Applications in Politics and Public Policy

Connections

Have you ever…

- Tried to understand a political poll's meaning?

- Analyzed the pros and cons on a legislative bill or amendment?

- Watched TV on the night of a presidential election?

Statistics can play a large role in the laws we pass, the politicians we elect, and the decisions the government makes. Politicians use statistics to influence voters and garner support for causes. Voters use statistics to make choices in elections. Administrations use statistics to make decisions about enforcing the law.

When a government election is drawing closer, you will often see a lot of polling statistics. Polls are also used to show common behavior and public support for issues. Polls show us how attitudes change over time and in different places.

Collecting and gathering these statistics is no easy task. Pollsters don't ask everyone in the country how they will vote or what their stance is on an issue. Instead, they ask a specifically defined random sample of people.

Pollsters may weight their data to remove biases in the sample compared to the overall population. They analyze this data and draw conclusions about the overall vote. If a sample is well defined and analyzed, it can give a reliable picture of a whole group. Some of the most accurate analyses look at multiple polls to draw conclusions.

Learn It!

What Is the Data Telling You?

Understanding political and public policy data can help you make important choices about the government and your local community. To understand statistical information, **UnPAC** the problem.

The following information was gathered from polling prospective voters for an upcoming local election. Participants were asked, "Are you planning to vote in the upcoming mayoral election?" If they answered yes, participants were asked, "Which candidate do you support, Adams, Jones, or Smith?" What does the table tell you about the voting behavior of 25- to 50-year-olds?
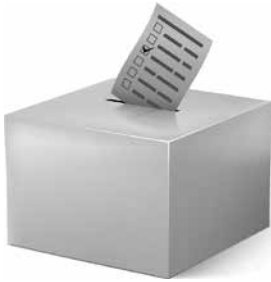
Poll of Registered Voters for Mayoral Election

Age	Likely to Vote	Of those likely to vote		
		Adams	Jones	Smith
18–24	62%	37%	40%	23%
25–50	70%	23%	37%	40%
51 & older	78%	30%	33%	37%

Un Understand

To understand issues involving polls and public policy statistics, pay close attention to what the percentages mean. Who was polled? What questions were asked? If it's an election poll, how were likely voters treated? Make sure you understand the information and can define the problem you're addressing.

?

1. What is the problem asking? What information do you have?

The question asks you to describe what the table shows for voters of the ages 25 to 50. The table shows two kinds of information for each age group. It shows the percentage of likely voters, and it shows the percentage of those likely voters who support each candidate.

P Plan

Plan your approach to the problem. Select the information that is important, and plan any calculations needed to use the data. To draw conclusions, you can look for patterns in the data. Do numbers generally go up or down? Are they higher or lower than other groups?

?   **2.** What information from the table is relevant to the question?

The problem asks you to describe the group of voters aged 25 to 50. This is the second row of information. No further calculations are required by the problem. The title lets you know that this is a poll of registered voters. To answer the question, you can examine the data and look for patterns and meaning.

A *Attack*

Carry out your plan and answer the question. When you're describing poll results, pay attention to who was surveyed, where they were surveyed, and how the questions were worded. Draw relevant conclusions about the information.

?   **3.** What does the table tell you about the voting behavior of 25- to 50-year-olds?

Of the 25- to 50-year-old registered voters in the poll, 70% were likely to vote, which is higher than 18- to 24-year-olds and lower than those 51 and older. Those described as likely to vote answered that they are planning to vote in the upcoming election. Of those voters, only 23% support Adams. The rest of the voters were fairly evenly divided among the other two candidates, with 37% supporting Jones and 40% supporting Smith.

C *Check*

Do your conclusions sound correct? Do you see any flaws in the poll or missing information?

?   **4.** Do you see any flaws in the poll or problems with your conclusions?

This poll doesn't give a margin of error. A margin of error can be useful, especially when two candidates are close, like Jones and Smith in this age group. The margin of error shows the range of likely numbers the poll represents. If the margin of error is ±2%, then it's possible that the actual number of voters who support Jones is 39% and the actual number who support Smith is 38%. It's just as likely that the number who support Jones is 35% while 42% support Smith.

Practice It!

In a poll, participants were asked, "What is your household yearly income?" Then, they were asked: "Did you vote on Amendment 5 in the last election?" If they answered yes, participants were asked, "Did you vote in favor of Amendment 5?" The poll showed the following results.
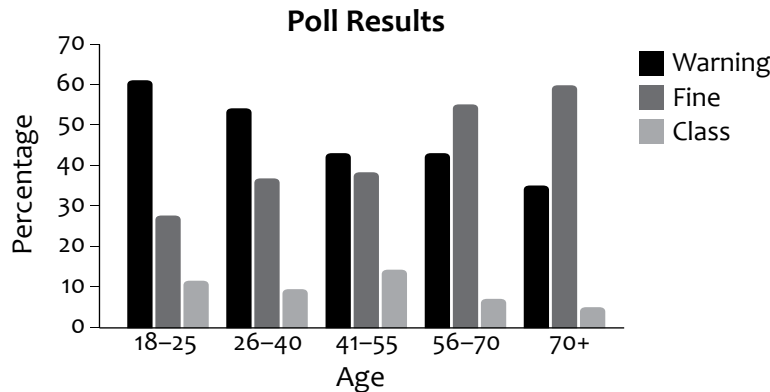
Household Income	For Amendment 5	Against Amendment 5
Less than $15,000	61%	39%
$15,000 to $25,000	63%	37%
$25,001 to $40,000	58%	42%
$40,001 to $65,000	49%	51%
$65,001 to $100,000	40%	60%
Greater than $100,000	32%	68%

Margin of Error: ±3%

1. Draw a conclusion about the people who voted for Amendment 5.

   a. **Understand:** What question do you need to answer?

   b. **Plan:** What information do you need to use? How will you use it?

   c. **Attack:** Draw a conclusion.

   d. **Check:** Check your answer, and identify any potential issues with the poll.

2. What does the table tell you about voters in the top three income categories?

3. How does voting behavior change as income changes from low to high?

Use the table below to answer questions 4–5.

A city council poll asked citizens to choose among three consequences for first offenders who did not buckle their seat belts while driving: a formal warning recorded for future incidents, a $50 fine, or a mandatory driving safety class. The chart shows the results from this poll, which had a margin of error of ±2%.

Poll Results

```
70
60
50
Percentage
40
30
20
10
0
      18–25   26–40   41–55   56–70   70+
                    Age
```

■ Warning
■ Fine
■ Class

⭐⭐ **4.** Describe what the poll tells you about the opinions of voters in different age groups.

    a. Understand: What question do you need to answer?

    b. Plan: What information do you need to use? How will you use it?

    c. Attack: Answer the question.

    d. Check: Check your answer, and identify any potential issues with the poll.

⭐⭐ **5.** What law would you propose based on this information? Why?

> **Math Tip**
>
> Polls are often shown as graphs instead of tables. Think about how a graph changes your interpretation of the data.

Use the following table to answer questions 6–8.

A camera that measures speeds of passing vehicles was set up in a dangerous construction zone. The following table shows the data that was collected for vehicles that were speeding.

Miles per Hour over the Speed Limit versus Time of Day

| Time	5–10 mph over	11–20 mph over	21+ mph over
12:01 A.M.–6:00 A.M.	51%	38%	11%
6:01 A.M.–12:00 P.M.	63%	31%	6%
12:01 P.M.–6:00 P.M.	58%	35%	7%
6:01 P.M.–12:00 A.M.	49%	44%	7%

6. What can you tell about drivers who speed between 12:01 P.M. and 6:00 P.M.?

   a. **Understand:** What question do you need to answer?

   b. **Plan:** What information do you need to use? How will you use it?

   c. **Attack:** Answer the question.

   d. **Check:** Check your answer, and identify any potential issues with the study.

7. In each speed range, find the time frame with the highest percentage of speeders.

8. What policy suggestions would you make based on this information? Why?

Check Your Skills

When you see this icon, you may use a calculator.

Use the following chart to answer questions 1–4.

Student Transportation in Guardia School District
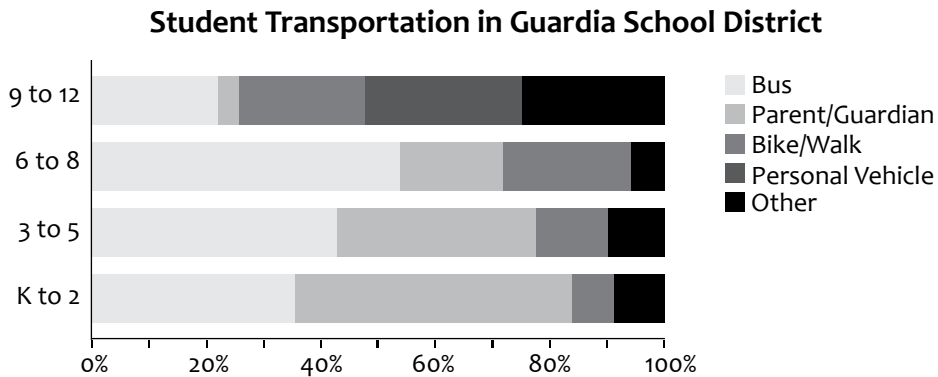
1. Which conclusion can you draw about students in third to fifth grades?
   a. More students ride the bus than use any other mode of transportation.
   b. More students ride the bus than in any other grade.
   c. More students ride the bus than use all other modes of transportation together.
   d. The top two modes of transportation are riding the bus and biking/walking.

2. How does the percentage of students who rely on a parent/guardian for transportation change in higher grade levels?
   a. The percentage increases for older students.
   b. The percentage decreases for older students.
   c. The percentage increases and then decreases for increasing grade levels.
   d. The percentage stays about the same throughout all grade levels.

3. Draw a line between each grade level and the most common means of transportation for that grade level. You may use a mode of transportation more than once.

K to 2	Bus
3 to 5	Parent/Guardian
6 to 8	Bike/Walk
9 to 12	Personal Vehicle

4. Is it important to provide bus transportation to students in sixth through eighth grades?
   a. Yes, because the students have only 18% access to other modes of transportation.
   b. No, because the students use the bus less than any other mode of transportation.
   c. No, because the students use all the available modes of transportation.
   d. Yes, because more than half of these students use the bus.

Use the following chart to answer questions 5–7.

The table shows the data from a survey that asked full-time college students to estimate how many hours they spend participating in various activities each week: studying, participating in clubs or groups, spending time with family, spending time with friends, and working. The table shows the means for these activities.

Academic Classification versus Time Spent in Activities (in hours)

Classification	Studying	Clubs/Groups	Family	Friends	Work
Freshman	10.3	2.1	3.5	9.3	18.7
Sophomore	11.2	3.1	3.3	10.3	20.5
Junior	14.3	3.9	4.1	9.9	20.9
Senior	18.4	4.1	3.7	12.5	25.4
Graduate	21.4	4.0	2.4	9.5	28.7

5. Which conclusion can you draw about full-time college students who are juniors?

   a. They work least of any other grade level.

   b. They spend more time studying than any other grade level.

   c. They spend more time with their families than any other grade level.

   d. They study more than any other activity listed.

6. Which conclusion can you draw about study time?

   a. Students don't spend enough time studying when they are freshmen.

   b. Students study more as they advance from freshmen to graduate level.

   c. Seniors study the least of any academic classification.

   d. Seniors work the most of any academic classification.

7. Make a comparison between the amount of time sophomores and graduates spend doing each activity. Use the following symbols: $>$ for "spend more time than;" $<$ for "spend less time than;" or $=$ for "spend an equal amount of time to."

     Studying: Sophomores _____ Graduates

Clubs/Groups: Sophomores _____ Graduates

       Family: Sophomores _____ Graduates

      Friends: Sophomores _____ Graduates

        Work: Sophomores _____ Graduates

> *Remember the Concept*
>
> Polls and surveys give valuable information. Key questions are:
>
> • Who was surveyed?
>
> • What were they asked?
>
> • What conclusions can you draw?

Applications in Politics and Public Policy   *page 275*

What Is the Data Telling You?

Practice It!   *pages 278–280*

1a. The question asks you to draw a conclusion. That means the task is to examine the information and make an overall statement or inference based on the information. The conclusion should be about the people who voted for Amendment 5. The data shows the polling questions and margin of error, as well as the household income and percent who voted for and against the amendment.

1b. The information that should be used is the data for the voters in all household income groups who voted for Amendment 5. A good plan is to examine the data and look for patterns in order to draw a conclusion.

1c. One pattern in the data is that the percent of people voting for Amendment 5 generally decreases as income increases. You might conclude that lower-income voters were more likely to vote for Amendment 5.

1d. The conclusion makes sense based on the data. Those with higher incomes were more likely to vote against Amendment 5, just as those with lower incomes were more likely to vote for it. The margin of error would not affect this conclusion. The polling questions may be problematic, though, since the poll only asked if participants voted in favor of the amendment. The pollsters could have asked, "How did you vote on Amendment 5, in favor of it or against it?" Only mentioning voting for the Amendment might give biased results.

2. Voters in the top three income categories generally voted against Amendment 5. The top two income categories voted heavily against the amendment, while the $40,001 to $65,000 category was evenly split, within the poll's margin of error.

3. As income changes from low to high, more people vote against Amendment 5 (and fewer people vote for it). The only income categories where this is not true are incomes less than $15,000 and $15,000 to $25,000, but the difference in voting behavior in these two groups is within the poll's margin of error.

4a. The question asks about the age groups of voters. How do opinions change as ages change?

4b. All the data is relevant, since it breaks the responses up by age group. A good plan is to examine the data and look for patterns.

4c. None of the age groups support the mandatory driving class as a consequence of driving without a seat belt. The 41 through 55 age group is evenly split between a warning and a fine. Those 56 to 70 are slightly more in favor of a fine, and those 71 and older are heavily in favor of a fine. Compared to other age groups, the older groups are more in favor of a fine. The younger groups are more in favor of a warning.

4d. The conclusion makes sense based on the data in the table. There are no clear problems with the data.

5. Support for a warning or a fine seems fairly evenly split in this data. You might propose either law. You might also propose a lower fine, as a compromise between a warning and a fine.

6a. The question asks you to look at information for speeders in the third time period, between noon and 6:00 P.M. The table gives you information broken down by how fast the speeders were driving, as well as by different times of day.

6b. The most relevant information will be the third row in the table, which describes speeders clocked between noon and 6:00 P.M. You might use other rows to compare. A good plan is to examine the data and look for patterns.

6c. Between noon and 6:00 P.M., most speeders were going 5 to 10 mph over the speed limit, the slowest group in the data. About a third of speeders were going 11 to 20 mph over the speed limit, with only 7% going faster. These percentages seem similar to those in other time ranges, and particularly similar to other daytime speeders. You might conclude that these drivers are similar to other daytime drivers, and that most speeders only go around 5 to 10 mph over the speed limit.

6d. The conclusion seems to make sense compared to the data, and it also seems to make logical sense. There is no information about how many speeders were tracked or how many drivers were speeders, which is a significant lack in the study. What if there were only four speeders from noon to 6:00 P.M., but 50 speeders from 6:00 A.M. to noon? More information is needed to fully understand the data.

7. The highest percentage of speeders going 5 to 10 mph is between 6:01 p.m. and noon. The highest

percentage going 11 to 20 mph is between 6:01 P.M. and midnight. The highest percentage of speeders going 21 mph or more is between midnight and 6:00 A.M. However, generally, most speeders in every time period go 5 to 10 mph over the speed limit.

8. Based on the information in this chart, speeder behavior is fairly consistent throughout the day, though there is a slightly higher percentage of "fast" speeders at night. However, the data does not provide information about driver behavior and the amount of speeding. If you wanted to reduce speeding, you might propose added signs or speed bumps near the construction to reduce speeding or adding lights at night so that speeders can see warning signs.

Check Your Skills   *pages 281–282*

1. a. More students ride the bus than use any other mode of transportation.

   Forty-three percent of 3rd through 5th grade students ride the bus, higher than any other percentage in that row.

2. b. The percentage decreases for older students.

   The data shows a pattern of parent/guardian transportation decreasing for older students.

3. **K to 2:** Parent/Guardian

   3 to 5: Bus

   6 to 8: Bus

   9 to 12: Personal Vehicle

4. d. Yes, because more than half of these students use the bus.

   According to the table, 54% of 6th to 8th grade students take the bus.

5. c. They spend more time with their families than any other grade level.

   The highest number of hours spent with family is 4.1, for juniors.

6. b. Students study more as they advance from freshmen to graduate level.

   The pattern of study time data from freshman through graduate shows study time increasing.

7. **Studying:** $<$ **Clubs/Groups:** $<$

   Family: $>$ **Friends:** $>$

   Work: $<$