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AP STATISTICS - MS. KLIMCZUK

Step-by-Step Example: Tests and Intervals

Anyone who plays or watches sports has heard of the “home field advantage.” Tournaments in many sports are designed to try to neutralize the advantage of the home team or player. Most people believe that teams tend to win more often when they play at home. But do they?

If there were no home field advantage, the home teams would win about half of all games played. To test this, we will use the games in the Major League Baseball 2012 season. That year, there were 2,430 regular-season games. It turns out that the home team won 1,295 of the 2,430 games, or 53.29% of the time.

***Main question: Could this deviation from 50% be explained just from natural sampling variability, or is it evidence to suggest that there really is a home field advantage, at least in professional baseball?***

We will answer this question using the following steps.

***Step 1: Write down the hypotheses***

***Step 2: Think about the assumptions and check the appropriate conditions. Are they all satisfied? What type of test can we use here?***

***Step 3: Show the mechanics.***

***Write down the mean and standard deviation of the null model.***

***Find the z-score for the observed proportion.***

***Make a picture. Sketch the normal model and shade the correct regions.***

***What is the P-value?***

***Step 4: State your conclusion in context. Write what the P-value means.***

***EXTENSION: Okay, but how big of a difference are we talking about here? Just knowing that there is an effect is only part of the answer. Let’s find a confidence interval for the home field advantage.***

***Step 1: Think about the assumptions and check the appropriate conditions. Are they all satisfied? What type of model can we use here?***

***Step 2: Show the mechanics for finding a 95% confidence interval.***

***Find the standard error of*** $\hat{p}$***.***

***What is the critical value?***

***What is the margin of error?***

***What is the 95% confidence interval?***

***Step 3: Confidence intervals help us think about the size of the effect. Explain what the confidence interval means here.***