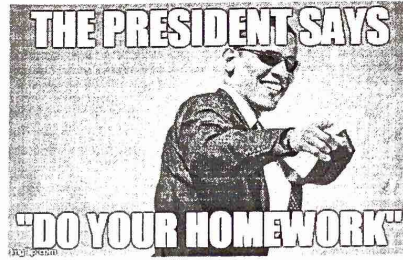


### Lesson 4.1: Day 3: What is wrong with these surveys?



Identify what is wrong in each of these surveys. Be sure to explain.

1. The mayor of Springfield is interested in finding out the average age of people in the city. He obtains a list of all of the landline telephones in the city, and then contacts a simple random sample of 300 people. He uses the data from the sample to estimate the average age of all the people in the city.

*Undercoverage*

a. What is wrong with this survey?

*He is only contacting people with land line phones. People without landlines aren't surveyed.*

b. Do you think the Mayor will over or underestimate the true mean age of people in Springfield? Why?

*Overestimate. Usually people with land line phones are old.*

2. The administration at a school wants to know the proportion of students that did all of their homework last night. They select a simple random sample of 100 students and send an email to each of them asking if they did all of their homework last night. Of the 40 responses, 36 of the students said that they did all of their homework last night (90%).

*Nonresponse  
Response bias*

a. What is wrong with this survey?

*Only 40 of the 100 responded*

b. Do you think the administration will over or underestimate the true proportion of students who did all of their homework last night? Why?

*Overestimate. Students might lie because the admin is asking. Or they might not respond if they didn't do it.*

3. Boy Scout Peter M. wants to know the proportion of people in his neighborhood who support the Boy Scouts. He takes a random sample of 30 homes and visits them dressed in his uniform.

*Response Bias*

a. What is wrong with this survey?

*He is influencing responses. People don't want to tell him they don't support boy scouts because they know he is one.*

b. Do you think Peter will over or underestimate the true proportion of his neighbors who support the Boy Scouts? Why?

*Overestimate, people may say they support boy scouts even if they don't. because of him.*

## Lesson 4.1: Day 3: Sample Surveys: What else can go wrong?

Big Ideas:

**Undercoverage:** When some members of the population cannot or are less likely to be chosen.

Ex: land lines

**Nonresponse:** When an individual is selected to be in a sample but chooses not to participate or isn't reached.

\* Different from

voluntary response \*

**Response Bias:**

Pattern of inaccurate responses. Could be due to wording, interviewer, lying, etc.

### Check Your Understanding:

1. Each of the following is a possible source of bias in a sample survey. Name the type of bias that could result.

(a) The sample is chosen at random from a telephone directory.

Undercoverage, only people with numbers in the phone directory can be chosen.

(b) Some people cannot be contacted in five calls.

Nonresponse, some of the sample can't be reached, so they don't respond.

(c) Interviewers choose people walking by on the sidewalk to interview.

Convenience sample, all the people on the sidewalk could have some commonality.

2. A survey paid for by makers of disposable diapers found that 84% of the sample **opposed banning** disposable diapers.

Here is the actual question: "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 wastes 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?"

Do you think the estimate of 84% is less than, greater than, or about equal to the percent of all people in the population who would oppose banning disposable diapers? Explain your reasoning.

84% is likely greater. The wording of the question makes it sound like diapers are not a problem in landfills. The question is leading.

Be careful with this. It means they think diapers should be allowed to be disposable.