Sec 1.2 Statistical Thinking

**Learning Objective:**
1. Context of data.
2. Source of data.
3. Sampling method.
5. Practical implication.

**Definitions:**

1. **Statistics** is the science of _____________________________
data in order to make decisions.

2. **Data** are collections of ___________________________ such as measurements, genders, survey responses.

3. A **population** is the complete collection of ___________________________ such as scores, people, measurements, and so on that we use in study. The collection is complete in the sense that it includes ____________________________ to be studied.

4. A **census** is the collection of data from________________________ member of the population.

5. A **sample** is a ___________________________ of members __________________________ from a population.

6. **Voluntary response sample** is one in which the__________________________ decide whether to be included in the study.

7. **Statistical significance** is indicated when methods of statistics are__________________________ that some treatment of finding is effective, but finding does not make enough of a difference to justify its use or to be practical.

**Example 1:** In a recent survey, 3002 adults in the United States were asked if they read news on the Internet at least once a week. Six hundred of the adults said yes. Identify the population and the sample. Describe the data set.

**Answer:**

Population: 

Sample: 

Data Set:
1. **Context of Data**

   **Data Used for Analysis**

<table>
<thead>
<tr>
<th>x</th>
<th>6.2</th>
<th>6.2</th>
<th>5.5</th>
<th>5.5</th>
<th>5.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>y</td>
<td>1.2</td>
<td>2.1</td>
<td>1.8</td>
<td>2.3</td>
<td>2.1</td>
</tr>
</tbody>
</table>

   **Questions:**
   
   1. What do the ____________represent?
   2. Where did the ____________come from?
   3. Why were they ____________?
   4. An understanding of the ____________will directly ____________the statistical procedure used.

2. **Source of Data**

   **Questions:**
   
   1. Is the source ________________?
   2. Is the source ________________?
   3. Is there some ________________to distort or spin results to support some self-serving position?
   4. Is there something to ________________or ________________by distorting results?
   5. Be vigilant and skeptical of ________________from sources that may be biased.

3. **Sampling Method**

   **Questions:**
   
   1. Does the method chosen greatly ____________the validity of the conclusion?
   2. Voluntary ________________or ________________samples often have bias and these samples’ results are not necessarily valid.
   3. Other methods are more likely to ________________good results.

4. **Conclusions**

   1. Make statements that are ____________to those without an understanding of statistics and its terminology.
   2. ____________making statements not justified by the statistical analysis.

5. **Practical Implication**

   1. State practical implications of the results.
   2. They may exist some statistical significance but there may be ____________practical significance.
3. Common sense might suggest that the finding does not make enough of a difference to justify its use or to be practical.

6. **Statistical Significance**

1. Consider the likelihood of getting the results by ______________________.

2. If results could easily occur by chance, then they are not ________________________________.

3. If the likelihood of getting the results is so small, then the results are ____________________.

**Example 2:** (#23.pg.10) Form a conclusion about statistical significance. Do not make any formal calculation. Either use results provided or make subjective judgments about the results.

In a study of the Ornish weight loss program, 40 subjects lost a mean of 3.3 lb after 12 months (based on data from “Comparison of the Atkins, Ornish, Weight Watchers, and Zone Diets for Weight Loss and Heart Disease Risk Reduction,” by Dansinger et al., *Journal of the American Medical Association*, Vol. 293, No.1). Methods of statistics can be used to show that if this diet had no effect, the likelihood of getting these results is roughly 3 chances in 1000. (a) Does the Ornish weight loss program have statistical significance? (b) Does it have practical significance? Why or why not?

**Answer:**