

Factors Affecting Data Collection

Focus on...

After this lesson, you will be able to...

- identify how bias, use of language, ethics, cost, time and timing, privacy, and cultural sensitivity may influence the collection of data
- write and analyse appropriate survey questions



A Super Food employee provides samples of Bob Brat Sausages to customers between 5:00 p.m. and 5:30 p.m. for one day.

Store employees asked customers who buy Bob Brat Sausages the following question.

Did you buy Bob Brat Sausages because they are delicious, quick to prepare, or both delicious and quick to prepare?

The table shows the results from the survey.

Bob Brat Sausages	
Delicious	+++
Quick to prepare	
Both delicious and quick to prepare	+++

A few weeks later, a store flyer made this advertising claim.

Over 90% of shoppers love Bob Brat Sausages because they taste great and save time!

What factors might have influenced the survey responses? How accurate do you think the advertising claim is? Explain.

Literacy Link

A *survey* is used to collect opinions and/or information.

Literacy Link

An advertising claim gives information about the performance of a product or service. The claim is designed to encourage you to buy. The claim may be true, false, or a little of both.

Explore Factors That Affect Survey Responses

1. From the store's point of view, did Super Foods promote Bob Brat sausages well? Explain.
2.
 - a) Did the survey ask a fair question? Explain your reasoning.
 - b) Did the survey sample represent the whole population of shoppers? Explain.
3. Some people who read the flyer said the advertisement was misleading. Do you agree with them? Explain why or why not. Discuss your ideas with your group.

Reflect and Check

4. Imagine you are hired as the store's public relations consultant.
 - a) What factors do you need to address to make the data collected about the sausages more accurate?
 - b) Develop a survey question you would ask about Bob Brat Sausages. Who would you ask?

Link the Ideas

Several *influencing factors* affect how data are collected or how responses are obtained.

These include:

- *bias*: Does the question show a preference for a specific product?
- *use of language*: Is the question presented in such a way that people understand what is being asked?
- *ethics*: Does the question refer to inappropriate behaviour?
- *cost*: Does the cost of the study outweigh the benefits?
- *time and timing*: Does the time the data were collected influence the results? Is the timing of the survey appropriate?
- *privacy*: Do people have the right to refuse to answer? Are the responses kept confidential?
- *cultural sensitivity*: Might the question offend people from different cultural groups?

Literacy Link

Ethics involves judgments of right and wrong. For example, cheating on a test is wrong.

Example 1: Identify Factors Affecting Data Collection

Helen and Andre are reviewing the data collection methods used by a marketing company. For each situation, help them identify any influencing factors. Explain your reasoning.



- a) A sales representative stands in front of a display of different kinds of toothpaste. He asks every person buying toothpaste the following question.
- b) Free samples of sunscreen are sent to every home in fall and winter. A mail reply card asks people if they would use the product again.
- c) A grocery store employee conducts a telephone survey of people living within 10 km of the store. To help determine what meat products to sell, she asks what type of red meat people prefer.
- d) A sales representative conducts a telephone survey. As she poses the question, a person receiving the call says, “I am not interested, thank you.” The sales representative responds, “Why not? Your input provides useful information.” She begins to repeat the survey question.
- e) Your school is under construction and is quite dusty and dirty. A survey is conducted about the environmental health of your school. The survey is done every four years.
- f) A sales representative sets up an online survey. The survey offers a free MP3 file of a song that was downloaded from the Internet to everyone who completes the survey. The company has not bought the rights to the song.

What is your favourite brand of toothpaste? For what reason(s)?

Solution

- a) There is no bias. Standing in front of a toothpaste display allows the sales representative to survey people who are buying toothpaste.
- b) Fall and winter sun is less intense than spring and summer sun. People may be less likely to wear sunscreen during fall and winter. Therefore, these seasons are not likely the best choice for testing sunscreen. Sending sunscreen products during fall and winter is very costly for the company. In addition, asking people if they would use the product again assumes that they did use it. This may confuse people who have not tested the product. The language is unclear.
- c) The question is biased. It assumes that all people eat red meat, which is not true. Red meat is not acceptable to some people. For these people, this may be a culturally sensitive question.
- d) The sales representative does not respect the individual’s right to refuse to participate in the survey. In addition, any responses obtained under pressure may not truly represent the person’s opinion.
- e) This survey is poorly timed. When a school is under construction, some routines may be disturbed. People may express frustration with the temporary changes. This would reflect in a negative way on the survey.

- f) Offering a reward to participants in the survey is ethically wrong. In addition, it is not ethical to download music from the Internet without buying it. When people do this, musicians are not being paid for their work.

Show You Know

A marketing firm displayed two sports shirts at a grades 7 to 12 school with 800 students. The first ten grade 12 students who entered the school were asked the following question.

Which one of these two sports shirts would you buy?

A week later, the firm gave this flyer to the student council.

What factors might have affected the data collected and the company's conclusions? Explain.

Over 78% of students at Central High will buy Shirt B.



Example 2: Write Survey Questions Free of Influencing Factors

A steel milling company conducts a survey.

- a) Does the survey question influence the results? Explain.
b) Rewrite the question so that it is free of influencing factors.

The proposed mill will produce 250 jobs and economic benefits for your community. Are you in favour of having a forward-thinking steel mill in your community? YES NO

Solution

- a) Yes, the wording in the question may lead people to answer in a specific way. It implies that due to the economic benefits the company can offer, people should vote in favour of the mill.
b) A better way to ask the question is, "Are you in favour of having a steel mill in your community?"

Show You Know

For each situation, explain whether the question has influencing factors. If it does, rewrite the question.

- a) Daniel is studying the population of polar bears in eastern Hudson Bay. He drafts the following question.

Do you think the senseless slaughter of polar bears should be stopped? YES NO

- b) A recent study shows that 45% of Canadians are using the Internet to shop. Amy develops the following question for a class survey.

What kinds of products and services do you buy online?

Key Ideas

- Survey questions should be worded so they are free from factors influencing the responses.

The survey questions ask about purchases made at a school cafeteria.

1. Do you buy food at the school cafeteria? YES NO
2. If you responded NO, what reason best explains why you do not buy food at the cafeteria? Circle one.
A The quality of the food is poor.
B I do not like the food choices.
C The cafeteria is in an inconvenient location.
D The prices are too high.
E Other (Please explain.) _____

- Influencing factors include bias, use of language, ethics, cost, time and timing, privacy, and cultural sensitivity.

Which box shows better survey questions? Why?

1. In the past year, how many times did you buy food items at the cafeteria? _____

1. In the past week, did you buy any food items at the cafeteria? YES NO
2. If you responded YES, how many times did you buy each of the following food items?
soup or salad _____ main course _____ drink _____ snack _____

Check Your Understanding

Communicate the Ideas

1. Your friend is unclear what the term *bias* means. Develop an example to help explain the term.
2. Explain how influencing factors affect the collection of data. Give an example.
3. Shunta and Susan are discussing how to choose the top five lunch specials for the cafeteria menu. Each develops a different survey question. They decide to survey all the students.

Shunta:

What are your top five favourite lunch specials?

Susan:

Which are your top five favourite lunch specials from this menu? Circle your choices.

LUNCH SPECIALS	
tomato soup and salad	grilled cheese
hamburger	chicken salad sandwich
vegetable lasagna	turkey hot dog
vegetarian chili	pepperoni pizza

Which survey question do you prefer? Explain why.

Practise

For help with #4 and #5, refer to Example 1 on pages 416-417.

4. In each case, identify and describe any factors that may affect the collection of data.
- a) Survey members of the soccer team about new uniforms for the volleyball team.
 - b) At a truck rally, ask drivers what type of vehicle they prefer to drive.
 - c) Provide samples of a new granola bar at all conferences and conventions in your community. Ask people who attend the following question.

What is your favourite among the new granola bars you tried in the past month?

- d) Ask customers in a sports store the following question.

Invincible Bikes are the most sturdy and expertly designed bikes on the market. What brand will you buy?

5. For each situation, identify whether there is bias. If so, identify the bias. Then, rewrite the statement to correct it.
- a) Ask all horse owners if they are willing to pay higher horse-boarding fees.
 - b) Ask owners of horses boarded in a stable in the city centre if this location is annoying.
 - c) Ask horseback riders if they would support building a public park on the site of their stable.

For help with #6 to #8, refer to Example 2 on page 417.

6. In each case, describe the effect of any influencing factors on the collection of data. Then, write an improved survey question.

- a) A sales representative asks the following question.

Which do you prefer?
A Cola
B Diet Cola

- b) An opposition party member asks the following question.

Is the current prime minister not the best prime minister in Canadian history?
YES NO

- c) A small business develops the following question.

Do you know about the Hands-On Repair Company and the maintenance your appliances and tools need?
YES NO

- d) Jennifer asks students the following question.

What is your parents' total income?



7. Rewrite each survey question without any influencing factors.

- a) Sam asks riders of all-terrain vehicles the following question.

Do you support closing some riding trails to save some endangered animals?
YES NO

- b) A marketer surveys all the people entering a movie theatre.

Who is your favourite male movie star?
A Brad Pitt
B Keanu Reeves
C Matt Damon
D Other _____

- c) A student asks people at an airport the following question.

Do you think flying is still the cheapest way to travel a long distance?
YES NO

8. Rewrite each survey question so there are no influencing factors.

- a) Do you like to watch hockey, the only great sport?
YES NO

- b) Most people choose chocolate, but what is your favourite flavour of ice cream?

- c) A recent survey shows that 42% of teens use the Internet to watch TV. What TV shows do you watch most often online?

Apply

9. For each situation, write two different survey questions that may have resulted in each conclusion.

- a) Most juice lovers prefer apple and orange.
b) Yellow is the most popular shirt colour.
c) Four out of five doctors surveyed strongly support a healthy, natural-food diet.

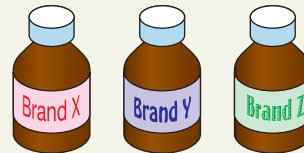
10. Write a survey question for each situation. Identify who you would ask to participate in the survey.

- a) You want to find out which sport teens like best.
b) You want to find out if price or brand is more important when buying a cell phone.
c) You want to find out which media source people trust most to give them accurate information.

11. Rewrite each survey question so that it collects more helpful data.

- a) If you are a juice drinker, would you consider switching to Crystal Juice?
YES NO

- b) Which of the following cough medicines have you tried?



- c) Would you run if you came across a moose?
YES NO

- d) Are you satisfied with your Internet access?
Circle one response.
A Excellent
B Good
C Poor

- 12.** For each case, identify the influencing factors that may affect the collection of data. Then, write a survey question that is free of influencing factors and is clearly written.
- Teens are asked about which clothing items they have bought at an expensive store in the past year.
 - The members of a golf club are asked if they are in favour of a proposed highway. It will reduce traffic jams by going through the golf course.

Extend

- 13. a)** Write two survey questions that relate to a topic of your choice, such as sports, fashion, movies, or games.
- Develop a question that contains bias.
 - Develop a different question that is free of influencing factors.
- b)** Use the first question to survey 20 friends or classmates. Use the second question to survey 20 different friends or classmates.
- c)** Compare the results. Identify the bias in the first question. Explain how its wording may have affected the results.

- 14. a)** You have been hired to develop Arctic adventure tours. Develop three survey questions to help determine the activities that appeal to tourists.
- b)** Exchange your questions with a classmate. Critique each other's questions for clarity and the presence of any influencing factors.
- c)** Based on the feedback, revise your survey questions so they are clearly written and free of influencing factors.

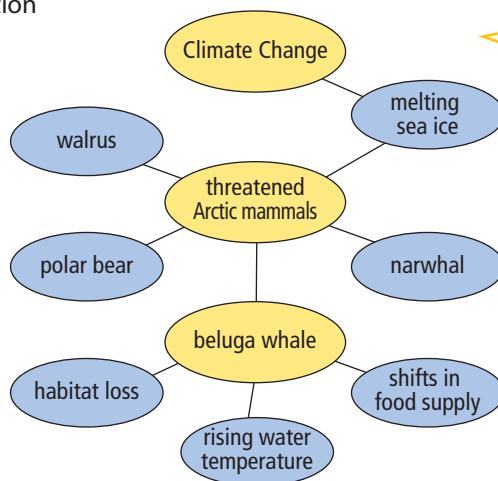


- 15.** When interpreting the results of a political poll, why is it important to know the source of the poll?

Math Link

For your research project, select a wildlife protection or management topic.

- Use a graphic organizer such as the concept map shown here to help you organize ideas for your topic. Record subtopics and connecting details and facts.
- Choose a subtopic to study.
- Consider what data you need to obtain related to your topic. Then, write three possible research questions.
- Exchange your questions with a classmate to check that they are free of influencing factors. Revise your questions if necessary.



I am interested in the effects of climate change on Arctic mammals, in particular, the beluga whale.

WWW Web Link

For information about national and provincial parks in Canada, go to www.mathlinks9.ca and follow the links.

Research Questions: How does melting sea ice threaten Arctic mammals?
Which Arctic mammals are most threatened by melting sea ice?
What are the population trends for beluga whales in Canada?