Bhs 220 case 5

Science, Statistics

due Hypothesis This is a statistical proposition describing a scientific phenomenon. Unlike a scientific theory whichis an acceptable proposition describing a phenomenon, a hypothesis has to be tested thoroughly in order to determine whether to reject or not reject it. In every proposition there are two types of hypothesis (Null hypothesis and alternative hypothesis).

Null hypothesis is a proposed statement that tries to say that there is no relationship between two measured phenomena. It is denoted H0. For example:-

Statistical hypothesis: If a medical practitioner uses two drugs to treat a certain ailment, then we may sort to test which drug is more effective. The null hypothesis will be as follows:-

H0: μA= μB (There is no difference between drug A and drug B)

Alternative hypothesis on the other hand is the proposition that prevails in the event that there is sufficient evidence to reject the null hypothesis. That is, it shows that there is a relationship between the tested phenomena. It is denoted H1. Citing the previous example an alternative hypothesis can be represented as follows.

H1: μA≠μB (one drug is more effective than the other – two tailed).

1. Hypothesis testing

These are the accepted procedures used by statisticians to reject or not reject a statistical hypothesis in order to obtain a statistical inference. Five steps are involved in hypothesis testing:-

Statement of the research question – the moment a researcher identifies a research problem. He/she comes up with an exhaustive research question that will enable him/her to carry out a rigorous process. This enables him to

also identify parameters as well as variables to be used in the sample data collection.

Formulation of the null and alternative hypothesis – at this level the researcher states the null and alternative hypothesis. For example, if we wish to test if the graduating age of a graduate is 24, then

H0: μ= 24 years

H1: μ≠24 years (This hypothesis suggests a two tailed test)

It is in this step that you select the level of significance (e. g., 0. 05, level of significance) which enables you to compute type I and type II errors.

Test statistic calculation – in this case we calculate the statistic analogous to the parameter stated by the null hypothesis, which in the case above, is xbar.

Z =

Compute the rejection region – here the p-value which is the probability of the test statistic is calculated for both tails. This value is compared with the value from the tables at the level of significance selected in step 2 above. If the probability is less than or equal to the significance level, then the null hypothesis is rejected and the opposite is true.

Stating conclusions – the first statement should describe the results of the null hypothesis and those of the alternative hypothesis, stating whether we rejected the null hypothesis or not. The second statement should refer to the research question deducing respective inferences based on the outcome of the null hypothesis.

2. Using the problem provided.

Let the A represent treatment and B represent no treatment. Then the,

Null hypothesis H1: μA= μB

Alternative hypothesis H2: μA≠μB

Procedure

In this case the first step will be specifying the null and the alternative hypothesis. Then choose the level of significance to be used and compute the test statistic. Compute the probability of the test statistic which is the p-value on both tails. This will give you a basis for rejecting or not rejecting the null hypothesis (rejection region). Lastly, deduce vivid and realistic conclusions from the outcome of the null hypothesis.

References

Lehmann, E L, and Joseph P. Romano. Testing Statistical Hypotheses. New York: Springer, 2005. Internet resource.