Notes: MS 204 Chapter 2 - confidence intervals

Overview

- Normal distribution review
- Applying normal model

68-96-99.7 rule (previous notes)

Applying normal model

Central Limit Theorem:

Standard error:

Z-score in a hypothesis test:

Ex: Patriots (se = 0.10)

Ex: Yawning (se = 0.13)

Confidence intervals

Analogy

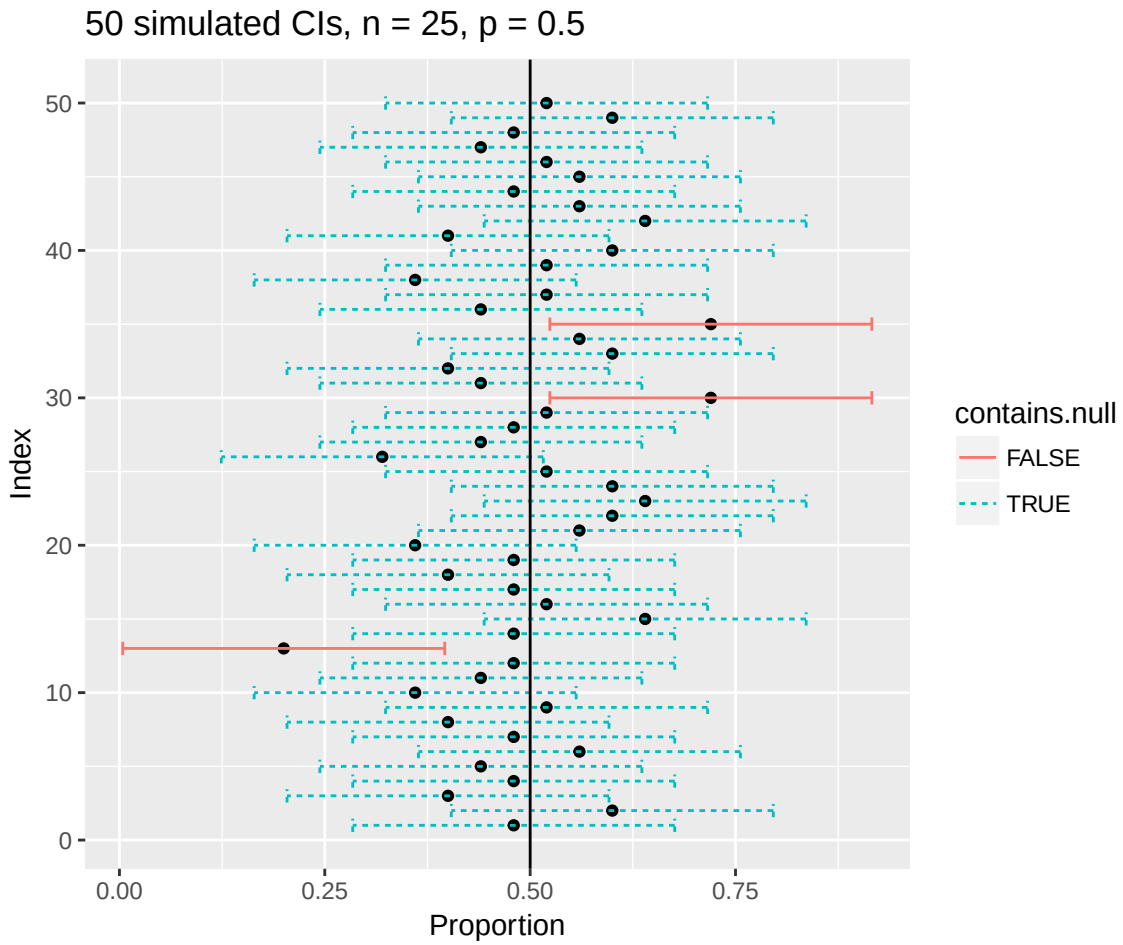
1. What is best guess?
2. More confidence – wider or narrower?
3. How probable is it that best guess is right?

Ex: Patriots (se = 0.10)

Ex: Yawning (se = 0.13)

Meaning of confidence

```
library(mosaic)
set.seed(5)
NFL.null <- do(50)*rflip(25, prob = 0.5)
NFL.null <- NFL.null %>%
  mutate(upp = prop + 1.96*0.1, low = prop - 1.96*0.1,
         contains.null = upp > 0.5 & low < 0.5,
         id = 1:n())
qplot(id, prop, data = NFL.null) +
  geom_errorbar(aes(ymin = low, ymax = upp, colour = contains.null,
                    lty = contains.null)) +
coord_flip() +
  labs(title = "50 simulated CIs, n = 25, p = 0.5",
       x = "Index", y = "Proportion") +
  geom_hline(aes(yintercept = 0.5))
```



Changing the confidence level

Incorrect language

Example

Implanting a stent in the brain of a patient at risk for a stroke increased the risk of a stroke. The study estimate a 9% increase in the number of patients who had a stroke, and the standard error of this estimate was about 2.8%.Calculate 90, 95, and 99% confidence intervals for the effect of the stent