“What is the difference in means between multiple groups in a one-way ANOVA analysis?

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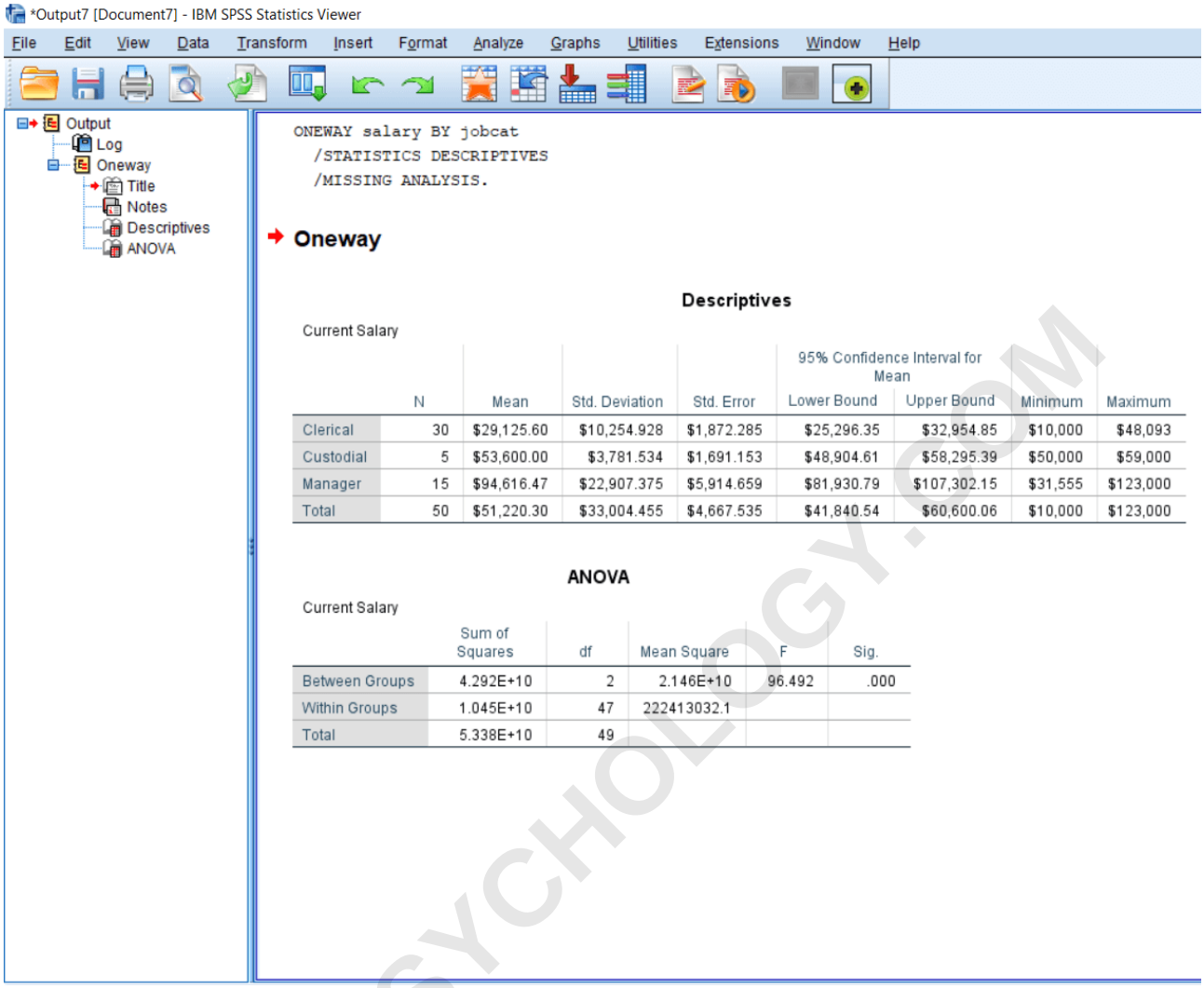
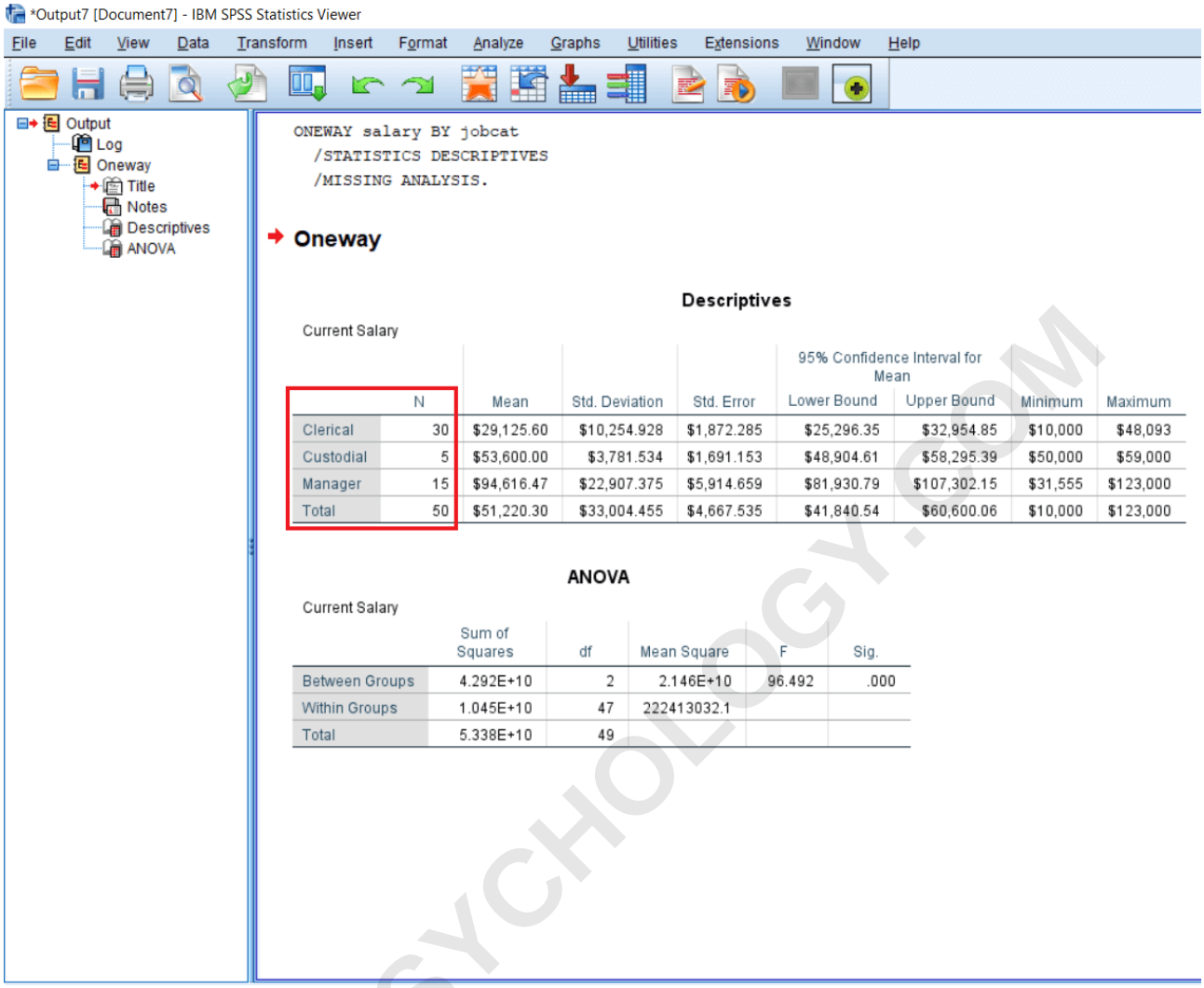
A one-way ANOVA (Analysis of Variance) is a statistical test used to determine if there is a significant difference between the means of two or more groups. It compares the variation within each group to the variation between the groups in order to assess whether the observed differences in means are due to chance or an actual difference in the population. The difference in means between multiple groups in a one-way ANOVA is the main focus of the analysis, as it provides information on the extent to which the groups differ from each other. This information is important in drawing conclusions about the relationship between the independent variable (group) and the dependent variable (outcome) being studied. In short, the one-way ANOVA helps to determine if there is a significant difference in means among multiple groups and provides insights into the nature of this difference.

Output of One-Way ANOVA

In this section, we will learn the output of One-Way ANOVA. The output of One-Way ANOVA is given below:

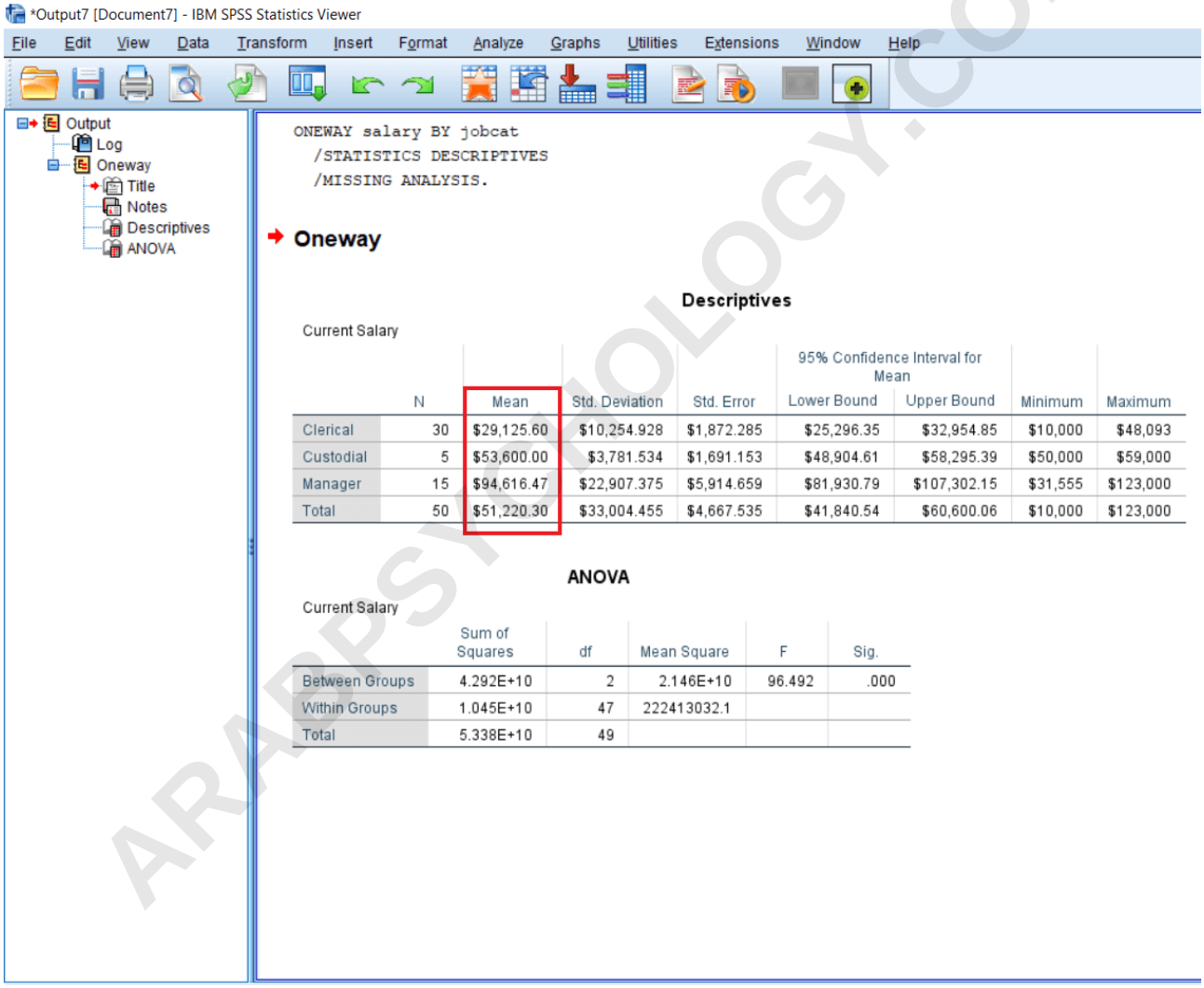


In the above output, we can see only three job categories are appearing, i.e., Clerical, Custodial, and Manager. The missing value 0 is not available in the output. 30 people belong to job category 1, i.e., Clerical, 5 belonging to job category 2, i.e., Custodial, and 15 belonging to job category 3, i.e., Managers. We are having a slightly lesser number of people in job category 2.



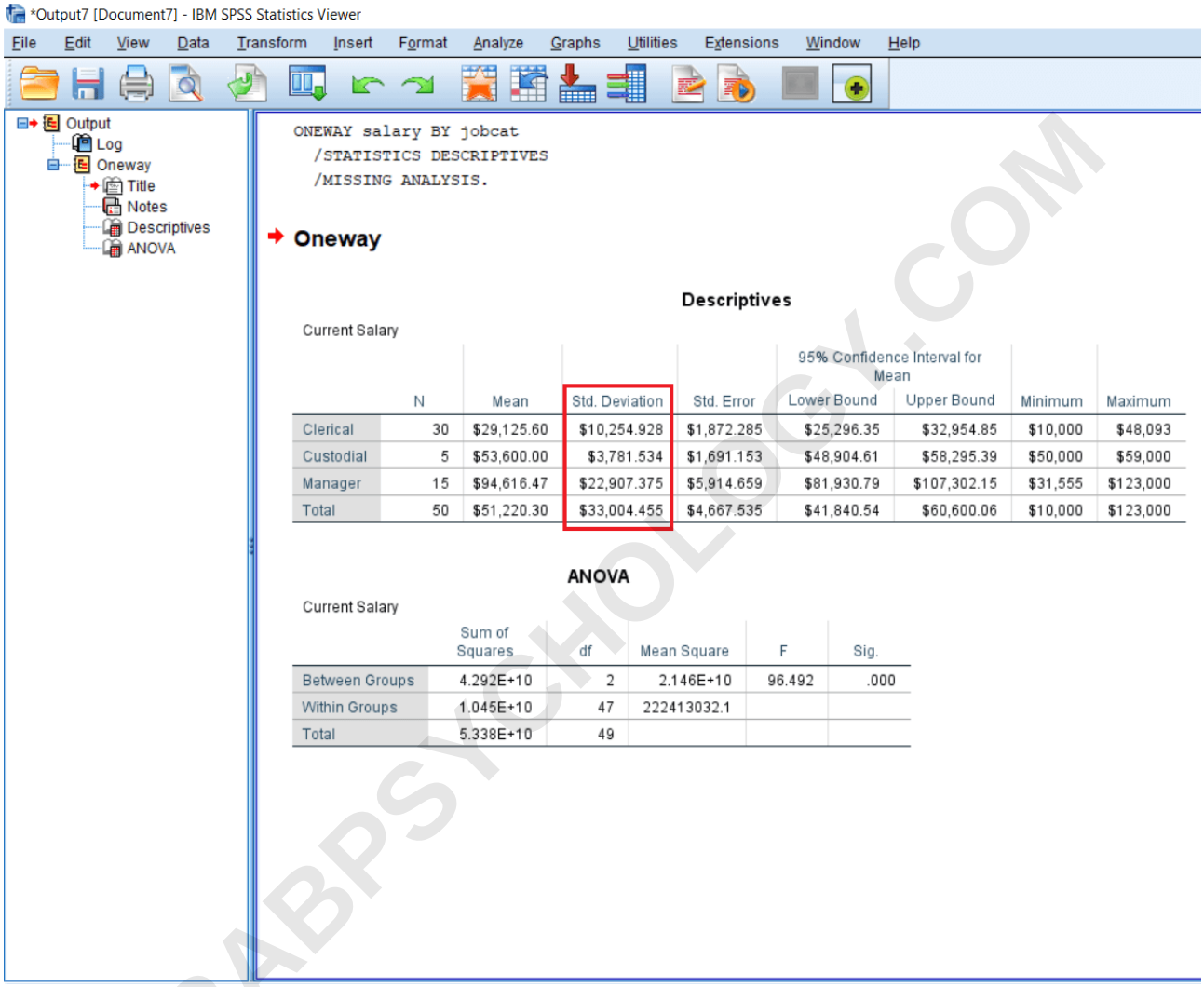
Now we will see it has any recursion for our analysis. Average salaries are 29,125 dollars, 53,600 dollars, and 94,616 dollars. If we look at these Means scores, we will see the impression that there are differences between people's salaries from three different job categories. But if we move from Clerks to Custodial employees, the amount of difference is not huge. But if we move from the Custodial employees to the Manager, there is a

huge significant difference, more than double the salary difference. So, we are expecting a significant difference between the groups. So that's how we can guess about the significant differences just by looking at the Mean scores.

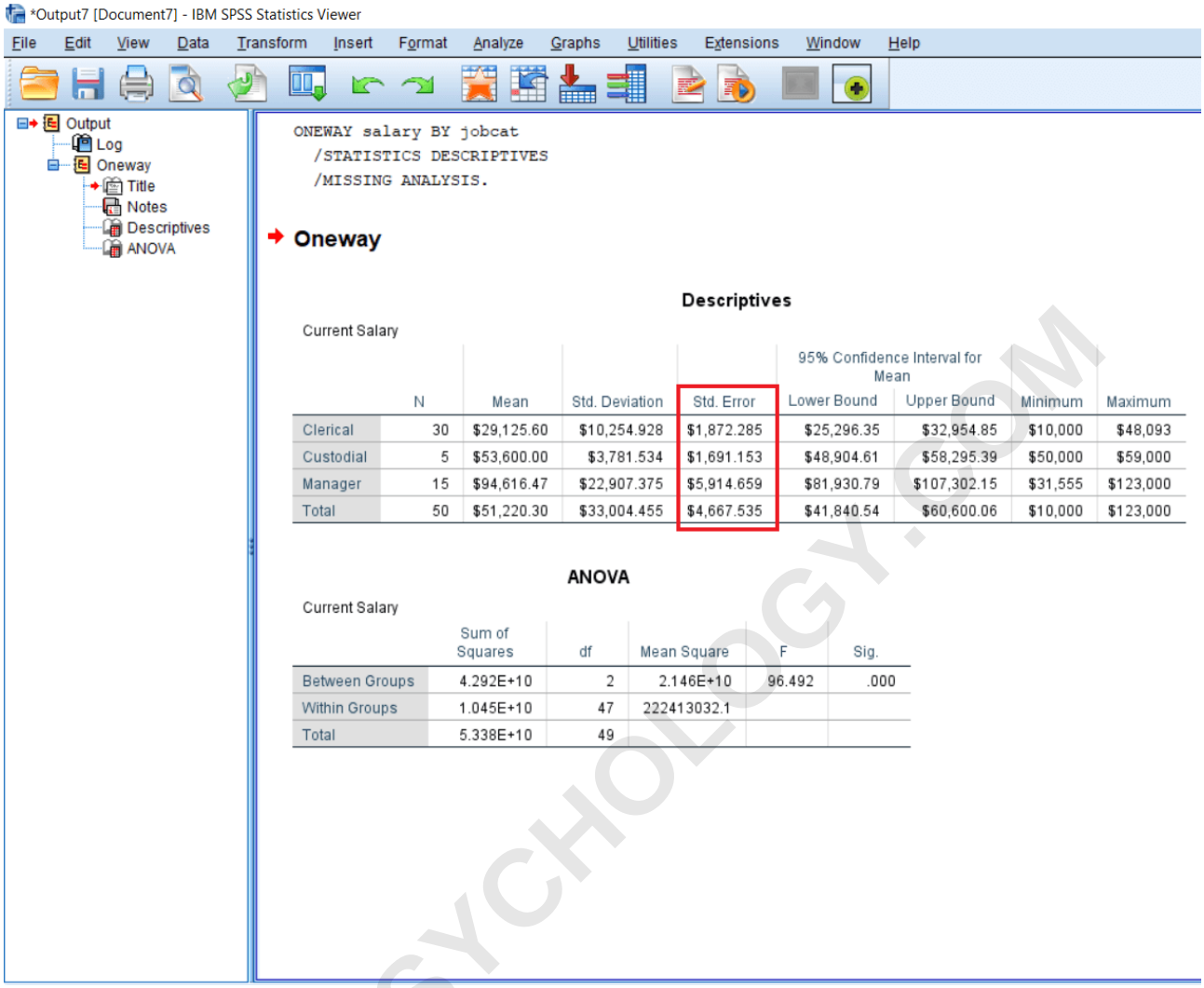


The Standard deviation in the case of Managers is quite high compared to the rest of two groups. So, managers are drawing on an average more salary, but there is a

huge variation in the managerial category compared to other groups.



The Standard error is shown in the following image. Standard error refers to the standard deviation of the sampling distribution of mean. So, it's an indication of the amount of error in measurement. So, the smaller it is better for us.



There is 95% confidence information. So, we can see none of the confidence information is having 0. So, we don't have a positive or negative value on either side, and these are the minimum and maximum amount of salary drawn by different groups. So, in the case of Manager, the difference is very high, 31 thousand to 123 thousand that's the descriptive scenario of output.