DESCRIBING DATA WITH TABLES

Frequency Distributions for Quantitative Data

- A frequency distribution is a collection of observations produced by sorting observations into classes and showing their frequency (f) of occurrence in each class.
- When observations are sorted into classes of single values, as in Table 2.1, the result is referred to as a frequency distribution for ungrouped data.
- The frequency distribution shown in Table 2.1 is only partially displayed because there are more than 100 possible values between the largest and smallest observations. Frequency distribution table is much more informative if possible observed values is less than 20. If more entry is observed then grouped data is used.

Table 2.1 FREQUENCY DISTRIBUTION (UNGROUPED DATA)

WEIGHT	*f*
245	1
244	0
243	0
242	0
*	
*	
*	
161	0
160	4
159	1
158	2
157	3
*	
*	
*	
136	0
135	2
134	0
133	1
Total	53

Grouped Data

According to their frequency of occurrence. When observations are sorted into classes of more than one value result is referred to as a frequency for grouped data. (Shown in table 2.2)

- The general structure of this frequency distribution is the data are grouped into class intervals with 10 possible values each.
- The frequency (f) column shows the frequency of observations in each class and, at the bottom, the total number of observations in all classes.

Table 2.2
FREQUENCY DISTRIBUTION (GROUPED DATA)

WEIGHT	*f*
240–249	1
230–239	0
220–229	3
210–219	0
200–209	2
190–199	4
180–189	3
170–179	7
160–169	12
150–159	17
140–149	1
130–139	3
Total	53

OUTLIERS

An outlier is an extremely high or extremely low data point relative to the nearest data point and the rest of the neighbouring co-existing values in a data graph or dataset you're working with. Outliers are extreme values that stand out greatly from the overall pattern of values in a dataset or graph.

RELATIVE FREQUENCY DISTRIBUTIONS

Relative frequency distributions show the frequency of each class as a part or fraction of the total frequency for the entire distribution. This type of distribution is especially helpful when you must compare two or more distributions based on different total numbers of observations. The conversion to relative frequencies allows a direct comparison of the shapes of two distributions without adjust other observations.

Table 2.5
RELATIVE FREQUENCY DISTRIBUTION

WEIGHT	*f*	RELATIVE *f*
240–249	1	.02
230–239	0	.00
220–229	3	.06
210–219	0	.00
200–209	2	.04
190–199	4	.08
180–189	3	.06
170–179	7	.13
160–169	12	.23
150–159	17	.32
140–149	1	.02
130–139	3	.06
Total	53	1.02*

** The sum does not equal 1.00 because of rounding-off errors.*

Constructing Relative Frequency Distributions

To convert a frequency distribution into a relative frequency distribution, divide the frequency for each class by the total frequency for the entire distribution. Table 2.5 illustrates a relative frequency distribution based on the weight distribution of Table 2.2.

Percentages or Proportions

Some people prefer to deal with percentages rather than proportions because percentages usually lack decimal points. A proportion always varies between 0 and 1, whereas a percentage always varies between 0 percent and 100 percent. To convert the relative frequencies, multiply each proportion by 100; that is, move the decimal point two places to the right.

CUMULATIVE FREQUENCY DISTRIBUTIONS

Cumulative frequency distributions show the total number of observations in each class and in all lower-ranked classes. Cumulative frequencies are usually converted, in turn, to cumulative percentages. Cumulative percentages are often referred to as percentile ranks.

Constructing Cumulative Frequency Distributions

To convert a frequency distribution into a cumulative frequency distribution, add to the frequency of each class the sum of the frequencies of all classes ranked below it.

Table 2.6
CUMULATIVE FREQUENCY DISTRIBUTION

WEIGHT	*f*	CUMULATIVE *f*	CUMULATIVE PERCENT
240–249	1	53	100
230–239	0	52	98
220–229	3	52	98
210–219	0	49	92
200–209	2	49	92
190–199	4	47	89
180–189	3	43	81
170–179	7	40	75
160–169	12	33	62
150–159	17	21	40
140–149	1	4	8
130–139	3	3	6
Total	53		

Cumulative Percentages

As has been suggested, if relative standing within a distribution is particularly important, then cumulative frequencies are converted to cumulative percentages. To obtain this cumulative percentage, the cumulative frequency of the class should be divided by the total frequency of the entire distribution.

Percentile Ranks

When used to describe the relative position of any score within its parent distribution, cumulative percentages are referred to as percentile ranks. The percentile rank of a score indicates the percentage of scores in the entire distribution with similar or smaller values than that score. Thus, a weight has a percentile rank of 80 if equal or lighter weights constitute 80 percent of the entire distribution.

FREQUENCY DISTRIBUTIONS FOR QUALITATIVE (NOMINAL) DATA

Frequency distributions for qualitative data are easy to construct. Simply determine the frequency with which observations occupy Each class, and report these frequencies as shown in Table 2.7 for the Face book profile survey.

Table 2.7
FACEBOOK PROFILE SURVEY

Response	*f*
Yes	56
No	27
Total	83

Qualitative data have an ordinal level of measurement because Observations can be ordered from least to most, that order should be preserved in the frequency table.

Relative and Cumulative Distributions for Qualitative Data

Frequency distributions for qualitative variables can always be converted into relative frequency distributions. if measurement is ordinal because observations can be ordered from least to most, cumulative frequencies (and cumulative percentages) can be used.

Table 2.8
RANKS OF OFFICERS IN THE U.S. ARMY (PROJECTED 2016)

RANK	*f*	PROPORTION	CUMULATIVE PERCENT
General	311	.004*	100.0
Colonel	13,156	.167	99.6
Major	16,108	.204	82.9
Captain	29,169	.370	62.5
Lieutenant	20,083	.255	25.5
Total	78,827		

**To avoid a value of .00 for General, proportions are carried three places to the right of the decimal point.*