Applied Statistical Decision Making
Confidence Intervals

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Exercise 1

When a General Social Survey asked 1326 subjects, "Do you believe in science?", the proportion who answered yes was 0.82.

1. Compute the standard error of this estimator.
2. Construct the 95% confidence interval. Interpret it in context.
3. How does the result in (2) change if you construct a 99% confidence interval?
4. Describe the effect of the sample size on the confidence interval.

Exercise 2

We are interested in estimating the mean IQ of students enrolled at Tor Vergata. It has been drawn a random sample of 25 students. Its mean is 120, while its standard deviation s is 10.

1. Construct a 90% confidence interval for the population mean.
2. Suppose to increse the sample size to 125, how does the interval in (1) change?
3. If you want to be more confident, what do you should change? Construct the corresponding confidence interval.
4. Another source claims that the mean IQ of students enrolled at Tor Vergata is 117. Is this a plausible value?

Exercise 3

For the following scenarios, identify the appropriate multiplier, the margin of error, and the corresponding confidence interval.

1. The proportion of Tor Vergata students who own a Iphone is 0.65. A random sample of 50 students is drawn. [$\alpha = 0.05$]
2. The mean number of credits completed by students enrolled at Tor Vergata for Fall 16 is 15. A random sample of 100 students is taken. Its standard deviation is 25. [$\alpha = 0.01$]
3. The proportion of registered Italian voters who plan to vote for Candidate A is 0.45. A random sample of 50 registered voters is taken. [$\alpha = 0.10$]

4. The average height of all Tor Vergata students is 175 cm. A random sample of 26 students is taken. Its standard deviation is 5. [$\alpha = 0.05$]

Describe the effect of standar deviation, sample size and α on the confidence interval.