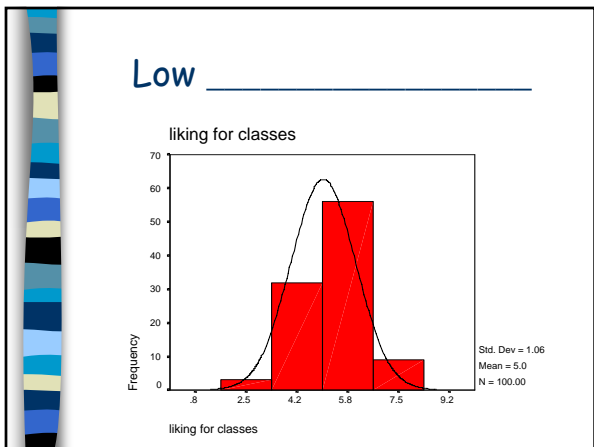
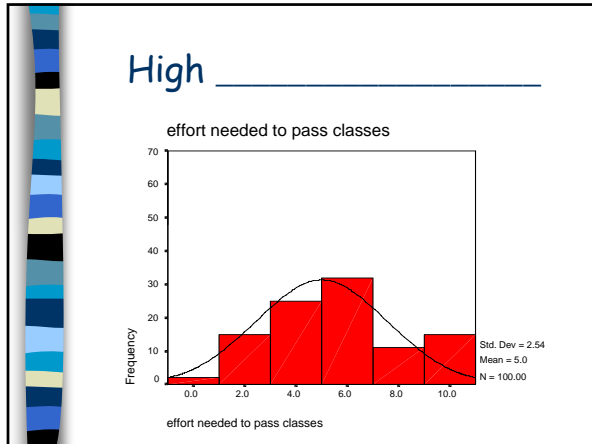


Variability

The degree to which scores in a distribution are spread out or clustered together







Why Is It Important?

- The basis of most _____
 - How much the variation in scores of one variable can be explained by variation of scores of other variables


_____ of
Variability




- Difference between the upper real limit of the largest value and the lower real limit of the smallest value
- Formula: $URL X_{max} - LRL X_{min}$
- Pro: Quick and easy
- Con: Not always accurate




- The range covered by the middle 50% of the scores
- Formula: $Q3 - Q1$
Score at the 75th percentile – Score at the 25th percentile
- Pro: Not vulnerable to outliers
- Con: Only accounting for half of all scores



- The distance of a given score from the mean
- Formula: $X - \mu$
- Pro: Accounts for all scores
- Cons:
 - Involves more steps
 - Not a summary score of variability




- The sum of the **squared** deviation scores
- Remember: a negative number squared becomes a positive number (e.g., $-3^2 = 9$)
- Pro: Summarizes deviation scores
- Con: Too large (will resolve this later)
- Two options for SS formulas...



_____ **Formula**

- $SS = \sum(X - \mu)^2$
- Steps in calculation:
 1. Find the mean (μ)
 2. Find all deviation scores ($X - \mu$)
 3. Square all deviation scores ($X - \mu$)²
 4. Add the squared deviation scores $\sum(X - \mu)^2$
- Preferred method for getting SS
 - Many calculations in PSY 301 are based on this formula



_____ **Formula**

- $SS = \sum X^2 - \frac{(\sum X)^2}{n}$
- Steps in calculation:
 1. Square all scores (X^2), then add them up ($\sum X^2$)
 2. Add all scores ($\sum X$), square the sum ($\sum X$)², then divide by (n)
 3. Find the difference between the outcomes of Step 1 and Step 2
- Pros
 - Don't need the mean
 - Less complicated if working with decimals
