

Read the introduction to Exploration 8.2A on page 447, then answer the following related questions. You will use the **Towels** data from the book's website.

1. Identify the explanatory and response variables and their types.

explanatory: message / norm invoked (categorical)

response: reuse or not (binary categorical)

2. State the relevant null and alternative hypotheses using correct notation.

$$H_0: \pi_1 = \pi_2 = \pi_3 = \pi_4 = \pi_5$$

H_A : not all are equal

3. There are two observed statistics: MAD and χ^2 . What are their values?

$$MAD = 0.055$$

$$\chi^2 = 10.153$$

4. Using the MAD statistic, conduct a simulation and compute the relevant p -value.

MAD p -value: 3.19. (varies with different simulations)

5. Using the χ^2 statistic, conduct a simulation and compute the relevant p -value.

χ^2 p -value (simulated): 3.859. (varies)

6. What is the theoretical p -value based on the χ^2 statistic?

χ^2 p -value (theoretical): 3.799.

7. These three p -values should be consistent. What do you conclude from them?

reject the null — evidence that all 5 messages are not equally effective

8. For a follow-up analysis, compute confidence intervals for pairwise differences. Which conditions differ significantly?

None - samerm ; samerm - gender

(for each of these pairs, 0 is outside the 95% confidence interval)