

Estimating average height of EUF students

Solving the exercise on terminology

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1 Task

Consider the example from the previous task on estimating the average height of EUF students. Use the right vocabulary from sampling theory to describe it.

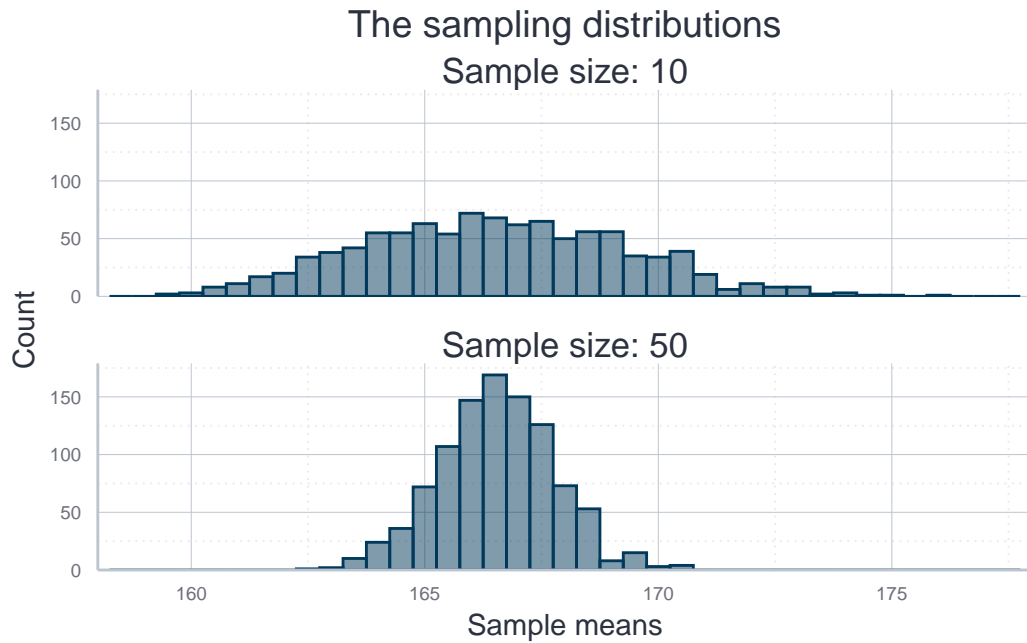
2 Possible solution

The *population* is the set of all students enrolled at the EUF ($N = 6402$). We are interested in the *population parameter* ‘average height’.

The *sample* is set of randomly drawn students from the population. We consider two cases, one with the *sample size* $n = 10$ and one with $n = 20$. We can assume the sample is a viable random sample, i.e. that it is unbiased and representative of the population.

The *point estimate* is the sample mean of the height, which is used to estimate the population parameter of interest (i.e. the average height of EUF students). This is viable since, given our assumptions, statements about the sample can be generalized to the population.

The sampling distribution visualizes the sampling variation, i.e. the variation of the point estimate obtained from different random samples. While in reality the sampling distribution remains unknown due to the fact that only one sample can be drawn, in the present case we used an artificial population and a Monte Carlo Simulation to characterize the sampling distribution as follows:



The *standard error* corresponds to the standard deviation of the sampling distributions and, due to the MCS framework, can be computed directly:

	Mean	Variation
Sample size: 10	166.49	2.832
Sample size: 50	166.54	1.244

3 Summary table

Concept	Pendant in example
Population	Set of all students enrolled at the EUF
Sample	Set of randomly drawn students from the population
Sample size	Here 10 or 50
Point estimate	Mean height of all students in the sample
Sampling distribution	The distribution of all the samples drawn from the population
Standard error	The standard deviation of the sampling distribution
Properties of the sample	We assume the sample to be a viable random sample, i.e. that it is unbiased and representative of the population, so its results are generalizable.

Concept	Pendant in example
Census	This would mean to measure the height of every student in the population directly.
Inference	The strategy of understanding a population parameter by studying a sample and generalize to the population.