In volleyball, timeouts are often called by teams when they are losing a set. By analyzing NCAA Division 3 Liberty League Conference Volleyball Data from the 2013-2022 seasons, we can examine the impact of calling a timeout on scoring a point or ultimately winning a set.

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In this sample of data, in words identify the observations.

Observations in this data would be each timeout in a set. It would include information about the score, and the timeout number within the set.

In this sample of data, identify the variable of interest.

* If it is categorical, identify the levels, if it is numerical, identify the units.

There would be a categorical variable of interest, which would be the outcome of the set after the last timeout was called. You would have 2 levels, losing the game or winning the game.

Identify a population from which this sample is representative.

This is representative of division three volleyball

Is the following quantity a statistic or parameter? Explain.

* The percentage of times a team scores a point after calling a timeout.

This is a statistic because it is calculated from a sample of data (2013-2022 seasons).

Based on this statistic, what is a possible parameter that we can infer?

The proportion of all volleyball sets in NCAA Division 3 Liberty League matches where the losing team wins the set after the last timeout. This is a parameter because it represents the characteristic of the entire population of volleyball sets.

What is our estimate of the losing team winning a set after the last timeout is called if it is reported that in 214 sets out of 2718 total sets, the losing team won the set after the last timeout was called?

p^= 214/2718 = 0.0787

If we were to take another sample of matches (look at a different conference), would we necessarily get the same estimate?

No, since each sample may vary due to different teams, situations, and strategies during matches. However, with a sufficiently large and random sample, we expect our estimate to be close to the true parameter.

Construct a 95% confidence interval for the proportion of losing teams winning a set after the final timeout (Use previously calculated p^).

We know p^ = 0.0787

Standard Error = = 0.005164915

z = 1.96

Margin of Error = 1.96\*0.005164915 = 0.0101

95% CI = (0.0686, 0.0888)

Provide an interpretation for the resulting interval.

With 95% confidence, the probability that the losing NCAA women’s volleyball team will win the set after the final timeout is called is between 0.0686 and 0.0888.

Why would a team call a timeout if the chances of the losing team winning the game after the last timeout are so low?

Even though the chances of winning are low, calling a timeout may allow for a higher chance of winning the game than if no timeout were called and teams may be able to better plan and score after a timeout is called.

When looking at only the first timeout of the set, we see that the losing team before the timeout has a significantly higher chance of winning the game than they would have after the last timeout ( about an 18% chance of winning the game). Why do you think that calling a timeout earlier in a game increases the chances of winning?

Calling an earlier timeout allows teams to have more time to make back the points they lost, so it makes sense that the chances of winning would increase if you call timeouts earlier in the game rather than later.