

## Chapter 20

**1. Canada** Suppose an advocacy organization surveys 960 Canadians and 192 of them reported being born in another country ([www.unitednorthamerica.org/simdiff.htm](http://www.unitednorthamerica.org/simdiff.htm)). Similarly, 170 out of 1250 Americans reported being foreign-born. Find the standard error of the difference in sample proportions.

**3. Canada, deux** If the information in Exercise 1 is to be used to make inferences about the proportion all Canadians and all Americans born in other countries, what conditions must be met before proceeding? Are they met? Explain.

**5. Canada, trois** The information in Exercise 1 was used to create a 95% two-proportion confidence interval for the difference between Canadians and Americans who were born in foreign countries. Interpret this interval with a sentence in context. Use Minitab to find a 95% confidence interval for  $(p_{\text{Canadians}} - p_{\text{Americans}})$ .

**7. Canada, encore** For the interval given in Exercise 5, explain what “95% confidence” means.

**9. Canada, la fin** The researchers from Exercise 1 want to test if the proportions of foreign born are the same in the United States as in Canada.

- What is the difference in the proportions of foreign born residents from both countries?
- What is the pooled proportion of foreign born in both countries combined?
- What is the standard error of the difference in part a)?
- What is the value of the  $z$ -statistic?
- What do you conclude at  $\alpha = 0.05$ ?

**49. Food preference** GfK Roper Consulting gathers information on consumer preferences around the world to help companies monitor attitudes about health, food, and healthcare products. They asked people in many different cultures how they felt about the following statement:

*I have a strong preference for regional or traditional products and dishes from where I come from.*

In a random sample of 800 respondents, 417 of 646 people who live in urban environments agreed (either completely or somewhat) with that statement, compared to 78 out of 154 people who live in rural areas.

Based on this sample, is there evidence that the percentage of people agreeing with the statement about regional preferences differs between all urban and rural dwellers?

**45. Convention bounce** Political pundits talk about the “bounce” that a presidential candidate gets after his party’s convention. In the past 40 years, it has averaged about 6 percentage points. Just before the 2004 Democratic convention, Rasmussen Reports polled 1500 likely voters at random and found that 47% favored John Kerry. Just afterward, they took another random sample of 1500 likely voters and found that 49% favored Kerry. That’s a two percentage point increase, but the pollsters claimed that there was no bounce. Explain.

**11. Cost of shopping** Do consumers spend more on a trip to Walmart or Target? Suppose researchers interested in this question collected a systematic sample from 85 Walmart customers and 80 Target customers by asking customers for their purchase amount as they left the stores. The data collected is summarized in the table below.

	<b>Walmart</b>	<b>Target</b>
$n$	85	80
$\bar{y}$	\$45	\$53
$s$	\$21	\$19

To perform inference on these two samples, what conditions must be met? Are they? Explain.

**13. Cost of shopping, again** Using the summary statistics provided in Exercise 11, researchers calculated a 95% confidence interval for the mean difference between Walmart and Target purchase amounts. Use Minitab to find the interval, then explain in context what this interval means.

**15. Cost of shopping, three** The researchers in Exercise 11 decide to test the hypothesis that the means are equal. The degrees of freedom formula gives 162.75 df. Test the null hypothesis at  $\alpha = 0.05$ . (Minitab!)

**17. Cost of shopping, once more** Repeat the test you did in Exercise 15, but assume that the variances of purchase amounts is the same at Target and Walmart. Did your conclusion change? Why do you think that is?

**65. Cereal** The data below show the sugar content (as a percentage of weight) of several national brands of children's and adults' cereals. Create and interpret a 95% confidence interval for the difference in mean sugar content. Be sure to check the necessary assumptions and conditions.

**Children's cereals:** 40.3, 55, 45.7, 43.3, 50.3, 45.9, 53.5, 43, 44.2, 44, 47.4, 44, 33.6, 55.1, 48.8, 50.4, 37.8, 60.3, 46.6

**Adults' cereals:** 20, 30.2, 2.2, 7.5, 4.4, 22.2, 16.6, 14.5, 21.4, 3.3, 6.6, 7.8, 10.6, 16.2, 14.5, 4.1, 15.8, 4.1, 2.4, 3.5, 8.5, 10, 1, 4.4, 1.3, 8.1, 4.7, 18.4

**67. Reading** An educator believes that new reading activities for elementary school children will improve reading comprehension scores. They randomly assign third graders to an eight-week program in which some will use these activities and others will experience traditional teaching methods. At the end of the experiment, both groups take a reading comprehension exam. Their scores are shown in the back-to-back stem-and-leaf display. Do these results suggest that the new activities are better? Test an appropriate hypothesis and state your conclusion.

New Activities	Control
	1 07
4	2 068
3	3 377
96333	4 12222238
9876432	5 355
721	6 02
1	7
	8 5