

PSYCHOLOGICAL STATISTICS- INTRODUCTION



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Descriptive Statistics

- **Variable** - something that can vary or change
- **Dependent variable** - something we measure
- **Data** - a collection of measurements
- **Statistics** - summary descriptions of data (i.e., mean, medium, range)

Descriptive Statistics

- **Used to describe or summarize sets of data to make them more understandable**
 - **measures of central tendency**
 - **mean, median, mode**
 - **measures of variability**
 - **range, standard deviation**
 - **measures of association**
 - **correlation coefficient**

Measures of Central Tendency

- ❑ **What is the average family income above?**
- ❑ **Mean - the arithmetic average**
- ❑ **Median - the center score**
- ❑ **Mode - the score that occurs the most**

Measures of Variability

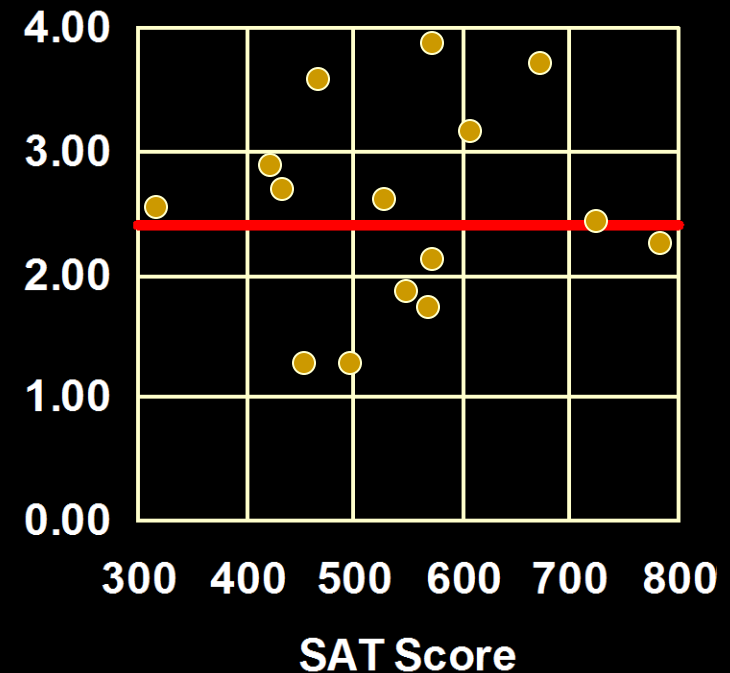
- **Range** - the difference between the highest and lowest score in a set of data
- **Standard deviation** - reflects the average distance between every score and the mean

Correlation Coefficient

- ❑ Often we measure more than one variable
- ❑ Grade point and SAT score
- ❑ Are they related?
- ❑ Correlation statistic is a way to find out

Correlation Coefficient

- Measures whether two variables change in a related way
 - Can be positive (max +1.00)
 - Negative (min -1.00)
 - Or not related! (~ 0.0)



Inferential Statistics

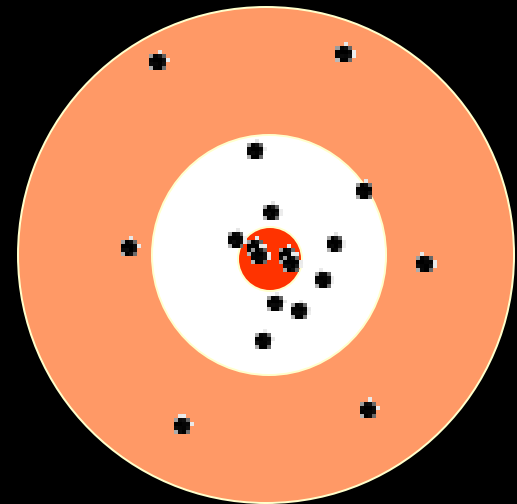
- **Descriptive statistics summarize a data set**
- **We often want to go beyond the data**
- **Is the world at large like my sample?**
- **Are my descriptive statistics misleading?**
- **Inferential statistics give probability that the sample is like the world at large**

Statistics and Probability

- **Probability means how likely something is**
- **How likely are results like mine to occur by chance?**
- **Statistical inferences**
 - **significant result - reflects the real world rather than chance, with high probability (e.g., $> .95$)**
 - **not significant - results reflect chance**

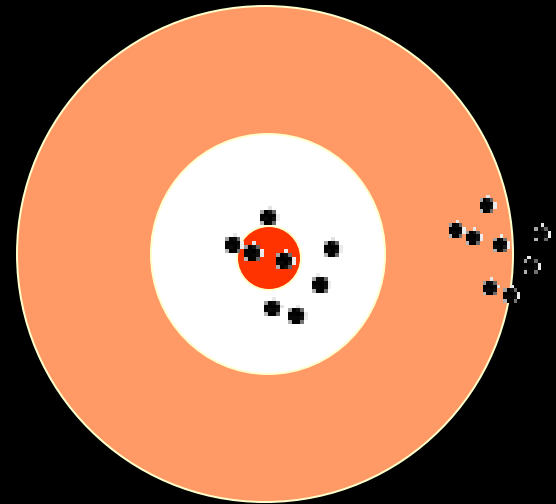
Measurement Errors

- **Why is inference based on probability instead of certainty?**
- **Data can be misleading because of variability**
 - **low variability**
 - **high variability**



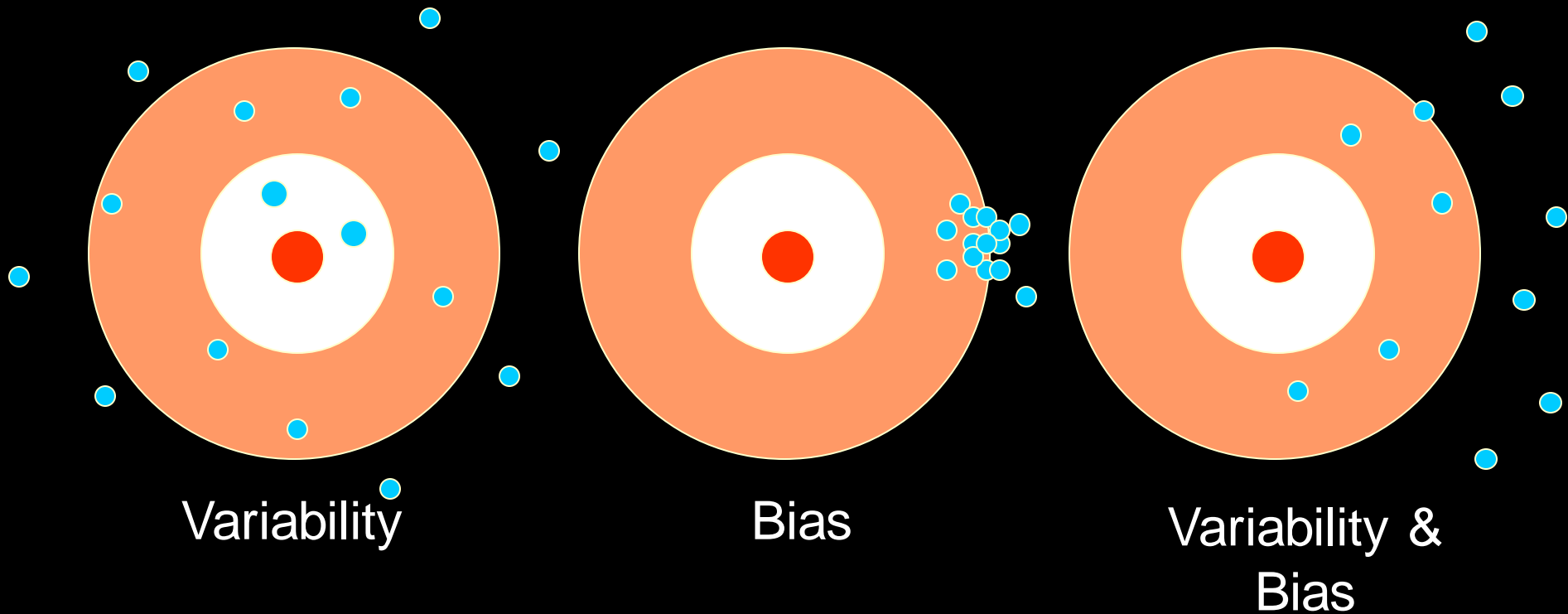
Measurement Errors

- **Why is inference based on probability instead of certainty?**
- **Data can be misleading because of bias**
 - **low bias**
 - **high bias**



Measurement Error

□ **Variability and bias can combine**



Sources of Bias

- **Biased sample - when the members of a sample differ in a systematic way from the larger population the researcher is interested in**
- **Example**
 - **interested in all voters**
 - **contact by telephone**
 - **biased sample - lower economic groups may not own telephones**

Sources of Bias



- ❑ **Observer-expectancy effect**
 - ❑ **researcher has expectations that influence measurements**
- ❑ **Subject-expectancy effect**
 - ❑ **subject knows design and tries to produce expected result**
- ❑ **Blinding**
 - ❑ **minimize expectancy by removing knowledge about experimental conditions**

Blinding



- **Single-blind study** - when subjects are kept uninformed as to the treatment they are receiving
- **Double-blind study** - when both subjects and experimenter are kept uninformed about aspects of the study that could lead to differential expectations

Ethical Issues in Psychological Research

- Right to privacy**
- Informed consent**
 - use of deception**
- Animal rights**
 - Is there justification for discomfort or harm a research procedure may produce?**
- APA publishes ethical guidelines**