Observations needed in Constructing a Confidence Interval

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Introduction

Statistical Rules of Thumb 1.14

- Precision does not vary linearly with sample size
- Width of CI is inversely proportional to the square root of the number of observations
- Sample size, an estimate of variability, pivotal variable (t-statistics in normal distribution)
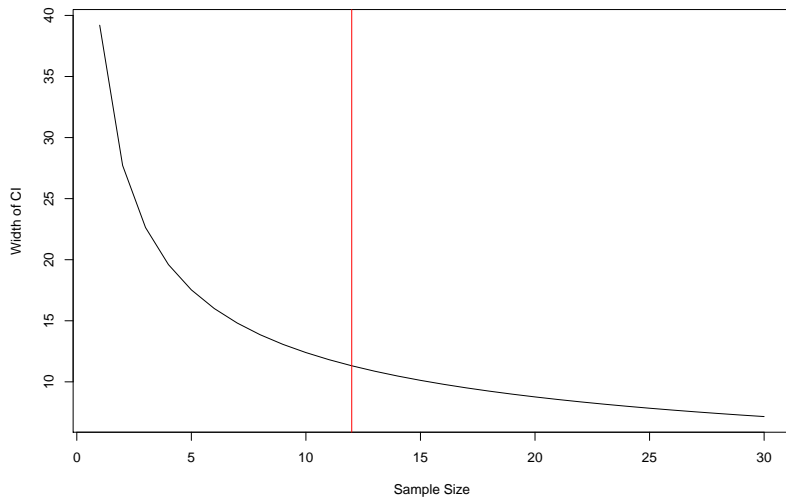
Assessment

How many observations do you think are needed for constructing a confidence interval?

Rule of thumb

The width of a confidence interval, involving estimation of variability and sample size, decreases rapidly until 12 observations and then decreases less rapidly.
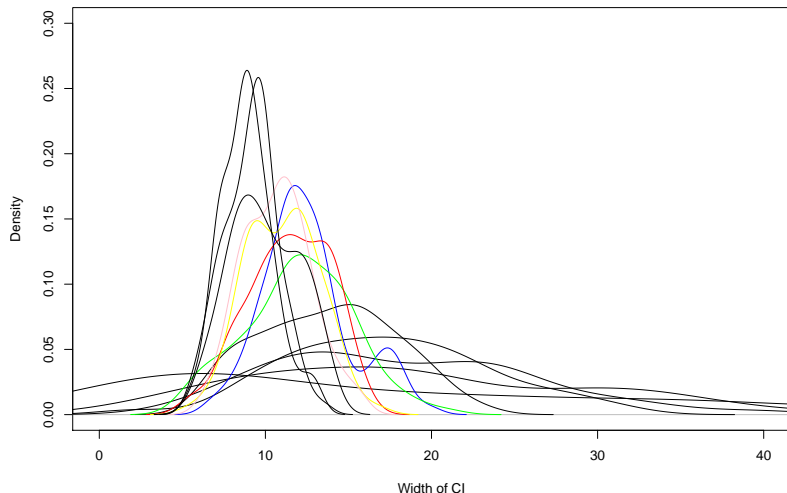
Illustration

Relationship between Width of 95% CI and Sample Size

Simulation

Distribution of Width of CI for Different Sample Size

Theoretical: 27.72 22.63 19.60 17.53 13.86 12.40 11.82 11.32 10.87 10.48

Closing thoughts

- The width of CI decreases as sample size increases
- If variance has to be estimated from the data, uncertainty due to this estimation, which is incorporated in the t-statistics, decreases also as the sample size increases