## **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.

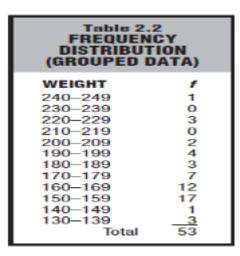
Table 2.1 FREQUENCY DISTRIBUTION (UNGROUPED DATA)			
WEIGHT	f		
245	1		
244	0		
243	0		
242	0		
*			
*			
*			
161	0		
160	4		
159	1		
158	2		
157	3		
*			
136	0		
135	2		
134	0		
133	_1		
Total	53		

### **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.

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#### **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		
180189	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.

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### **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	<u>3</u> 53	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.

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Table 2.7 FACEBOOK PROFILE SURVEY			
Respon	se	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.