One-tailed test or a two-tailed test

Science, Statistics

One-Tailed Test or a Two-Tailed Test

Introduction

A drug company is measuring levels of oxygenation in patients after receiving a test medication. As the researcher, you are interested in whether Group I, which received the medication, has the same oxygenation levels as Group II, which did not.

1) Group 1: 2, 3, 3, 4, 4, 7, 8, 9

2) Group 2: 1, 2, 2, 3, 4, 4, 5, 5, 6, 8

Using Excel to run a t-test for two samples, assuming equal variances, with an alpha value of 0. 05.

The first step in any t-test analysis, according to Jackson (2011), is setting both the null and alternative hypotheses so that it can be determined whether there is any difference in the two means under study. In this case, our main interest is to know whether there is a difference between the oxygenation levels of the two groups. This can be posed in as a question such as whether the oxygenated levels of the two groups are equal. The equality part in the hypothesis is always taken to be the null hypothesis. In this case, our two hypotheses will look like this:

Ho: M1= M2

HA: M1≠M2

M1 is the mean of oxygenation levels of the first group and M2 is the mean oxygenation levels of the second group. It is important to note that this kind of hypothesis setting is the most appropriate for a two-tailed t-test.

A One-Tailed Test or a Two-Tailed Test

This should be a two-tailed t-test because the issue to decide between one

and two tailed t tests is not based on whether there is an expected difference of the means (Urdan, 2005). If there were foreknowledge that there was no expected difference, it would be absurd to collect the data and do the analysis. In this case scenario, the comparison is between two groups of people in which one has received oxygenation medication whereas the other one has not. Jackson (2011) asserts that the use of one tailed analysis is predicated upon a high certainty prior to the data collection that either there is no difference or a difference exists in a certain area of the entire population. In the event that the data analysis ends in showing the existence of a difference in the incorrect region, it then becomes automatic that the difference is attributable to random sampling. This consideration or assumption is done without giving due thought to the possibility that true difference might be a reflection of the measured or calculated difference (Urdan, 2005).

The Probability That Group I Is Different from Group 2 and the Significance Against the Benchmark of P < . 05

According to Rasch, Kubinger, and Moder (2011), the null hypothesis can only be rejected when the t-static from tables is less or greater than t critical two-tail value gotten after computation. Therefore, if the test statistic is less than -2. 12 or greater than 2. 12, the null hypothesis will be rejected and the alternative hypothesis adopted instead. The test statistic is 0. 899, which falls into the rejection region, so the null hypothesis is not rejected, which states that there is no difference between the means from the two samples. In other words, reject that the mean levels of oxygenation in the first group is equal to the mean oxygenation levels of the second group at 95%

confidence level.

References

Jackson, S. L. (2011). Research methods and statistics: A critical thinking approach. New York: Cengage Learning

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