

What is the procedure for conducting a One-Way ANOVA using SPSS?

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One-Way ANOVA (Analysis of Variance) is a statistical test used to compare the means of three or more groups. It is commonly used in research studies to determine if there is a significant difference between the groups being compared. Conducting a One-Way ANOVA using SPSS involves the following steps:

1. **Data Preparation:** The first step is to input the data into SPSS. The data should be organized with one column for the dependent variable (the variable being measured) and one column for the independent variable (the groups being compared).
2. **Choosing the Correct Test:** In SPSS, go to the "Analyze" tab and select "Compare Means" followed by "One-Way ANOVA." This will open the dialogue box where you can select the appropriate test based on the type of data and the number of groups being compared.
3. **Setting the Variables:** In the dialogue box, select the dependent variable and move it into the "Dependent List" box. Then, select the independent variable and move it into the "Factor" box.
4. **Options:** The options tab allows for the adjustment of certain parameters such as the confidence interval and the type of post-hoc test to be conducted.
5. **Running the Analysis:** Once all the necessary parameters have been set, click "OK" to run the analysis. The results will be displayed in a new window.
6. **Interpreting the Results:** The results will include the calculated F-value, degrees of freedom, and p-value. If the p-value is less than the chosen alpha level (usually 0.05), then there is a significant difference between the groups.

In conclusion, conducting a One-Way ANOVA using SPSS involves preparing the data, selecting the correct test, setting the variables, running the analysis, and interpreting the results. This procedure is essential for accurately analyzing and comparing the means of multiple groups in a research study.

One-Way ANOVA in SPSS

In this section, we will learn how to conduct One-Way ANOVA in SPSS. The theory of One-Way ANOVA was given by British Mathematician or statistician Ronald Fisher. He gives One-Way ANOVA to identify the significant differences between more than two groups.

Whenever we have more than two groups, we cannot apply a t-test. So, in that case, we have to go to One-Way ANOVA. Generally, more than two groups mean more than two levels of one independent variable. For example, suppose there is a researcher who wants to determine the effect of three different kinds of therapies or medicines on the patient's condition, such as depression. Suppose he treats the patient for depression and has three or more than three therapies. In that case, we want to determine whether these three different therapies lead to significantly different results. We will check whether one therapy leads to significantly more improvement in the patient's condition as compared to other therapy. In this case, we have just two variables. The first variable is a therapy that is our independent variable, and the second variable is depression, that is our dependent variable. Therapy has three levels, which are Psychodynamic therapy, behavioral therapy, and cognitive. So we have three levels of a single variable. In that case, we want to determine whether these three different levels have a significantly different influence on the dependent variable.

Calculating One-Way ANOVA in SPSS

To calculate One-Way ANOVA, we will take the Employee data set, which is given below:

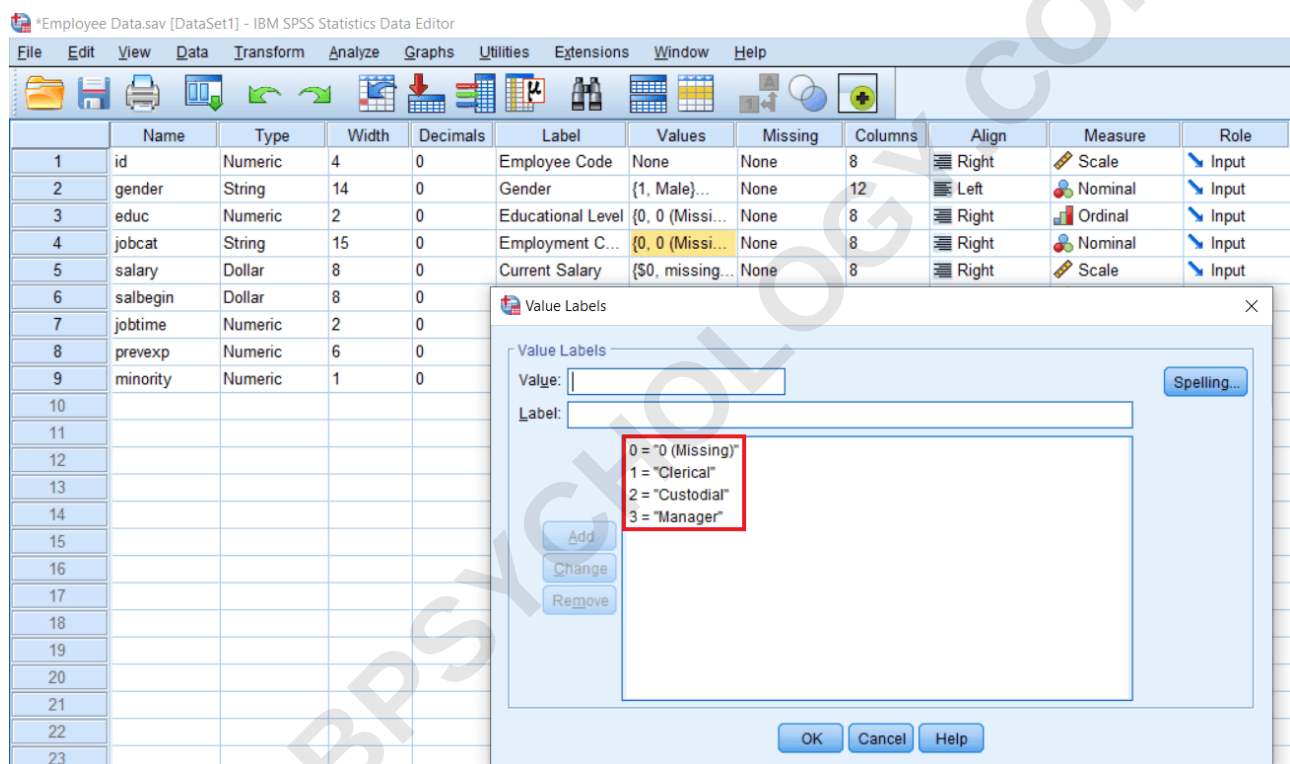
*Employee Data.sav [DataSet6] - IBM SPSS Statistics Data Editor

	id	gender	educ	jobcat	salary	salbegin	jobtime	prevexp	minority	var
1	1	Male	15	3	\$57,000	\$27,000	98	144	0	
2	2	Male	16	1	\$40,000	\$18,000	98	36	0	
3	3	Female	12	1	\$21,000	\$15,000	98	381	0	
4	4	Female	8	1	\$21,500	\$15,000	98	190	0	
5	5	Male	15	1	\$45,000	\$30,500	98	138	0	
6	6	Male	15	1	\$32,000	\$20,000	98	67	0	
7	7	Male	15	1	\$35,000	\$29,000	98	114	0	
8	8	Female	12	1	\$21,900	\$16,000	98	0	0	
9	9	Female	15	1	\$27,900	\$20,500	98	115	0	
10	10	Female	12	1	\$24,000	\$15,500	98	244	0	
11	11	Female	16	1	\$30,000	\$21,000	98	143	0	
12	12	Male	8	1	\$28,350	\$20,500	98	26	1	
13	13	Male	15	1	\$27,750	\$18,000	98	34	1	
14	14	Female	15	1	\$35,000	\$28,500	98	137	1	
15	15	Male	12	1	\$27,300	\$20,443	97	66	0	
16	16	Male	12	1	\$34,000	\$19,334	97	24	0	
17	17	Male	15	1	\$27,000	\$17,550	97	48	0	
18	18	Male	16	3	\$102,000	\$50,000	97	70	0	
19	19	Male	12	1	\$32,759	\$21,000	97	103	0	
20	20	Female	12	1	\$42,000	\$34,600	97	48	0	
21	21	Female	16	1	\$39,000	\$25,000	97	17	0	
22	22	Male	12	1	\$35,000	\$24,000	96	315	0	
23	23	Female	15	1	\$43,648	\$36,000	96	75	0	
24	24	Female	12	1	\$48,093	\$37,555	96	124	1	
25	25	Female	15	3	\$90,378	\$70,000	96	171	1	
26	26	Male	15	3	\$98,367	\$79,000	96	14	0	
27	27	Male	15	3	\$107,293	\$89,000	96	96	0	
28	28	Male	16	2	\$60,000	\$30,000	96	12	0	

Data View Variable View

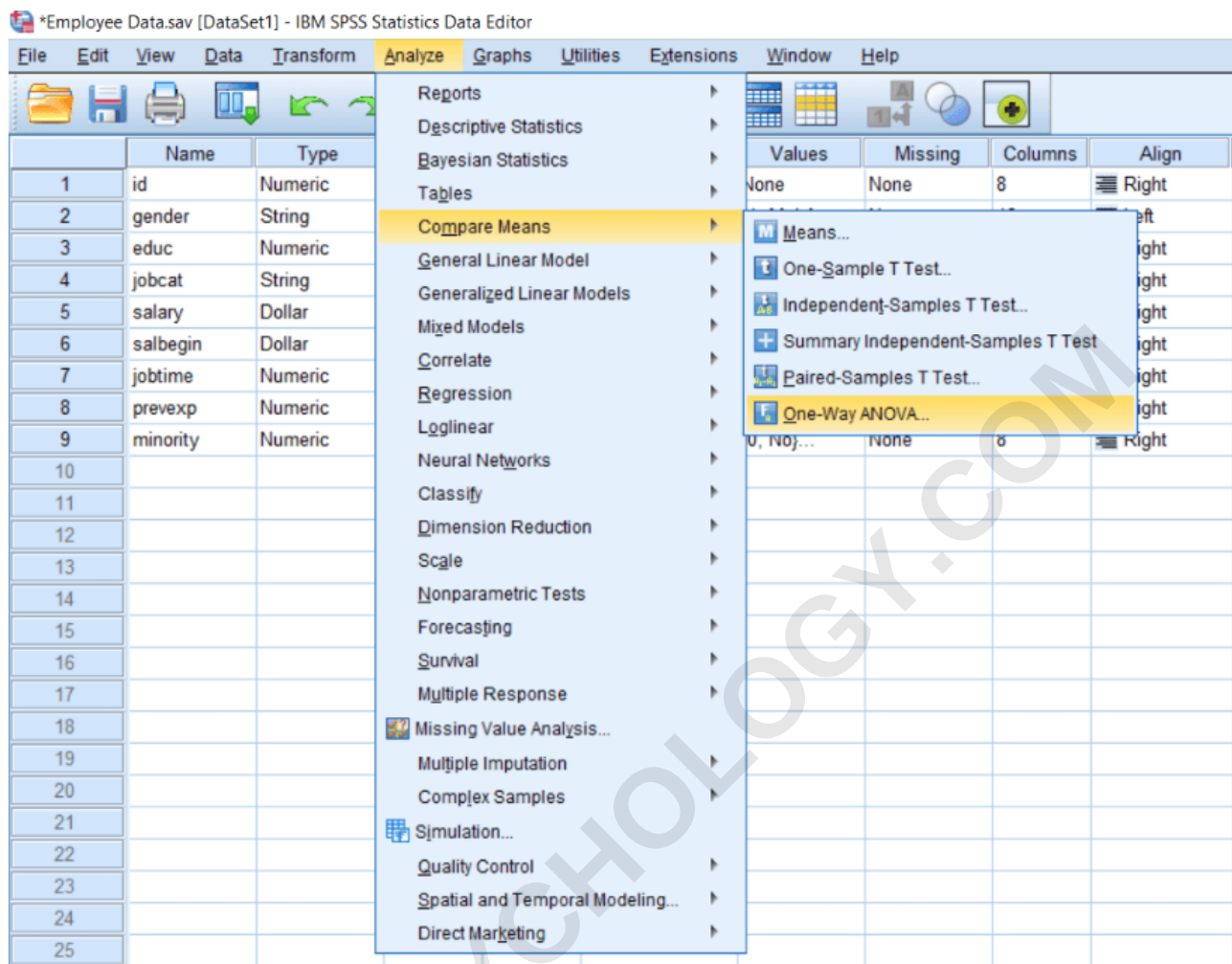
In this data set, we have a variable called jobcat. Now, if we look at the jobcat variable, we find that jobcat has three levels. If we click on the Values option, there are people from three different job categories, i.e., Clerical level, Custodial level, and Managerial level. 0 stands for

the missing value. That is a good way of defining missing value. 0 has been defined as a missing value, and they have kept in the missing value option. It means if we calculate any stat, for example, we want to do One-Way ANOVA, 0 will not be counted as a variable.

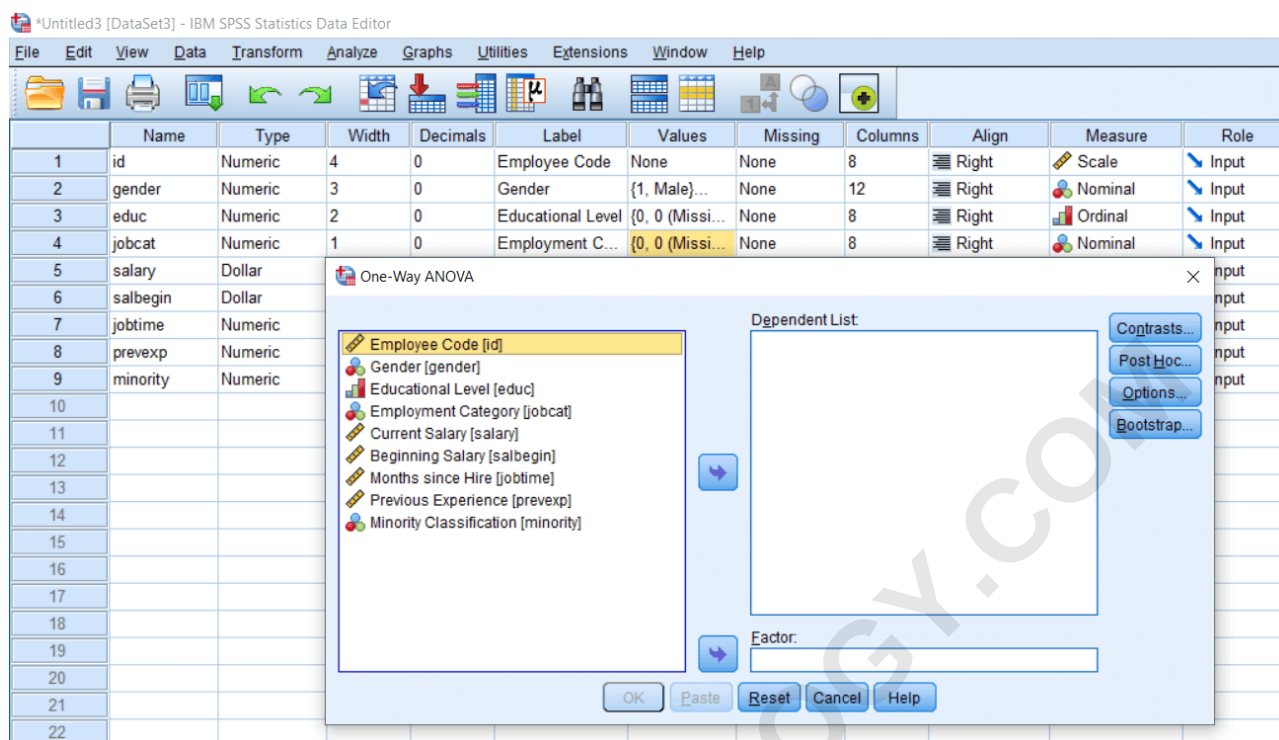


We want to find out that people belonging to different job categories will be drawing significantly different amounts of salary. To be more precise, we want to make a test. In which we can say that Managers are drawing significantly more amount to salary as compare to custodial or clerical people. So we

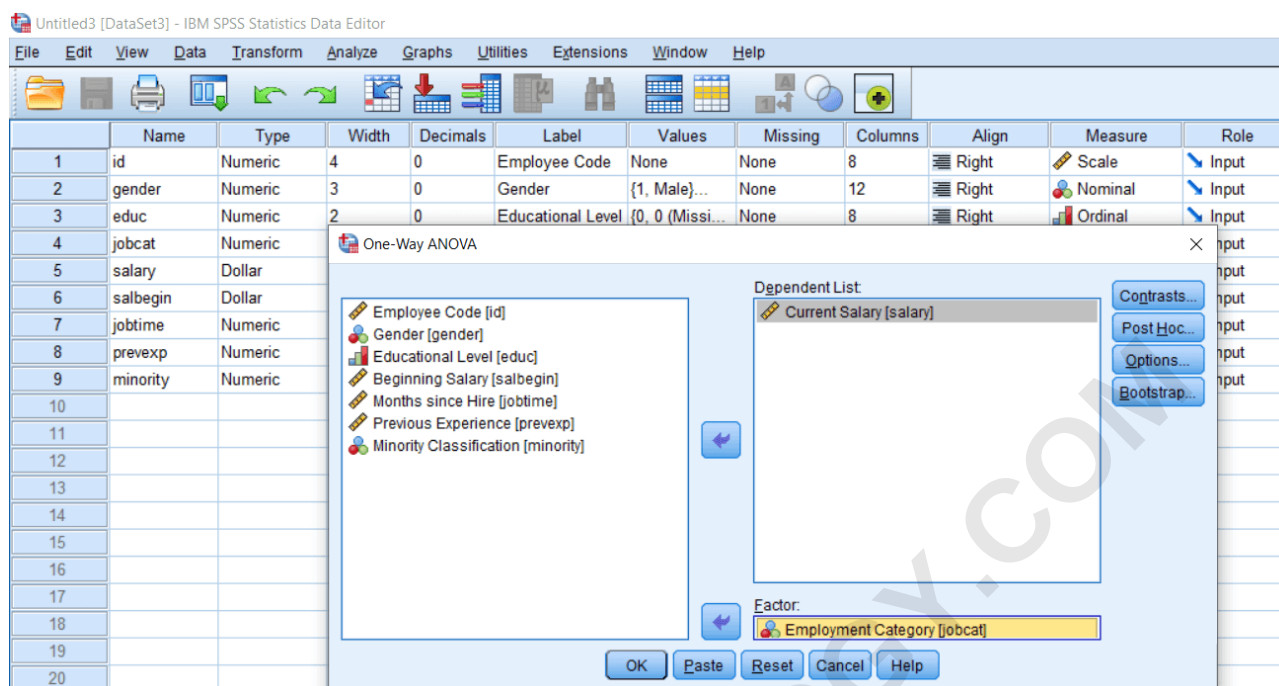
hypothesize that when we move from the clerical level to the managerial level, there is an increase in salary. We can test it by using One-Way ANOVA. So we have two variables here. One is an independent variable that is jobcat, which has three levels and one dependent variable, i.e., current salary. Now once all variables are defined, we will move to the calculation of One-Way ANOVA. To calculate One-Way ANOVA, we will go Analyze menu, and Compare Means and then One-Way ANOVA.



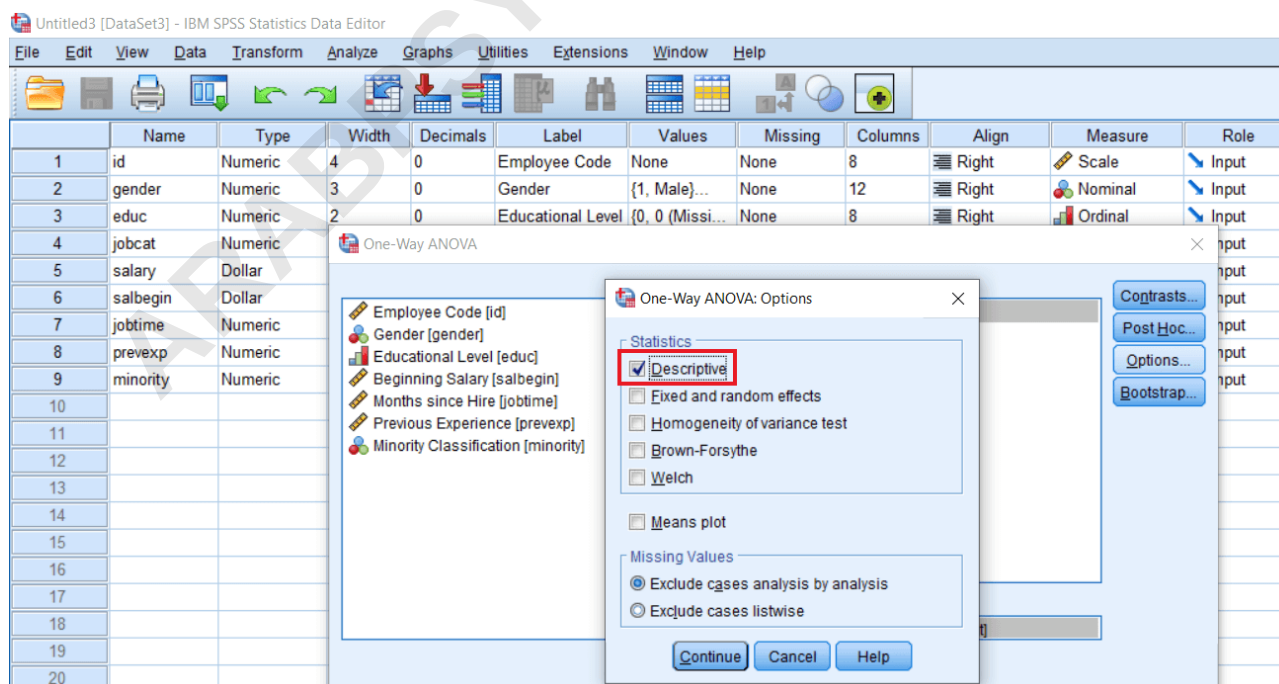
The symbol of One-Way ANOVA is F . So F stands for the Ronald Fisher, the person who gives this test. When we click on One-Way ANOVA, we will see a dialog box like this:



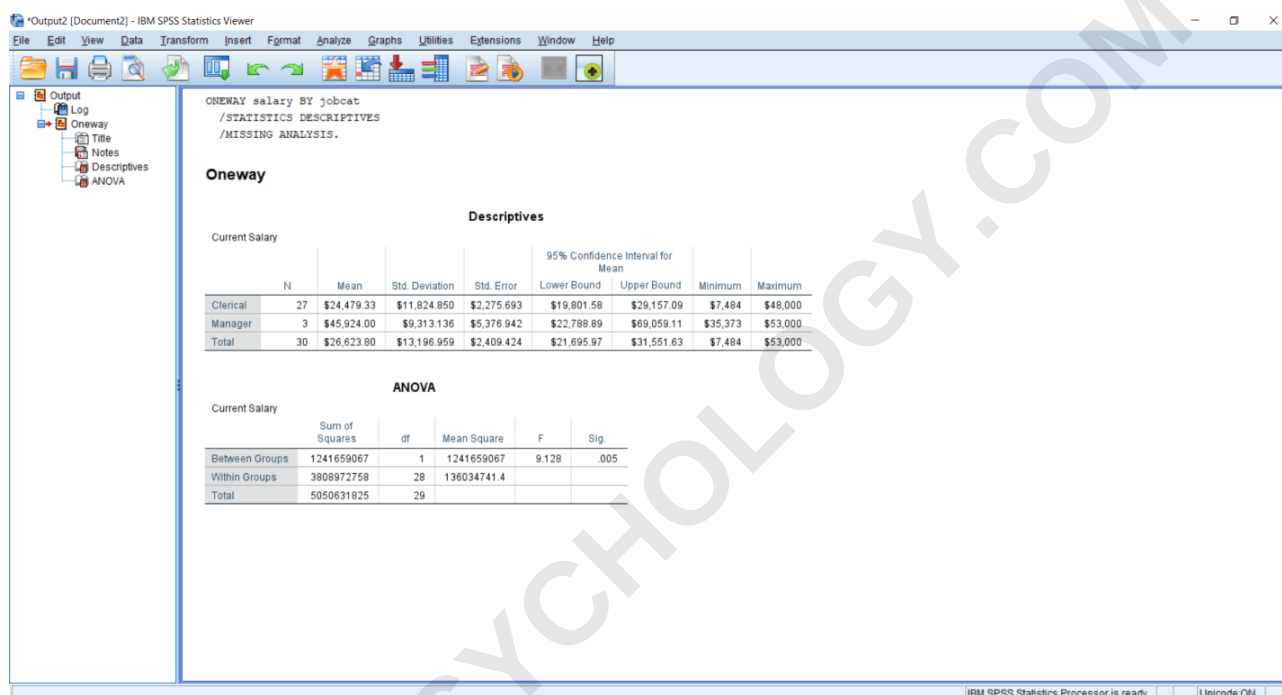
All the variables are populated on the left-hand side. So we have to select our dependent variable in the Dependent List and independent variable in Factor. So our dependent variable is the Current salary, and the independent variable is Job category, so we will select it.



By going to the Options tab, we can look at the Descriptive statistics like this:



Now we are ready to test the significant differences between three salary groups, three job categories. So click on, Ok. The following is the output for One-Way ANOVA.



The screenshot displays the IBM SPSS Statistics Viewer window. The left sidebar shows a tree view with 'Output' expanded, containing 'Log', 'Oneway', 'Title', 'Notes', 'Descriptives', and 'ANOVA'. The main window area shows the following output:

ONEWAY salary BY jobcat
/STATISTICS DESCRIPTIVES
/MISSING ANALYSIS.

Oneway

Descriptives

Current Salary

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Clerical	27	\$24,479.33	\$11,824.850	\$2,275.693	\$19,801.58	\$29,157.09	\$7,484	\$48,000
Manager	3	\$45,924.00	\$9,313.136	\$5,376.942	\$22,788.89	\$69,059.11	\$35,373	\$53,000
Total	30	\$26,623.80	\$13,196.959	\$2,409.424	\$21,695.97	\$31,551.63	\$7,484	\$53,000

ANOVA

Current Salary

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1241659067	1	1241659067	9.128	.005
Within Groups	3808972758	28	136034741.4		
Total	5050631825	29			

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