Illustration

In a previous class we looked at examples where the true value of the parameter of interest was given, and we computed the probability of getting the statistic we found in our sample. Here is a recap:

Exercise:
In order to gauge public opinion about a referendum on the ballot in the upcoming elections in Indiana, a news organization conducted telephone interviews with 602 voters registered in the state. They found 74% of those interviewed supported the referendum. Let p denote the true proportion of supporters of the referendum. For each of the following possible values of p estimate the probability of getting our sampled value, $\hat{p} = 0.74$.

Answers:
(a) For $p = 0.7$: probability that $\hat{p}$ is 0.74 or worse $= 0.016$.

(b) For $p = 0.75$: probability that $\hat{p}$ is 0.74 or worse $= 0.285$.

(c) For $p = 0.78$: probability that $\hat{p}$ is 0.74 or worse $= 0.0089$.

In the real-world:

We of course do not know the true value p. All we have is the sampled value $\hat{p}$ and the CLT. How can we use these to help us make decisions? Here are 2 questions to consider (in fact, let's make this a CW exercise!):

1. Knowing $\hat{p} = 0.74$, what is the worst-case possible value of p? Why?
2. Suppose someone claims that $p =$ some specific value (e.g., 0.78). Is there a way to assess the plausibility of that claim? Discuss.

Illustration 2

The 2nd example you saw in that previous class was:

A children's research organization studied the television viewing habits of 822 children between the ages of 8 and 14 years. They found the average time these children spent in front of a television per year was about 1054 hours. Let μ, σ respectively denote the true mean and standard deviation of children's TV watching time. For each of the following scenarios, estimate the probability of getting our sampled value, $\bar{x} = 1054$ hours.

Answers:

(a) $\mu = 1020, \sigma = 400$ hours: probability that $\bar{x}$ is 1054 or worse = 0.0074.

(b) $\mu = 1040, \sigma = 400$ hours: probability that $\bar{x}$ is 1054 or worse = 0.158.

(c) $\mu = 1080, \sigma = 400$ hours: probability that $\bar{x}$ is 1054 or worse = 0.031.

Again, same real-world Qs:

We of course do not know the true value μ. All we have is the sampled value $\bar{x}$ and the CLT. How can we use these to help us make decisions?

1. Knowing $\bar{x} = 1054$ hours, what is the worst-case possible value of μ?

2. Suppose someone claims that μ = some specific value (e.g., 1080). Is there a way to assess the plausibility of that claim?

Two major tools of inferential stats

1. Confidence intervals $\Rightarrow$ knowing only the sampled value, what is the worst-case value of the parameter of interest?
2. Hypothesis tests $\Rightarrow$ how can we tell if some specific/proposed value of the parameter is plausible?