

I asked 47 stegosauruses if they prefer to run early (before sunrise) and 42 said yes. Construct and interpret a 99% confidence interval for the proportion of stegosauruses that prefer to run early.

- I. The population of interest is not clearly defined, so I'll proceed with the assumption that it was meant to be all stegosauruses alive. The parameter we wish to make a claim about is p , the true proportion of stegosauruses that prefer to run early.
- II. Because we wish to make a claim about a proportion, we will construct a one-proportion z-interval. We don't know anything about the sampling method, so the results may not generalize to the population of interest. The population of all stegosauruses is certainly more than 10×47 so our sampling will be approximately independent, and we can use the formula for standard deviation.

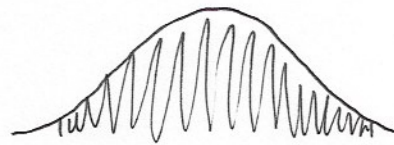
$$\begin{array}{ll}
 n(\hat{p}) \stackrel{?}{\geq} 10 & n(1-\hat{p}) \stackrel{?}{\geq} 10 \\
 47\left(\frac{42}{47}\right) \stackrel{?}{\geq} 10 & 47\left(1-\frac{42}{47}\right) \stackrel{?}{\geq} 10 \\
 \checkmark & \text{No}
 \end{array}$$

so the sampling distribution of \hat{p} is not necessarily approximately normal and our calculations may not be accurate.

- III. estimate \pm margin of error

$$\begin{aligned}
 \hat{p} \pm z^* \sqrt{\frac{\hat{p}(1-\hat{p})}{n}} \\
 \frac{42}{47} \pm 2.576 \sqrt{\frac{\frac{42}{47}\left(\frac{5}{47}\right)}{47}}
 \end{aligned}$$

$$(.7778, 1.0095)$$



- IV. We are 99% confident that the true proportion of stegosauruses that prefer to run early is between .7778 and 1, subject to serious concerns about the sampling method and accuracy of calculations.