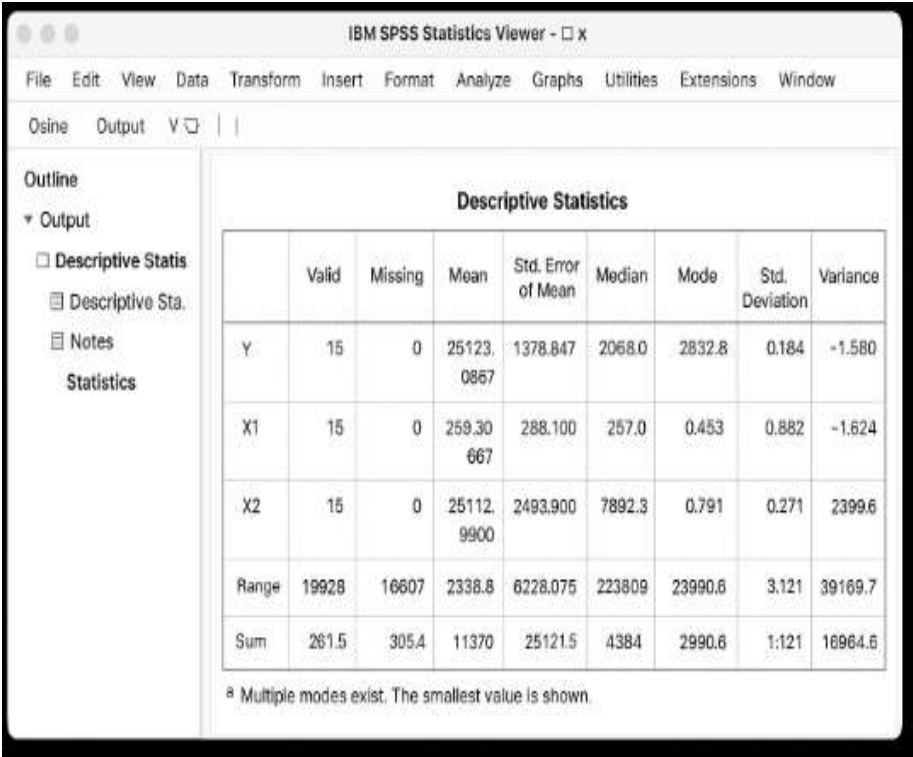
Now, to get our measures – the mean, standard deviation, etc. – we go to the menu: Analyze > Descriptive Statistics > **Descriptives**. We select the three variables (Y, X1, X2) and move them into the box on the right. Then, we click on Options. There, we check all the necessary measures:

The Mean for central tendency.

The Standard Deviation and Variance for dispersion.

The Minimum and Maximum for the range.

We confirm with Continue and then OK. The results will appear in the output window.



IBM SPSS Statistics Viewer - x

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Outline

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Statistics

	Valid	Missing	Mean	Std. Error of Mean	Median	Mode	Std. Deviation	Variance
Y	15	0	25123.0867	1378.847	2068.0	2832.8	0.184	-1.580
X1	15	0	259.30667	288.100	257.0	0.453	0.882	-1.624
X2	15	0	25112.9900	2493.900	7892.3	0.791	0.271	2399.6
Range	19928	16607	2338.8	6228.075	223809	23990.6	3.121	39169.7
Sum	261.5	305.4	11370	25121.5	4384	2990.6	1.121	16964.6

^a Multiple modes exist. The smallest value is shown.

Step 3: Interpretation of Results

Let's now look at the output table. For each variable, we have:

The Mean: it represents the typical value. For example, for Y, it is 25,123.09.

The Standard Deviation: it measures the spread of the data around the mean. A higher standard deviation, like for variable X2 (7,892.33), indicates greater variability.

The Variance: it is the square of the standard deviation. For example, for X2, it is approximately 62,280,945, which confirms very high dispersion.

The Range (Min–Max) shows the interval covered by the data. It is 14,928.1 for Y, 40.5 for X1, and 23,990.6 for X2.

These measures help us summarize and understand the distribution of our variables. We can clearly see that X2 is the most dispersed variable, while X1 is the most stable.

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Descriptive Statistics

	Y	Valid	Mean	Std. Dev.	Variance	Minimum
Y	15	0	25123.09	5337.85	2849263	16607.7
X1	15	0	288.31	15.91	253.09	307.5
X2	15	0	26112.98	7892.33	62280945	41794.3

	Mean	Missing	Variance	Range
Y 1	16607.2	267	7892	14928.1
X2	2561.3	15.91	253.09	789.3

DETAILED RESULTS OF CENTRAL TRENDS:

Variable Y:

Mean: 25,123.09

Median: 26,465.80

Standard Deviation: 5,337.85

Variance: 28,492,633

Minimum: 16,607.7

Maximum: 36,536.5

Variable X1:

Mean: 288.31

Median: 288.10

Standard deviation: 15.91

Variance: 253.09

Minimum: 267.0

Maximum: 307.5

Variable X2:

Mean: 26,112.98

Median: 24,939.00

Standard Deviation: 7,892.33

Variance: 62,280,945

Minimum: 17,803.7

Maximum: 41,794.3

The results show that:

Variable Y has a mean of 25.123 with moderate dispersion (standard deviation of 5.338).

Variable X1 is much more stable with a mean of 288.3 and a low standard deviation of 15.9.

Variable X2 shows the greatest variability with a standard deviation of 7.892.

The median being close to the mean for Y and X1 suggests a relatively symmetrical distribution, whereas for X2, the difference between mean and median indicates possible asymmetry.

Step 4: Additional Verification and Data Management

For a robust analysis, it is crucial to check for the absence of outliers. We can use the command **Analyze > Descriptive Statistics > Explore** and generate boxplots. These charts visually alert us to extreme values (outliers) that could skew our results. Additionally, let's remember the importance of handling missing values, as explained in class, using the **Transform > Replace Missing Values** function if necessary.

CONCLUSION

In conclusion,
we have seen how to import data into SPSS, calculate measures of central tendency and dispersion, and interpret the results. Let's master these fundamental steps for our future analyses.
Thank you for your attention.

1. Fundamental Course References

Class by our professor Dr. Amira Gado on 11/22/2025

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Thank You

