

Comparing Two Proportions Homework

1. **I want red!** A candy maker offers Child and Adult bags of jelly beans with different color mixes. The company claims that the Child mix has 30% red jelly beans while the Adult mix contains 15% red jelly beans. Assume that the candy maker's claim is true. Suppose we take a random sample of 50 jelly beans from the Child mix and a separate random sample of 100 jelly beans from the Adult mix.

(a) Find the probability that the proportion of red jelly beans in the Child sample is less than or equal to the proportion of red jelly beans in the Adult sample. Show your work.

(b) Suppose that the Child and Adult samples contain an equal proportion of red jelly beans. Based on your result in part (a), would this give you reason to doubt the company? Explain.

2. **Listening to rap.** Is rap music more popular among young blacks than among young whites? A sample survey compared 634 randomly chosen blacks aged 15 to 25 with 567 randomly selected whites in the same age group. It found that 368 of the blacks and 130 of the whites listened to rap music every day. Construct and interpret a 95% confidence interval for the difference between the proportions of black and white young people who listen to rap every day.

3. **Steroids in high school.** A study by the National Athletic Trainers Association surveyed random samples of 1679 high school freshmen and 1366 high school seniors in Illinois. Results showed that 34 of the freshmen and 24 of the seniors had used anabolic steroids. Steroids, which are dangerous, are sometimes used to improve athletic performance.

(a) Is there a significant difference between the population proportions? Carry out a significance test at the $\alpha = 0.05$ level.

(b) Construct and interpret a 95% confidence interval for the difference between the population proportions. Explain how the confidence interval is consistent with the results of the test in part (a).

4. **Marry Lower?** "Would you marry a person from a lower social class than your own?" Researchers asked this question of a random sample of 385 black, never married students at two historically black colleges in the South. Of the 149 men in the sample, 91 said "Yes." Among the 236 women, 117 said "Yes." Is there reason to think that different proportions of men and women in this student population would be willing to marry beneath their class?

5. **Preventing strokes.** Aspirin prevents blood from clotting and so helps prevent strokes. The Second European Stroke Prevention Study asked whether adding another anticlotting drug, named dipyridamole, would be more effective for patients who had already had a stroke. Here are the data on strokes and deaths during the two years of the study.

	<u>Number of Patients</u>	<u>Number of Strokes</u>
Aspirin alone	1649	206
Aspirin + dipyridamole	1650	157

The study was a randomized comparative experiment.

(a) Is there a significant difference in the proportion of strokes between these two treatments? Carry out an appropriate test to help answer this question.

(b) Describe a Type 1 and a Type 2 error in this setting. Which is more serious? Explain.