

Warm Up

- Jane earned a 90 on her math exam, and a 78 on her French test. The average score on the math exam was an 83, with standard deviation 2. The average score on the French test was a 66, with standard deviation 3. Relative to her classmates, on which exam did she do better? Explain your answer.

Day 4: Bias

Unit 1: Statistics

Today's Objectives

1. Discuss the Types of Bias when sampling
2. Determine if Questions are potentially Biased and rewrite them

Types of Bias in Survey Questions

Bias occurs when a sample systematically favors one outcome.

1. Question Wording Bias

occurs when the question pushes survey participants towards a certain answer.

For example, In a survey, participants were asked, “How interested are you in the world’s most popular sport, soccer?”

2. **Undercoverage bias** occurs when the sample is not representative of the population.

3. **Response bias** occurs when survey respondents lie or misrepresent themselves.

4. **Nonresponse bias** occurs when an individual is chosen to participate, but refuses.

5. **Voluntary response bias** occurs when people are asked to call or mail in their opinion.

Name that bias!

On the twelfth anniversary of the death of Elvis Presley, a Dallas record company sponsored a national call-in survey. Listeners of over 1000 radio stations were asked to call a 1-900 number (at a charge of \$2.50) to voice an opinion concerning whether or not Elvis was really dead. It turned out that 56% of the callers felt Elvis was alive.



Voluntary response bias

Name that bias!

In 1936, *Literary Digest* magazine conducted the most extensive public opinion poll in history to date. They mailed out questionnaires to over 10 million people whose addresses they had obtained from telephone books and vehicle registration lists. More than 2.4 million people responded, with 57% indicating that they would vote for Republican Alf Landon in the upcoming Presidential election. However, Democrat Franklin Roosevelt won the election, carrying 63% of the popular vote.

Undercoverage bias

Group Work:

Biased or Unbiased Survey Questions

- Work in your groups to determine the survey sample is biased or unbiased. Explain your reasoning and be prepared to share with the class.

Why is this question biased?

Do you think the city should risk an increase in pollution by allowing expansion of the Northern Industrial Park?

Can you rephrase it to remove the bias?



Why is this question biased?

If you found a wallet with \$100 in it on the street, would you do the honest thing and return it to the person or would you keep it?

Can you rephrase it to remove the bias?



Group Work: Potentially Biased?

- Work with your group to determine whether each question is potentially biased. Explain your reasoning.
- If the question is potentially biased, rewrite it so that it is not.