

**Statistics 300:
Introduction to Probability
and Statistics**

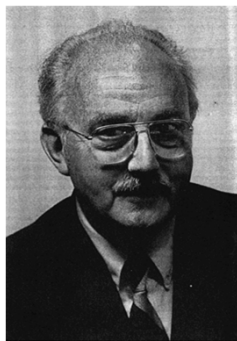
Section 1-1

What is this class all about?

**Definitions of “Statistics” as
a “field of study”**

**Definitions of
“Statistics”**

- **George Box:**
“The art and
science of
making sense
out of data”



George E. P. Box

Definitions of “Statistics”

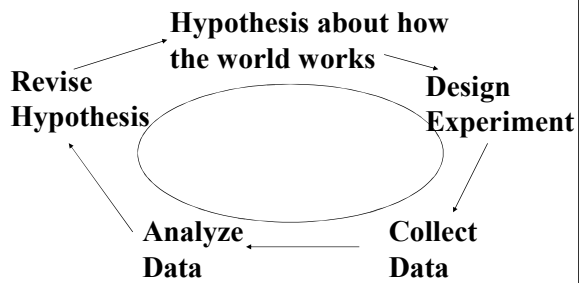
- **George Box:** The art and science of making sense out of data
- **Data** contain both “information” and “disinformation” [“sense” and “nonsense”]
- **Emphasize information and disregard disinformation**

Definitions of “Statistics”

- **R.A. Fisher:** Statistical method and scientific method are synonymous



Scientific Method = Statistical Method



Definitions of “Statistics”

- M.F. Triola (author of textbook) :
- Collection of methods for planning experiments, obtaining data, and then organizing, summarizing, presenting, analyzing, interpreting, and drawing conclusions based on the data.

More Definitions

- Data
- Population
- Census
- Sample

Data

- Collections of observations
 - ✓ Measurements, genders, survey responses, etc.
- Contain both information and disinformation
 - ✓ Learn from information
 - ✓ Discard disinformation

“Big” Data

- **Volume**
- **Velocity**
- **Variety**
 - ✓ All newspaper articles yesterday
 - ✓ All photos put on Facebook today
 - ✓ All the Tweets in the last hour
 - ✓ All YouTube videos posted last month
 - ✓ All satellite temperature data from 2013

Population

- **More general than the way we usually use the word**
- **A complete collection of all elements to be studied**

Populations are collections of Measurements or Values

1. Weights of all dogs in CA shelters
2. Annual fuel economy of all Toyotas registered in Sacramento
3. Grams of fat in all McDonald’s hamburgers served last year

**Populations are collections
of Measurements or Values**

4. (Future) Monthly rainfall in Sacramento for all months in the coming century

5. (Past) Monthly rainfall in Sacramento for all months during the 1900's

**Populations are collections
of Measurements**

6. (Conceptual / Abstract) Sale prices of all homes in Sacramento if they were sold in today's market

Census

- The act of observing every element in a specified population
- The set of data that results from carrying out a census
- A comprehensive "sample"

Sample

- **A subset of the elements in a specified population**
 - **Weights of 10 dogs**
 - **Fuel economies of 42 Toyotas**
 - **Fat grams in 20 hamburgers**
 - **Values of 327 homes**

Sample

- **A subset of the elements in a specified population**
 - **The fuel economy (miles per gallon) for 27 Toyotas**
 - **The monthly rainfall for 20 random years in Sacramento**
