



# Example 2.6 Stats Anxiety

A student enrolled in a business program is attending the first class of the required statistics course. The student is somewhat apprehensive because he believes the myth that the course is difficult.

To alleviate his anxiety the student asks the professor about last year's marks.

The professor obliges and provides a list of the final marks, which is composed of term work plus the final exam. What information can the student obtain from the list?

Example 2.6 Stats Anxiety				
65	81	72	59	
71	53	85	66	
66	70	72	71	
79	76	77	68	
65	73	64	72	
82	73	77	75	
80	85	89	74	
86	83	87	77	
67	80	78	69	
64	67	79	60	
62	78	59	92	
74	68	63	69	
67	67	84	69	
72	62	74	73	
68	83	74	65	
				1.4









## **Descriptive Statistics**

Descriptive statistics deals with methods of organizing, summarizing, and presenting data in a convenient and informative way.

One form of descriptive statistics uses graphical techniques, which allow statistics practitioners to present data in ways that make it easy for the reader to extract useful information.

Chapter 2 introduces several graphical methods.

# Key Statistical Concepts

#### **Population**

— a *population* is the group of <u>all</u> items of interest to a statistics practitioner.

- frequently very large; sometimes infinite.

E.g. All 5 million Florida voters, per Example 12.5

#### Sample

— A *sample* is a set of data drawn from the population.

— Potentially very large, but less than the population.

E.g. a sample of 765 voters exit polled on election day.

1.10









## **Descriptive Statistics**

... are *methods* of organizing, summarizing, and presenting data in a convenient and informative way. These methods include:

Graphical Techniques (Chapter 2), and Numerical Techniques (Chapter 4).

The actual method used depends on what *information* we would like to extract. Are we interested in...

- measure(s) of central location? and/or
- measure(s) of variability (dispersion)?

Descriptive Statistics helps to answer these questions...

## **Inferential Statistics**

Descriptive Statistics describe the data set that's being analyzed, but doesn't allow us to draw any conclusions or make any interferences about the data. Hence we need another branch of statistics: *inferential statistics*.

Inferential statistics is also a set of methods, but it is used to draw conclusions or inferences about characteristics of *populations* based on data from a *sample*.

1.16





#### Statistical Inference

#### **Rationale:**

• Large populations make investigating each member impractical and expensive.

• Easier and cheaper to take a sample and make estimates about the population from the sample.

#### However:

Such conclusions and estimates are not always going to be correct. For this reason, we build into the statistical inference "measures of reliability," namely **confidence level** and **significance level**.

1.19

#### Confidence & Significance Levels

The *confidence level* is the proportion of times that an estimating procedure will be correct.

E.g. a confidence level of 95% means that, estimates based on this form of statistical inference will be correct 95% of the time.

When the purpose of the statistical inference is to draw a conclusion about a population, the *significance level* measures how frequently the conclusion will be wrong in the long run.

E.g. a 5% significance level means that, in the long run, this type of conclusion will be wrong 5% of the time.



## Confidence & Significance Levels

Consider a statement from polling data you may hear about in the news:

"This poll is considered accurate within 3.4 percentage points, 19 times out of 20."

1.22

In this case, our confidence level is 95% (19/20 = 0.95), while our significance level is 5%.



# Statistical Applications in Business

Statistical analysis plays an important role in virtually *all* aspects of business and economics.

Throughout this course, we will see applications of statistics in accounting, economics, finance, human resources management, marketing, and operations management.