

## Variance & Standard Deviation



---

---

---

---

---

---

---

---

- Average value of the squared deviation scores
  - Typical distance of scores from the mean
- How is an average obtained?
  - Sum of scores ÷ Number of scores
- Variance ( $\sigma^2$ ) =  $SS \div N$ 
  - Can use either Def. of Comp. Formula for SS
  - Used to obtain \_\_\_\_\_

---

---

---

---

---

---

---

---

## Problem

- By squaring the deviation scores, we are exaggerating the distance from the mean
- How do we correct it?
  - How do you reduce a squared value?
  - \_\_\_\_\_
- \_\_\_\_\_ ( $\sigma$ ) =  $\sqrt{\text{Variance}}$ 
  - Conversely, Variance =  $SD^2$

---

---

---

---

---

---

---

---

## Sample Estimates

- Problem: Samples are almost always less variable in scores than the population
- Thus, our variance statistic is always \_\_\_\_\_ the population parameter
- Need to make a correction in the formula
  - Where should it take place?

---

---

---

---

---

---

---

---

## Long Story Short...

- Sample \_\_\_\_\_ ( $s^2$ )  
=  $SS \div (n - 1)$ 
  - Sometimes shortened as  $SS \div df$
- Sample \_\_\_\_\_ ( $s$ )
  - Still  $\sqrt{\text{variance}}$ , but use the sample variance

---

---

---

---

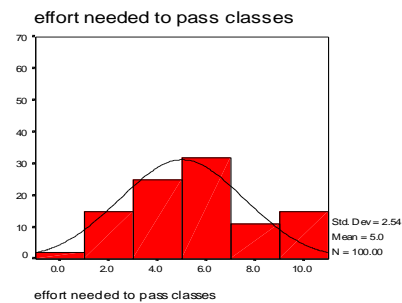
---

---

---

---

## Factors That Affect




---

---

---

---

---

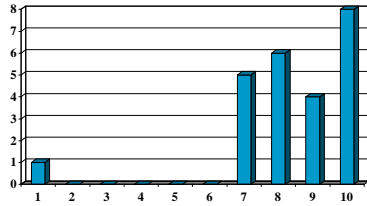
---

---

---

## Extreme Scores

- All indicators affected except the *IQR*
- Exclude cases if you have a good reason
- Interpret Variance and SD carefully




---

---

---

---

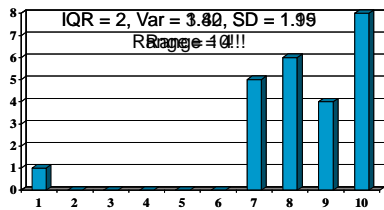
---

---

---

---

- Each additional score can potentially be the highest or lowest
- Range greatly affected (not good)




---

---

---

---

---

---

---

---

## Under Sampling

- Similar samples → similar scores (stability)
  - If taken from the same population
- Most stable with variance and SD (good)
  - Because they take all scores into account

---

---

---

---

---

---

---

---



### Distributions

- No specific boundary for the highest or lowest score
  - Ex. P's unable to complete task
- Can't obtain anything but the *IQR*

---

---

---

---

---

---

---

---



### Review of Formulas

- Population Variance
  - $SS \div n$
- Population Standard Deviation
  - $\sqrt{\text{population variance}}$
- Sample Variance
  - $SS \div (n-1)$
- Sample Standard Deviation
  - $\sqrt{\text{sample variance}}$

---

---

---

---

---

---

---

---