NAME: Ereh Deborah Ekojonwa

MATRIC NO: 17/SCI05/005

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**QUESTIONS**

1. What do you understand by hypothesis testing

2. Differentiate between the classical and the p-value approach for hypothesis testing.

3. What is the importance of hypothesis testing in Research

**ANSWERS**

1. What do you understand by hypothesis testing

Hypothesis testing is an act in statistics whereby an analyst [tests](https://www.investopedia.com/terms/w/wilcoxon-test.asp) an assumption regarding a population parameter. The methodology employed by the analyst depends on the nature of the data used and the reason for the analysis. Hypothesis testing is basically an assumption that we make about the population parameter.

"Hypothesis" is a word used in several contexts in data analysis or statistics:

***The*research hypothesis**: is the general scientific issue that is being explored by a data analysis. It may take the form of quite specific statements, or just general speculations.

**Null hypothesis:**Null hypothesis is a statistical hypothesis that assumes that the observation is due to a chance factor.  Null hypothesis is denoted by; H0: μ1 = μ2, which shows that there is no difference between the two population means.

**Alternative hypothesis:**Contrary to the null hypothesis, the alternative hypothesis shows that observations are the result of a real effect.

2. Differentiate between the classical and the p-value approach for hypothesis testing.

There are two general approaches toward setting up and testing specific hypotheses: the "classical approach" and the "p-value" approach.

**Classical Approach**

The Classical Approach to hypothesis testing is to compare a test statistic and a critical value. It is best used for distributions which give areas and require you to look up the critical value (like the Student's t distribution) rather than distributions which have you look up a test statistic to find an area (like the normal distribution).

The Classical Approach also has three different [decision rules](https://people.richland.edu/james/lecture/m170/ch09-typ.html), depending on whether it is a left tail, right tail, or two tail test.

One problem with the Classical Approach is that if a different level of significance is desired, a different critical value must be read from the table.

**P-Value Approach**

The P-Value Approach, short for Probability Value, approaches hypothesis testing from a different manner. Instead of comparing z-scores or t-scores as in the classical approach, you're comparing probabilities, or areas.

The level of significance (alpha) is the area in the critical region. That is, the area in the tails to the right or left of the critical values.

The p-value is the area to the right or left of the test statistic. If it is a two tail test, then look up the probability in one tail and double it.

If the test statistic is in the critical region, then the p-value will be less than the level of significance. It does not matter whether it is a left tail, right tail, or two tail test. This rule always holds.

The steps in the classical approach:

1. define or state the null and alternative hypotheses.
2. select a test statistic.
3. select a significance level, or a specific probability level, which if exceeded, signals that the test statistic is large enough to consider significant.
4. delineate the "rejection region" under the pdf of the appropriate distribution for the test statistic, (i.e. determine the specific value of the test statistic that if exceeded would be grounds to consider it significant.
5. compute the test statistic.
6. depending on the particular value of the test statistics either a) reject the null hypothesis (Ho) and accept the alternative hypothesis (Ha), or b) fail to reject the null hypothesis.

The steps in the "p-value" approach are:

1. define or state the null and alternative hypotheses.
2. select and compute the test statistic.
3. refer the test statistic to its appropriate reference distribution.
4. calculate the probability that a value of the test statistic as large as that observed would occur by chance if the null hypothesis were true (this probability, or *p-value*, is called the significance level).sif the significance level is small, the tested hypothesis (Ho) is discredited, and we assert that a "significant result" or "significant difference" has been observed.

3. What is the importance of hypothesis testing in Research

Hypothesis as the Investigator’s ‘Eyes’: By guiding the investigator in further investigation it serves as the investigator’s ‘Eyes’ in seeking answers to tentatively adopted generalization.

It Focuses Research: Without it, research is unfocussed research and remains like a random empirical wandering. It serves as necessary link between theory and the investigation.

It Places Clear and Specific Goals: A well thought out set of hypothesis is that they place clear and specific goals before the research worker and provide researcher with a basis for selecting sample and research procedure to meet these goals.

It Links Together: It serves the important function of linking together related facts and information and organizing them into wholes.

It Prevents Blind Research: The use of hypothesis prevents a blind search and indiscriminate gathering of masses of data which may later prove irrelevant to the problem under study.

As a Sort of Guiding Light: A hypothesis serves as a powerful beacon that lights the way for the research work.

George J. Mouley thinks that Hypotheses serve the following purposes –

They…

• Provide direction to research and prevent the review of irrelevant literature and the collection

* + Sensitize the investigator certain aspects of situation which are irrelevant from the standpoint ‬‬of the problem at hand.
  + Enable the investigator to understand with greater clarity his/her problem and its ramification. ‬‬
  + Serve as a framework for the conclusive - in short a good hypothesis: (a)Gives help in deciding ‬‬the direction in which he has to proceed. (b) It helps in selecting pertinent fact. (c) It helps in drawing conclusions.

Van Dalen advocates the importance of hypothesis in the following ways –

* + Hypotheses are indispensable research instrument, for they build a bridge between the problem ‬‬and the location of empirical evidence that may solve the problem.
  + A
  + A hypothesis pin
  + Using hypothesis determines the
  + The hypothesis indicates not only what to look for is an investigation but how to obtain data. It ‬‬helps in deciding research design. It may suggest what subjects, tests, tools, and techniques are needed.
  + The hypothesis provides the investigator with
  + A hypothesis provides the framework for drawing conclusions. ‬‬
  + These hypotheses simulate the investigator for further research studies‬‬

• Sensitize the investigator certain aspects of situation which are irrelev