TEACHING THE EXACT TEST FOR PROPORTIONS

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WHY TO TEACH THE EXACT TEST FOR PROPORTIONS?

- Most introductory statistics courses include only the test for Ho: $p=p_o$ using the normal approximation and warn students not to use it when the sample is small; however, they frequently don't say what to use instead when the sample *is* small.
- Software commonly used in statistics courses, such as MINITAB, include the exact test for proportions as an option: Our students deserve to know what is this about.
- The only pre-requisite is some working knowledge of the binomial distribution.
- We can calculate the p-values just by adding numbers in the binomial table, focusing on the ideas and not on formulas. In the same way we can calculate α, β, and the power of the test (Seier & Liu, 2013).
- It is useful in applications when the sample size is small such as in some experiments, small surveys, and science fair projects in schools.
- It can be even used to introduce the ideas of hypothesis testing for the first time without formulas (Seier & Robe, 2002).

HOW TO TEACH IT?

The poster will show the strategy we use to teach this topic. We start with a hands-on activity flipping a two-color plastic chip (red/yellow) to test Ho: p=0.5 where p is the probability of red; any other object with a corresponding reasonable value for p_o could be used. Each student flips a chip 10 times and records the number of reds he/she obtains. We use the binomial table to calculate the probability of that outcome, or a more extreme one, when Ho is true, introducing in this way the concept of p-value. After practicing with more examples (Chapter 5 of Seier & Joplin) and cases of H_o and H_a, we use the binomial table to evaluate decision rules for rejecting the null hypothesis by calculating α, β, and the power of the test. The relationship between power and sample size is explored.

REFERENCES

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