

The subject of statistics is largely about using sample data to make inferences about an entire population.

- Parameter - a numerical measurement describing some characteristic of a population.
- Statistic - a numerical measurement describing some characteristic of a sample.

A graduate student at the University of Newport conducts a research project about communication in the U.S. She mails a survey to all of the 500 adults that she knows. She asks them to mail back a response to this question: "Do you prefer to use email or snail mail (the U.S. Postal Service)?" She gets back 65 responses, with 22 of them indicating a preference for snail mail. She then reported that  $22/65 = 33.8\%$  of adults prefer to use snail mail.

1. What is the parameter?

- The 33.8% of adults in the sample that prefer snail mail.
- The proportion of all adults in the U.S. that prefer snail mail.
- All adults in the U.S.
- The 500 adults that she knows

2. What is the sample?

- All adults in the U.S.
- The 65 adults that responded.
- 500 adults that she knows.
- The 22 adults that prefer snail mail.

3. What is the statistic?

- The 33.8% of adults in the sample that prefer snail mail.
- The proportion of all adults in the U.S. that prefer snail mail.
- All adults in the U.S.
- The 500 adults that she knows

4. Suppose you want to estimate the percentage of videos on YouTube that are cat videos. It is impossible for you to watch all videos on YouTube so you use a random video picker to select 1000 videos for you. You find that 2% of these videos are cat videos. Determine which of the following is an observation, a variable, a statistic, or a parameter.

- |   |             |
|---|-------------|
| a) Percentage of all videos on YouTube that are cat videos. | Parameter   |
| b) 2%   | Statistic   |
| c) A video in your sample.                                  | Observation |
| d) Whether or not a video is a cat video.                   | Variable    |

A cabinet shop wants to determine the effect of adhesive brands on the bonding of veneer to the side of cabinets. Four different brands of adhesive were applied to glue veneer to random samples of cabinet ends. The treatments were identical except for the brand of adhesive.

- Circle the independent variable: Bonding of Veneer      Brands of Adhesive
- Circle the dependent variable: Bonding of Veneer      Brands of Adhesive
- Is the given study observational or experimental?      Experimental

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Types of Data:

- Qualitative Data - Categorical data that consists of names or labels representing categories or attributes.
- Quantitative Data – numerical data that consists of *numbers* representing counts or measurements. Quantitative data can be further described by distinguishing between *discrete* and *continuous* types.
  - Discrete data result when the number of possible values is either a finite number or a 'countable' number.
  - Continuous data result from infinitely many possible values that correspond to some continuous scale that covers a range of values without gaps, interruptions, or jumps.

Quantitative and qualitative data can take on different levels of measurement.

- Nominal level of measurement - characterized by data that consist of names, labels, or categories only, and the data cannot be arranged in an ordering scheme (such as low to high).
- Ordinal level of measurement - involves data that can be arranged in some order, but differences between data values either cannot be determined or are meaningless.
- Interval level of measurement - involves data that can be arranged in order and the difference between any two data values is meaningful. However, there is no *natural* zero starting point (where *none* of the quantity is present).
- Ratio level of measurement - the interval level with the additional property that there is also a natural zero starting point (where zero indicates that *none* of the quantity is present); for values at this level, differences and ratios are meaningful.

8. Is the color of the car a qualitative or quantitative variable?                      Qualitative
9. Is the times it takes to cut a lawn qualitative or quantitative variable?      Quantitative
10. Is the marital status of faculty members in a large university qualitative or quantitative variable?  
Qualitative
11. The mean (average) weight of pennies currently being minted is 2.5 grams. Is this value from a discrete or continuous data set?      Continuous
12. Is blood pressure discrete or continuous?                      Continuous
13. Is the number of customers at a drive thru each hour discrete or continuous?      Discrete
14. Eye Color is what level of measurement?                      Nominal
15. Weight is what level of measurement?                      Ratio
16. A letter Grade on an Exam is what level of measurement?                      Ordinal
17. Fahrenheit Temperature is what level of measurement?                      Interval
18. Gender is what level of measurement?                      Nominal
19. Age is what level of measurement?                      Ratio
20. Class in school (Fresh, So, Jr, Sr) is what level of measurement?      Ordinal