



Unit 1 Day 4

Biased or Unbiased in Sampling



Bias in Sampling



- ▶ **Sampling bias:** a sample is collected in such a way that some members of the intended population are less likely to be included than others.

Bias in Sampling

- ▶ Sampling Bias refers to the method of sampling.
- ▶ There is no guarantee that random sampling will result in a sample representative of the population
- ▶ If the sample is biased, the results of the study/experiment will also be biased, or slanted in a particular direction.
- ▶ This makes the results faulty, as well as any predictions based on the results.

Types of Bias in Sampling

- 1) Under-coverage bias
- 2) Non-response bias
- 3) Response bias
- 4) Question wording bias
- 5) Voluntary response bias

Undercoverage Bias



Occurs when some members of the population are inadequately represented in the sample.

Non-response Bias



When individuals chosen for the sample are unwilling or unable to participate in the survey.

Response Bias



People answer but they give false or misleading answers to questions

Question Wording Bias



- ▶ **Wording is confusing or misleading!**
- ▶ **Example: "Cigarettes cause lung cancer. Would like your child to smoke cigarettes?"**

Voluntary Response Bias



Occurs when sample members are self-selected volunteers.

Bias

A Gallup poll sponsored by the disposable diaper industry asked “It is estimated that disposable diapers account for less than 2% of the trash in today’s landfills. In contrast, beverage containers, third-class mail, and yard waste are estimated to account for about 21% of the trash in landfills. Given this, in your opinion, would it be fair to ban disposable diapers?”

Which type of bias does this poll suffer from?

- a) Under-coverage bias
- b) Non-response bias
- c) Response bias
- d) Question wording bias
- e) Voluntary response bias

Bias (answer)

A Gallup poll sponsored by the disposable diaper industry asked “It is estimated that disposable diapers account for less than 2% of the trash in today’s landfills. In contrast, beverage containers, third-class mail, and yard waste are estimated to account for about 21% of the trash in landfills. Given this, in your opinion, would it be fair to ban disposable diapers?”

Which type of bias does this poll suffer from?

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- c) Response bias
- d) **Question wording bias**
- e) Voluntary response bias

Bias

Using a local telephone book to select a simple random sample could introduce what type of bias?

- a) Under-coverage bias
- b) Non-response bias
- c) Response bias
- d) Question wording bias
- e) Voluntary response bias

Bias (answer)

Using a local telephone book to select a simple random sample could introduce what type of bias?

- a) **Under-coverage bias**
- b) Non-response bias
- c) Response bias
- d) Question wording bias
- e) Voluntary response bias

Re-write the following questions to remove the bias

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

Re-write the following questions to remove the bias

- ▶ 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?

Classwork

Are these samples representative?

1. To determine the percentage of teenage girls with long hair, *Teen* magazine published a mail-in questionnaire. Of the 500 respondents, 85% had hair shoulder length or longer (*USA Today*, July 1, 1985).

No; only teenagers who read *Teen* and choose to write would respond. This does not represent all teens

2. A college psychology professor needs subjects for a research project to determine which colors average American adults find restful. From the list of all 743 students taking introductory psychology at her school, she selects 25 students using a random number table.

No; the sample only includes students. Students are most likely young, and would not be representative of “average American adults”, which should include all age groups