

# How Much Do Fans Love Justin Timberlake? Day 1

Justin Timberlake's concert promoter wants to find out how much fans enjoy the concerts. He will ask fans, "From 1 to 100, where 100 is the most, how much did you enjoy the concert?" The section he wants to survey has 50 seats (5 rows x 10 columns). The stage runs along the northern edge of the venue (where Justin is pictured). He wants to take a sample of 10 seats.

## 1. Method #1:

Take a simple random sample (SRS) of 10 fans. Explain below the steps you used to obtain an SRS.



			X			X		X	
			X		X				X
	X								
				X			X		

Label all seats 1-50.  
 RNG(1,50) for 10 unique numbers.  
 Select the corresponding seats.

## 2. Method #2:

Randomly choose 2 fans from each horizontal row.

Start with first row.  
 Label seats 1-10.

RNG(1,10) for 2 unique numbers.  
 Select the seats.

Repeat with every row.



					X			X	
X				X					
	X					X			
					X				X
					X			X	X

## 3. Method #3:

Randomly choose 1 fan from each vertical column.

Start with first column.  
 Label seats 1-5.

RNG(1,5) for 1 number.  
 Select seat.

Repeat with every column.



X									
				X			X		
		X	X		X				
	X							X	X
						X			

## 4. Which method do you think is best? Why?

The rows because the row your seat is in affects how much you like the show.

Answers will vary.

5. Now, it's time for the actual data. For each of your samples on the previous page, calculate the average enjoyment. Add your average to the dotplots on the board.

*Answers will vary.*

Sample #1:  $\frac{+ + \dots + +}{10} = \bar{X}$

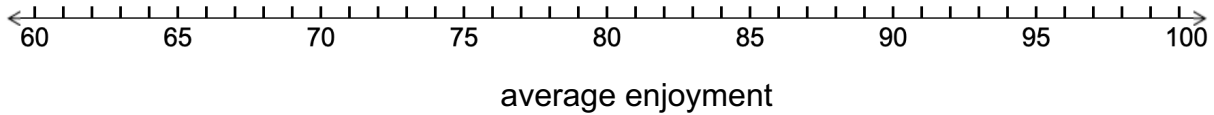
Sample #2:  $\frac{+ + \dots + +}{10} = \bar{X}$

Sample #3:  $\frac{+ + \dots + +}{10} = \bar{X}$

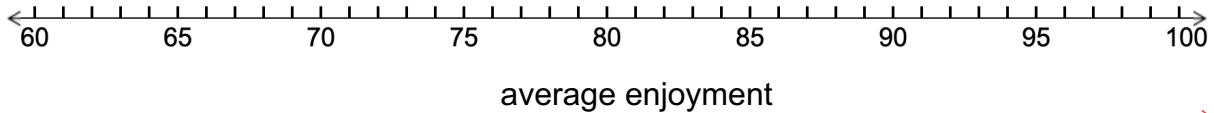


92	89	90	88	95	10	98	93	95	84
82	86	90	88	86	91	90	89	85	83
80	74	80	67	81	82	76	77	74	65
72	68	74	73	70	69	72	70	68	67
69	67	68	68	64	66	63	63	70	68

**Method #1: SRS**

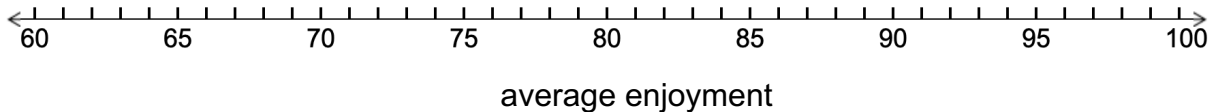


**Method #2: Stratify by Row**



*least variability*

**Method #3: Stratify by Column**



*\*Choose strata based on characteristics that may affect responses.*

## Other Random Sampling Methods Day 1

### Important Ideas:

- Stratified Random Sample: splits population into groups (strata) and chooses an SRS from each group.
- Cluster sampling: split population into groups based on location (clusters) and randomly select clusters. Sample everyone in cluster.

Simple Random Sample:  
Choosing a group from the population so that every individual and group of individuals has an equal chance of being chosen.

- Steps for taking an SRS

- ① Label
- ② Randomize
- ③ Select

### Check Your Understanding:

A factory runs 24 hours a day, producing wood pencils on three 8-hour shifts— day, evening, and overnight. In the last stage of manufacturing, the pencils are packaged in boxes of 10 pencils each. Each day a sample of 300 pencils is selected and inspected for quality.

1. Describe how to select a stratified random sample of 300 pencils. Explain your choice of strata.

Strata: For each shift (day, evening & overnight) choose 100 pencils. ① Label all pencils 1 to N.  
② Randomly choose 100 different numbers. RNG(1, N).  
③ Select the 100 pencils.  
Repeat for all shift.

2. Describe how to select a cluster sample of 300 pencils. Explain your choice of clusters.

Cluster: Boxes are the clusters. ① Label every box 1 to N. ② Randomly choose 30 different numbers. RNG(1, N). ③ Check all boxes in 30 boxes.

3. Explain a benefit of using a stratified random sample and a benefit of using a cluster random sample in this context.

Stratified: We get 100 from every shift so we get a more precise estimate.

Cluster: simplifies process. We don't have to label every pencil, just every box.