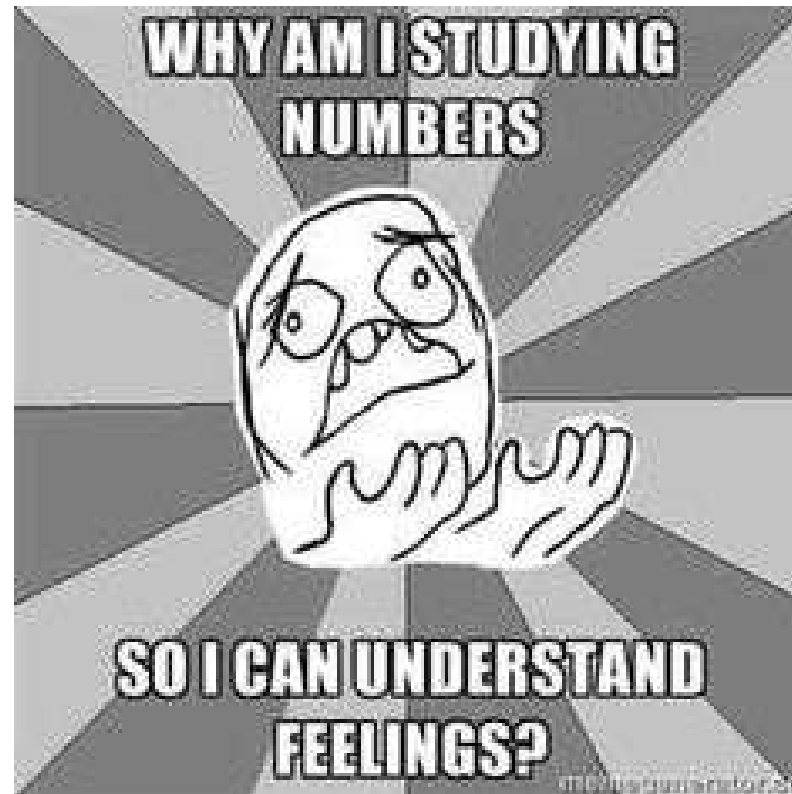


Statistics

Use of mathematics to ORGANIZE, SUMMARIZE and INTERPRET numerical data. Needed to help psychologists draw conclusions.



Descriptive v. Inferential Statistics

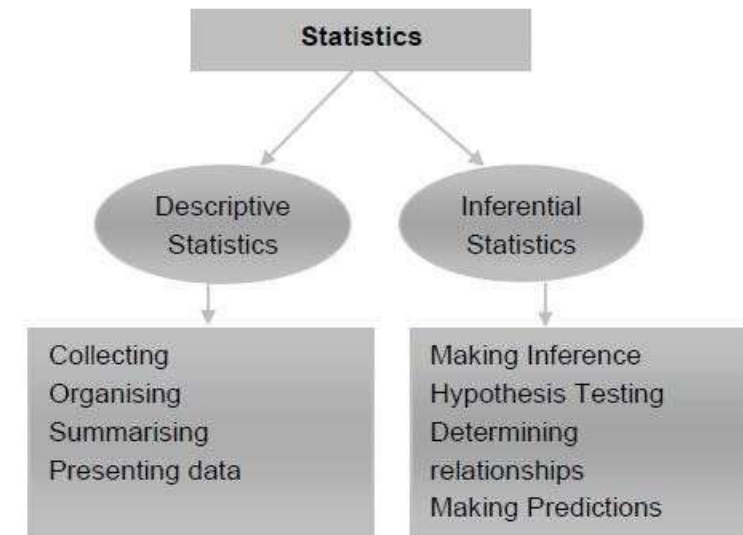
Descriptive- organize and summarize data

Central tendency and variation

Histogram- bar graph depicting frequency distribution

*Have to read the vertical scales and note range

Inferential- interpret the data and draw conclusions



Descriptive Statistics

Measures of Central Tendency:

Mean-Arithmetic average

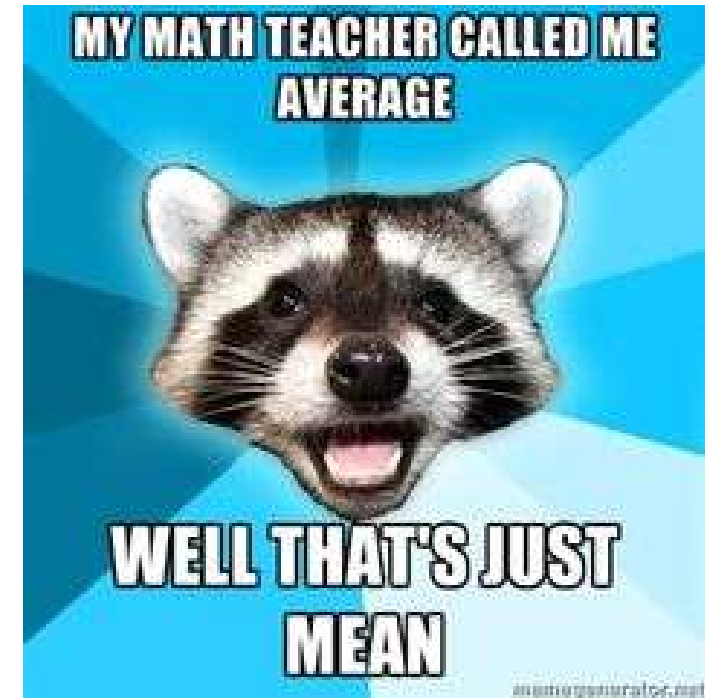
Add all and divide by # of scores

Most useful but very sensitive to extremes

Median- Middle score in a distribution

Put in order from lowest to highest

Mode- Most frequently occurring score

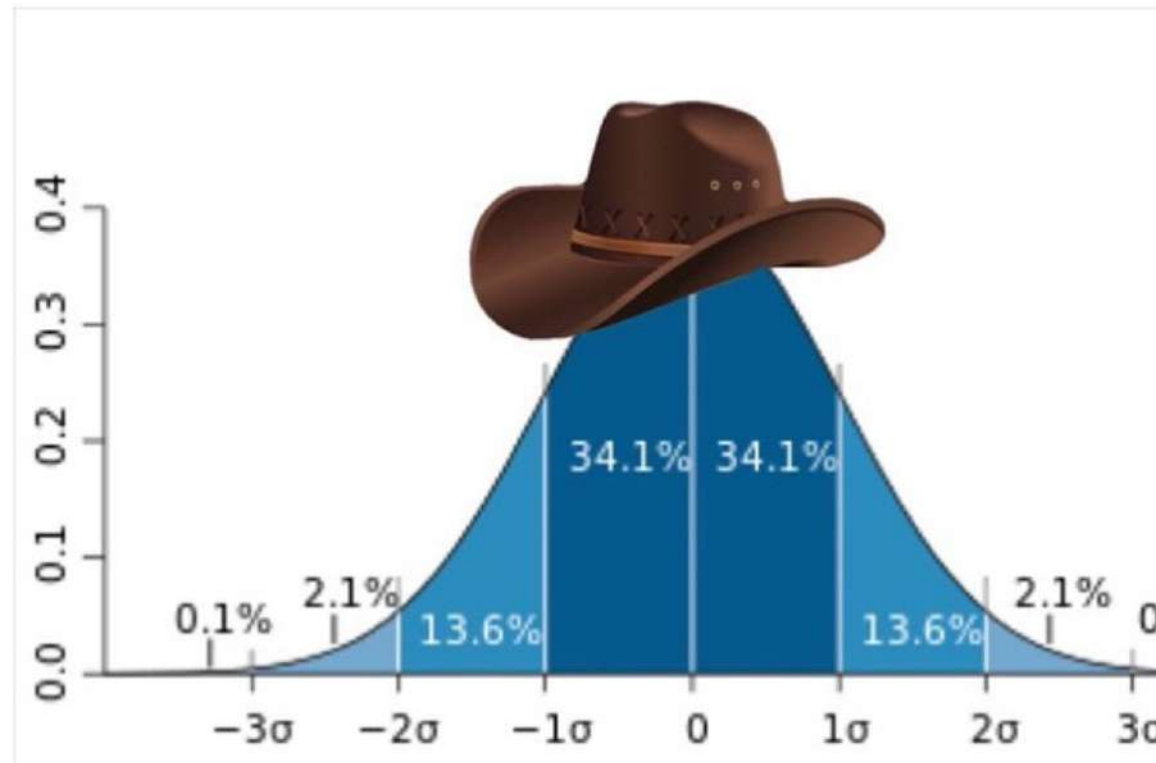


Descriptive Statistics

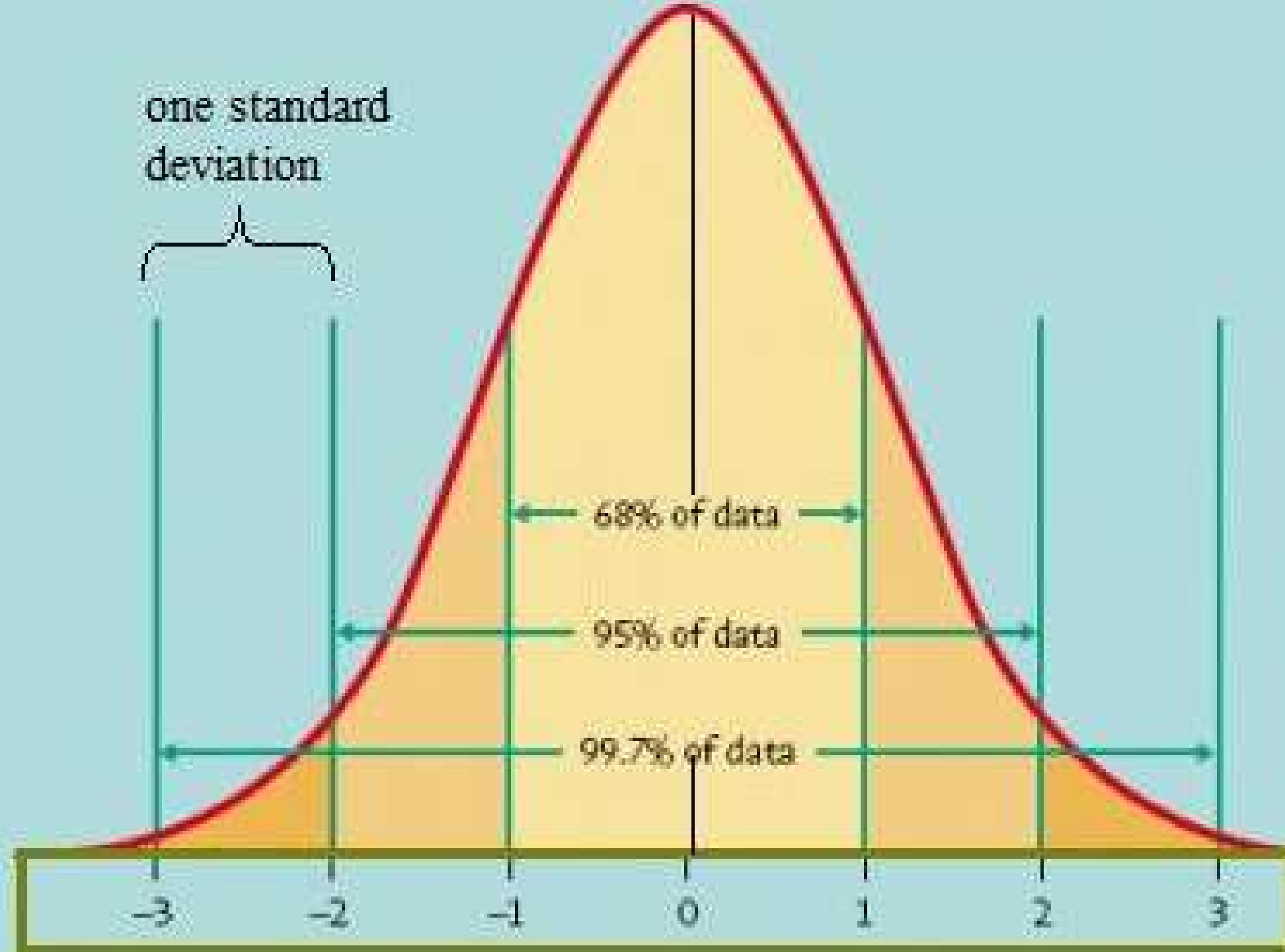
Variability- how much the scores in a data set vary from each other (range) and from the mean

Standard Deviation- index of the amount of variability in a set of data

what in standard deviation



one standard deviation



Find the mean, median, mode, range!

5, 10, 8, 5, 12, 19, 2, 3, 7, 5

Descriptive Statistics

Correlation- exists when two variables are related to each other

CORRELATION DOES NOT EQUAL CAUSATION!!!!

Correlation coefficient- numerical index of the degree of relationship between two variables (-1.00 to +1.00)

Direction (+/-) and strength

Scatterplots

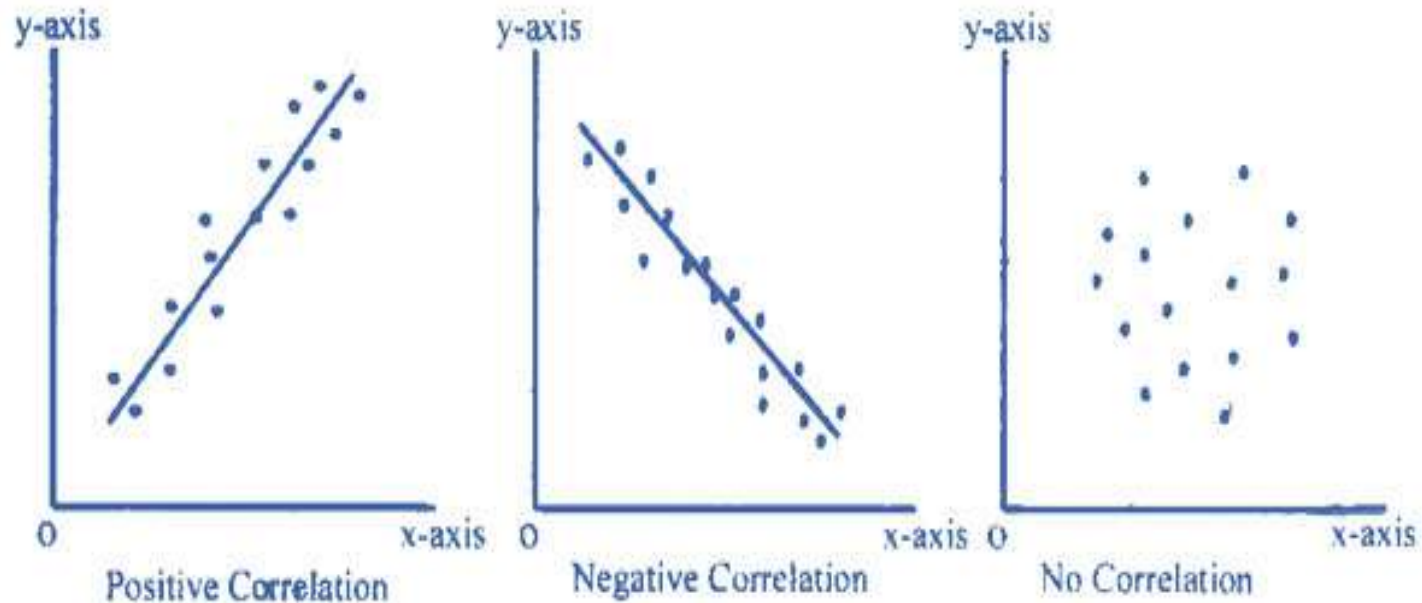
Descriptive Statistics

Positive Correlation- 2 variables co-vary in the same direction

High scores on variable X are associated with high scores on variable Y

Negative Correlation- 2 variables co-vary in the same direction

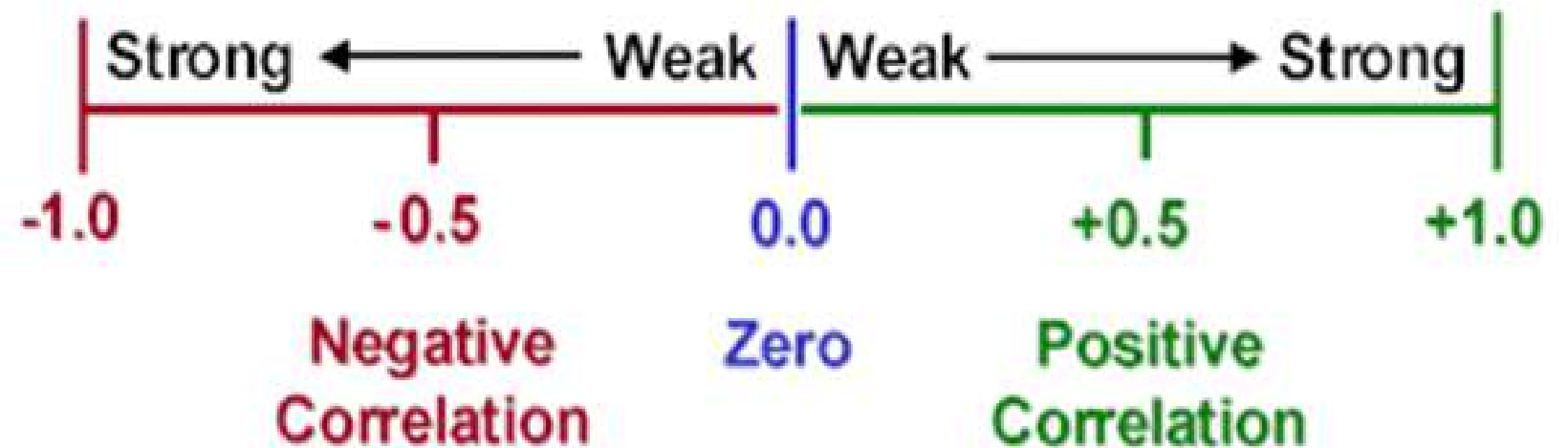
High scores on variable X are associated with low scores on variable Y



Descriptive Statistics

Correlation Coefficient Shows Strength & Direction of Correlation

0= NO relationship
-1.00 or +1.00= perfect



As correlation increases in strength, the ability to predict 1 variable based on knowledge of other variable increases

Practice AP Exam Question

Which of the following correlation coefficients most likely represents the relationship between the length of sleep deprivation and level of alertness?

- A. 1.35
- B. .85
- C. .01
- D. -0.4
- E. -1.25

Inferential Statistics

Statistically significant- indicates that research results are NOT likely due to chance. The pattern found in a sample **likely generalizes** to the broader population of interest that is being studied.

Probability that the observed findings are due to chance is very LOW

$$p < .05$$

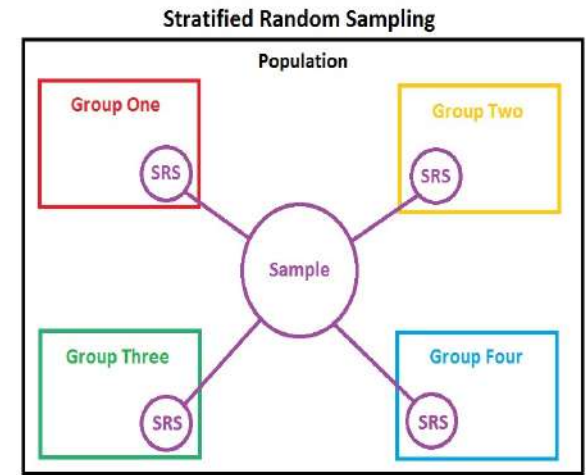


A researcher studying the effect of noise level on concentration randomly assigns student participants to either a noisy room or a quiet room to take a problem solving test. The researcher subsequently compares the two groups' test scores and concludes $p=0.05$.

The researcher's conclusion that $p=.05$ most likely indicates

- A that the difference in the two groups' scores is likely due to chance
- B that a loss of concentration is common among students
- C the presence of a confounding variable
- D that the difference between the two groups is statistically significant
- E that noise has no effect on concentration

Evaluating Research



Research is not 100% free from error 😞

Need replication to help identify and purge errors

Sampling Bias- Sample is not representative of population (Random, Stratified)

Placebo effect- participants expectation leads them to experience some change even when receiving fake, empty or ineffectual treatment

Self-Report Bias- Subjects verbal accounts can show distortion

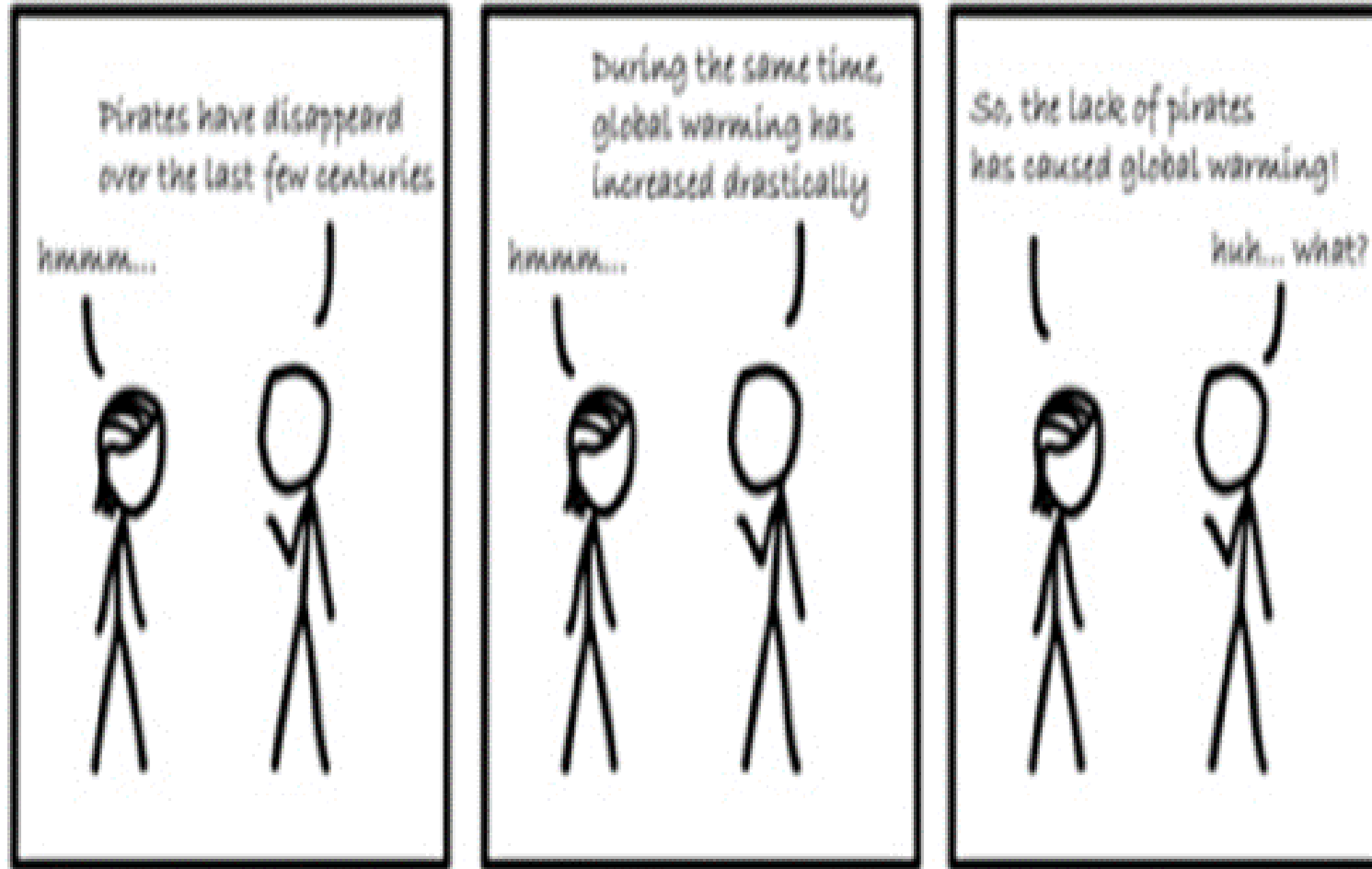
Social desirability bias- tendency to give socially approved answers

Misunderstanding questions, wording, memory error, **response set**

Experimenter Bias- researchers expectations/preferences about outcome influence the results (unintentionally)

Double Blind Procedure- experimenter and subjects in the dark about which subjects are experimental or control group

Correlation



Homework!

- 1- Read 55-64 if you did not already 😊
- 2- Look over my PPT on my website “Statistics” Take notes!
- 3- Complete handout