STAT 101 Introduction to statistics

Berlin School of Business and Statistics

Dr. Noah Mutai

February 8, 2023

Learning objectives

By the end of this lesson learners should be able to;

(a) State at least one definition of statistics.

(b) Differentiate between descriptive and inferential statistics.

(c) Classify a variable as quantitative or qualitative, continuous or discrete, ordinal or nominal.

1 Introduction

This chapter forms as an introduction to statistics. It also lays a foundation for the other chapters.

1.1 What is statistics?

The word statistics can have two meanings:

1. In plural sense, statistics is considered as a numerical description of quantitative aspect of things. It stands for numerical facts pertaining to a collection of objects.
2. In singular sense, statistics means the science of collection, organization, presentation, analysis and interpretation of numerical data to assist in making more effective decisions.

Statistics is the most widely used quantitative method in business. It is often applied to;

(a) Sales forecasting

(b) Quality control

(c) Market research

1.2 Branches of statistics

Statistics as a science can be broadly classified into two broad branches:

(a) Descriptive Statistics: summary values and presentations which gives some information about the data e.g. the mean height of a 1st year student in BSBi is 170cm. 170cm is a statistics which describes the central point of the heights data.

(b) Inferential Statistics: summary values calculated from the sample in order to make conclusions about the target population

1.3 Data types and variables

1.3.1 Data

Collection of measurements or observations. We use datum for a single observation.

1.3.2 Variables

A variable is a characteristic often but not always quantitatively measured, containing two or more values or categories that can vary from person to person, place to place and time to time. e.g. gender, family size, monthly income, price of a commodity etc. A variable can be **independent/predictor/explanatory** or **dependent/outcome/response**.

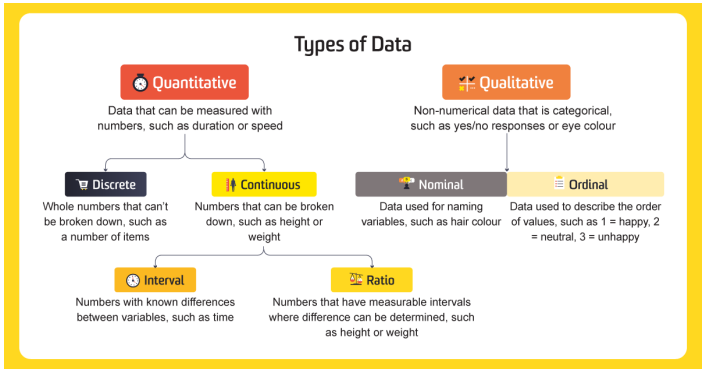

Figure 1: Types of variables

1.3.3 Types of Variables

1. Qualitative Variables: Variables whose values fall into groups or categories. They are called categorical variables and are further divided into 2 classes namely nominal and ordinal variables.

   (a) Nominal variables: variables whose categories are just names with no natural ordering. Eg gender marital status, skin colour, district of birth etc

   (b) Ordinal variables: variables whose categories have a natural ordering. Eg education level, performance category, degree classifications etc

2. Quantitative Variables: these are numeric variables and are further divided into 2 classes namely discrete and continuous variables.

   (a) Discrete variables: can only assume certain values and there are gaps between them. Eg the number of calls one makes in a day, the number of vehicles passing through a certain point etc

   (b) Continuous variables: can assume any value in a specified range. Eg length of a telephone call, height of a 1st year student in JKUAT etc

1.4 Check your understanding

1. For each of the variables listed below identify the level of measurement.

   (a) Date of diagnosis

   (b) Town of residence

   (c) Age (years)

   (d) Sex

2. Distinguish between descriptive and inferential statistics.

3. You are interested in how stress affects heart rate in humans. What would be your dependent variable.