

You may work with one partner on this assignment, submitting one report with both names, provided that both students contribute substantially to the work. Word-processed reports are preferred to hand-written ones. Integrate computer output into your report as appropriate.

Conserving Hotel Towels?

Many hotels have begun a conservation program that encourages guests to re-use towels rather than have them washed on a daily basis. A recent study examined whether one method of encouragement might work better than another. One of two different signs explaining the conservation program was placed in the bathrooms of the hotel rooms, with random assignment determining which rooms received which sign. One sign mentioned the importance of environmental protection, while the other sign claimed that 75% of the hotel's guests choose to participate in the program. The researchers suspected that the latter sign, but appealing to a social norm, would produce a higher proportion of hotel guests who agree to re-use their towels. Researchers used the hotel staff to record whether guests staying for multiple nights agreed to re-use their towel after the first night.

- Identify the observational units, explanatory variable, and response variable in this study.
- State the null and alternative hypotheses in symbols, and be sure to define the parameter in the context of this study.

The following table displays the observed data in this study:

	Social norm	Environmental protection	Total
Guest opted to re-use towel	98	74	172
Guest did not opt to re-use towel	124	137	261
Total	222	211	433

- Calculate the conditional proportions of re-use in each group. Also calculate the difference between them and the ratio of these proportions.
- Interpret what this ratio reveals in this context.
- Use a two-sample z -test to test the hypotheses that you stated in (a). Report the test statistic and p -value.
- Report your test decision at the $\alpha = .10, .05,$ and $.01$ significance levels. Also summarize what these test decisions reveal about the strength of evidence for the researchers' conjecture.
- Produce and interpret a 90% confidence interval for the *difference* in probabilities of re-using towels between these two signs.
- Produce and interpret a 90% confidence interval for the *ratio* of probabilities of re-using towels between these two signs.