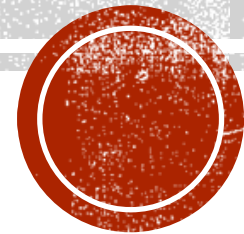


Why $n - 1$?

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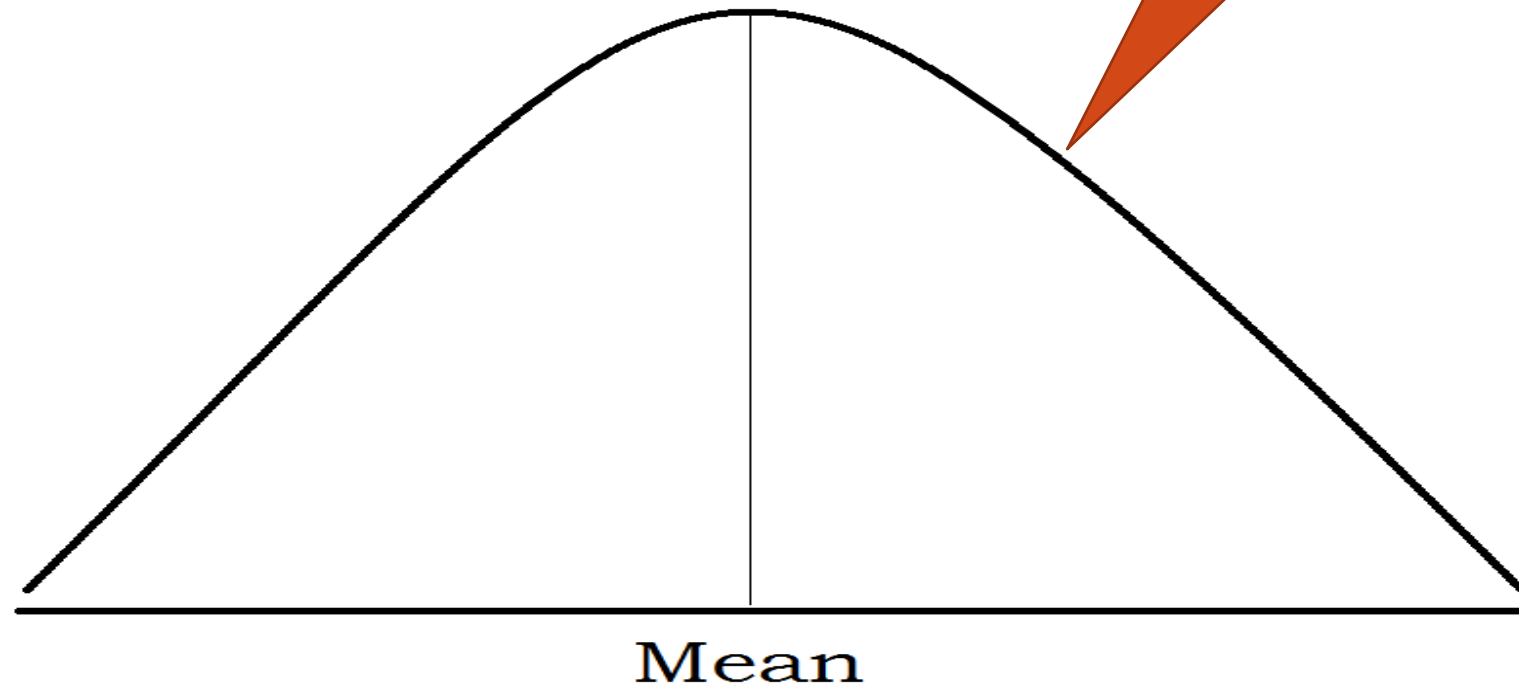
Why $n - 1$?



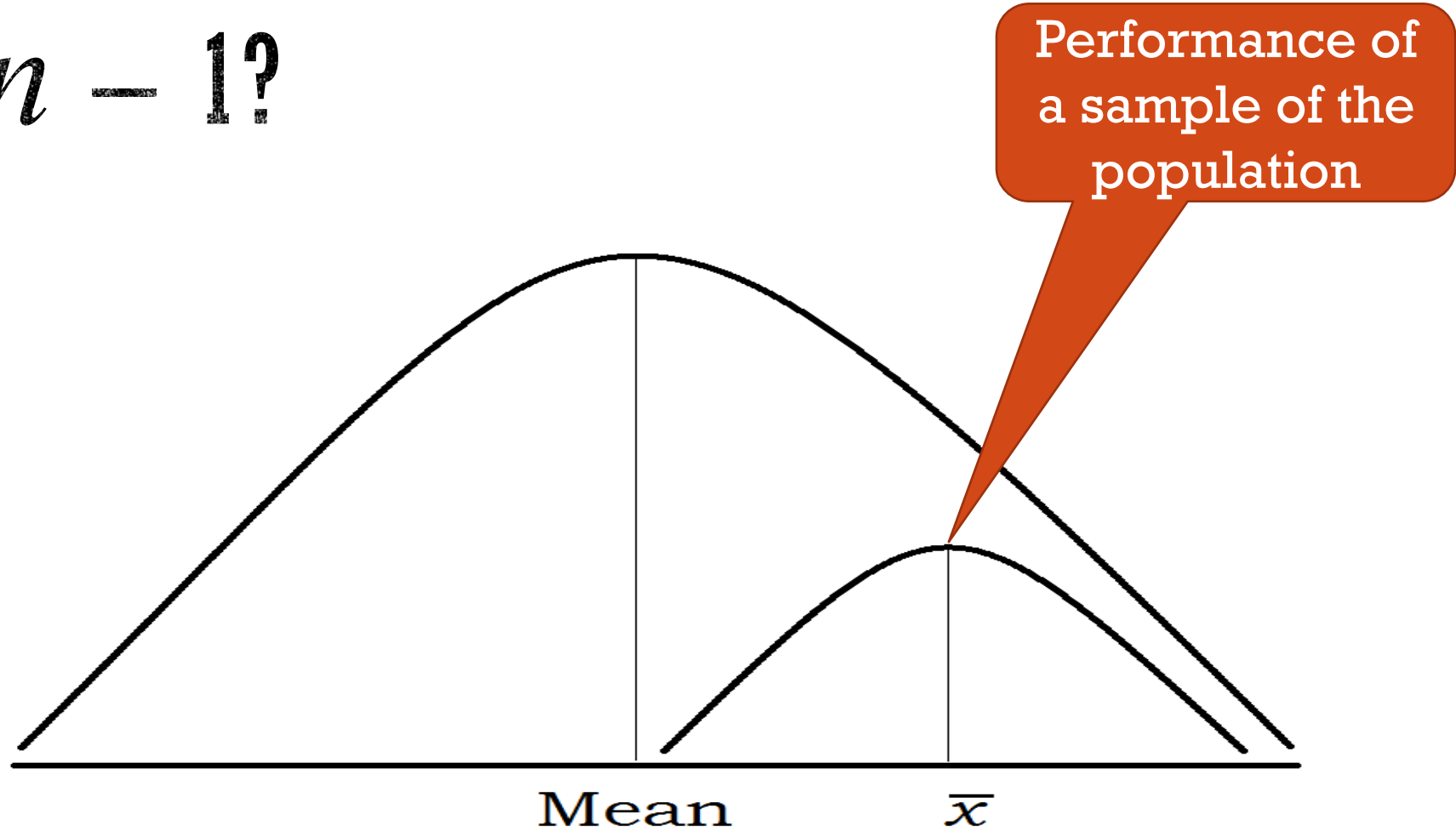
Why do we use n in certain calculations and $n-1$ in other calculations? It can be very confusing!



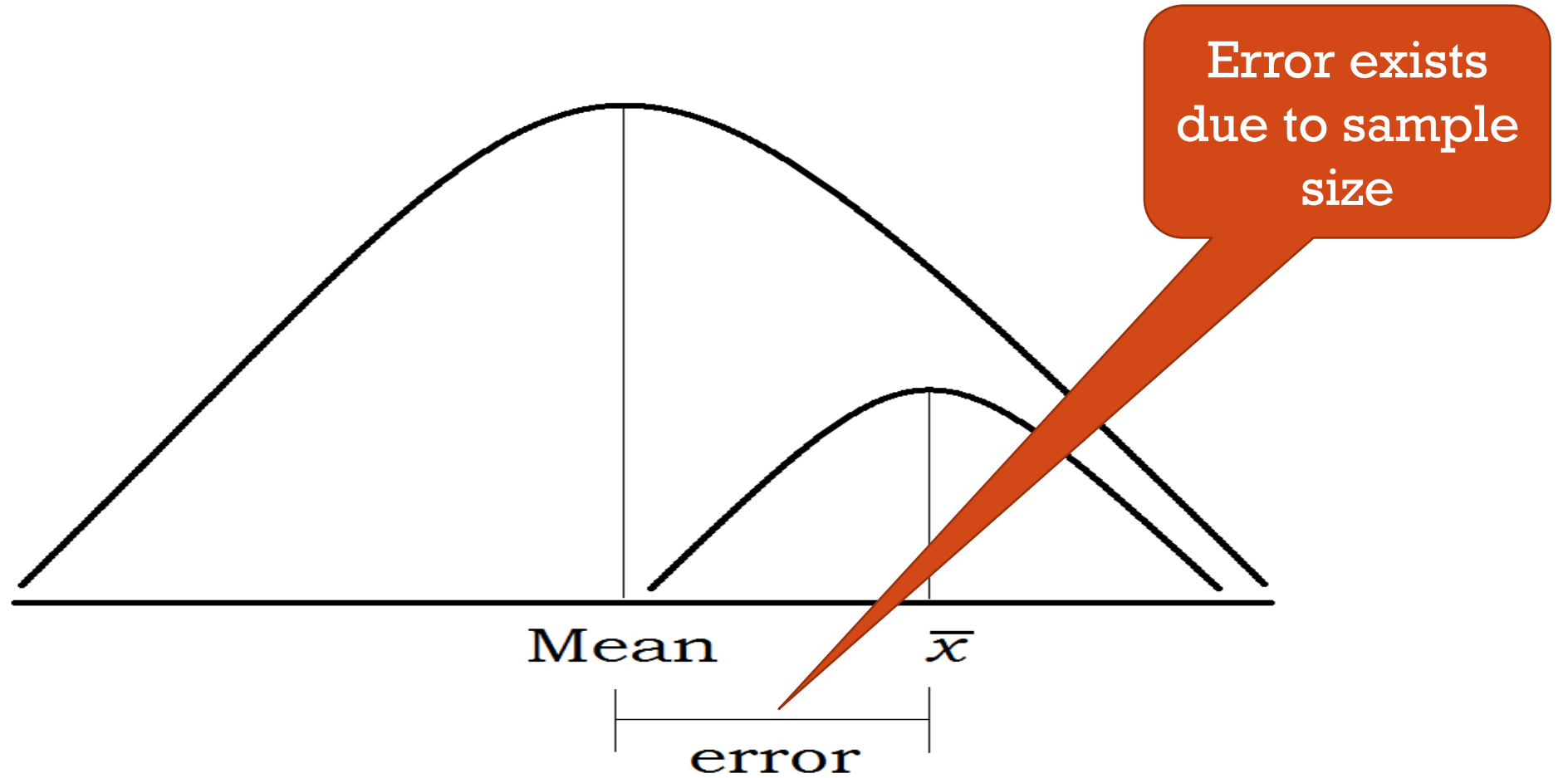
Why $n - 1$?



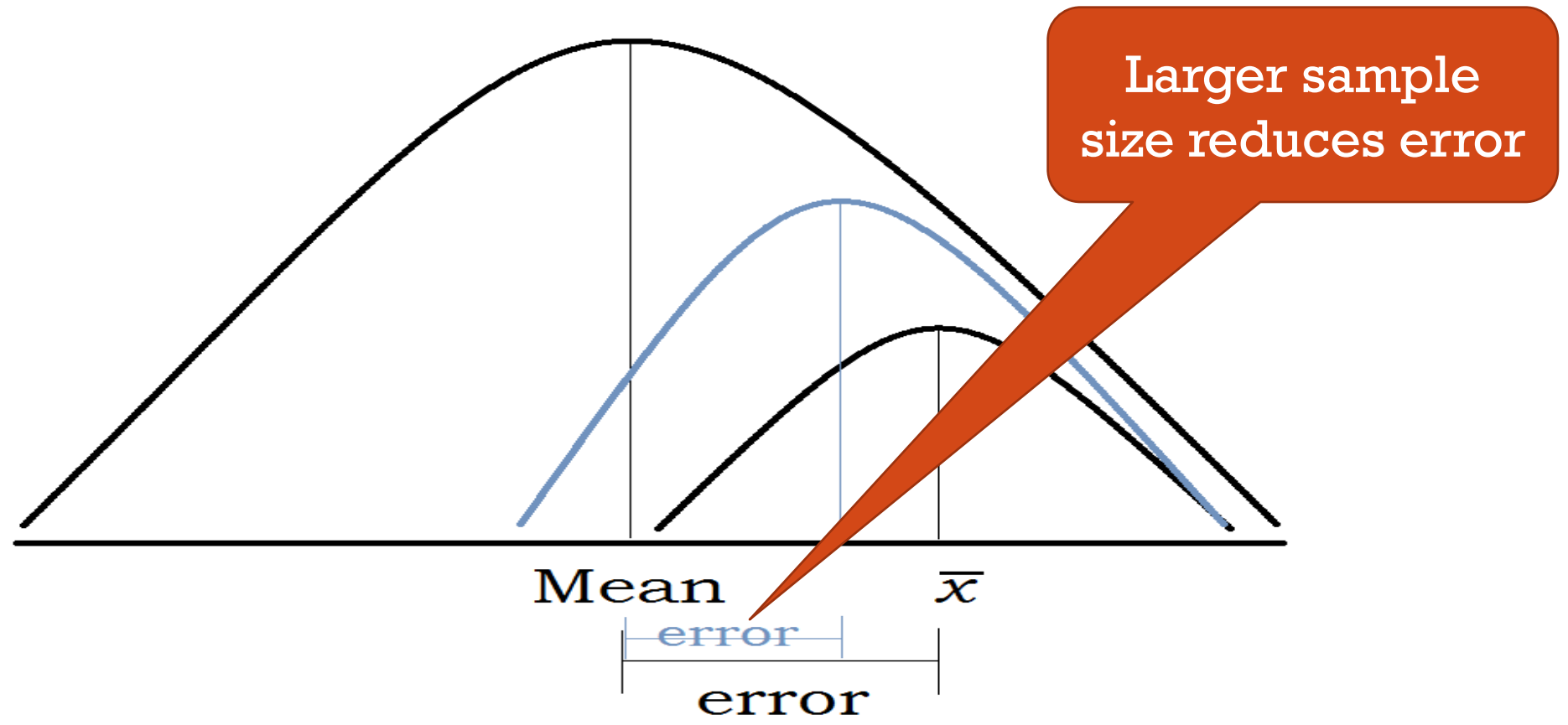
Why $n - 1$?



Why $n - 1$?

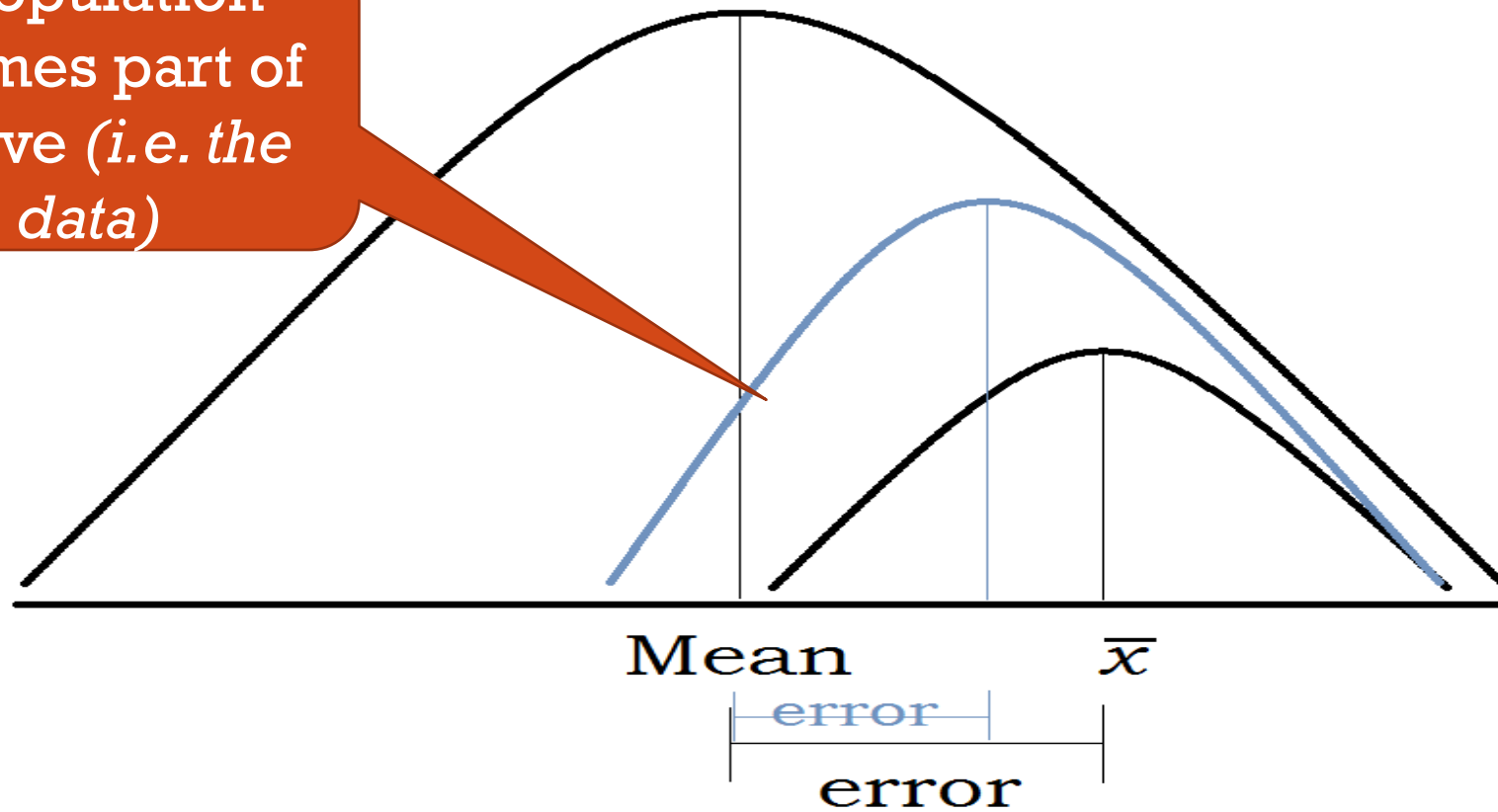


Why $n - 1$?



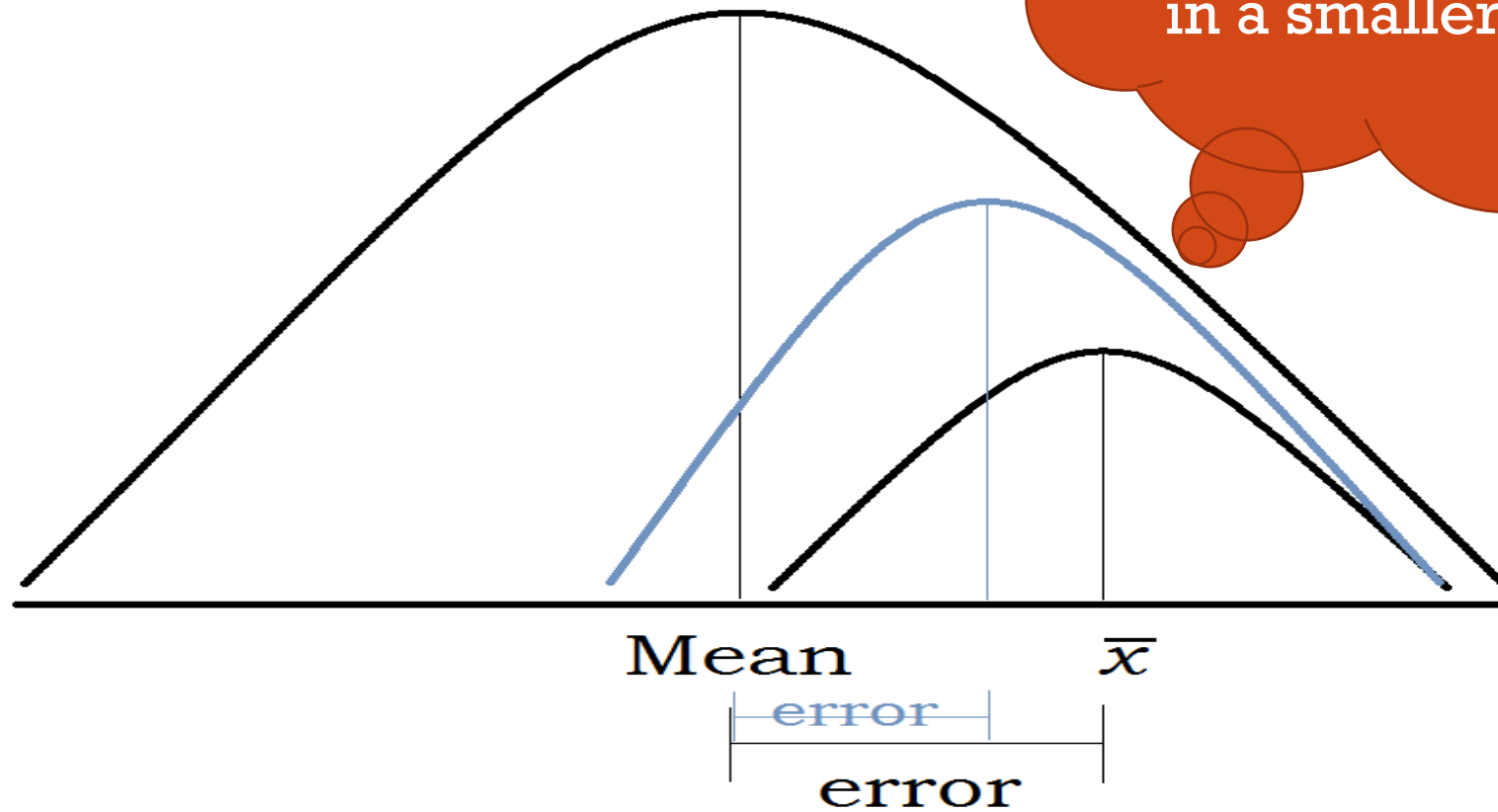
Why $n - 1$?

And, the population mean becomes part of the bell curve (i.e. the sample data)



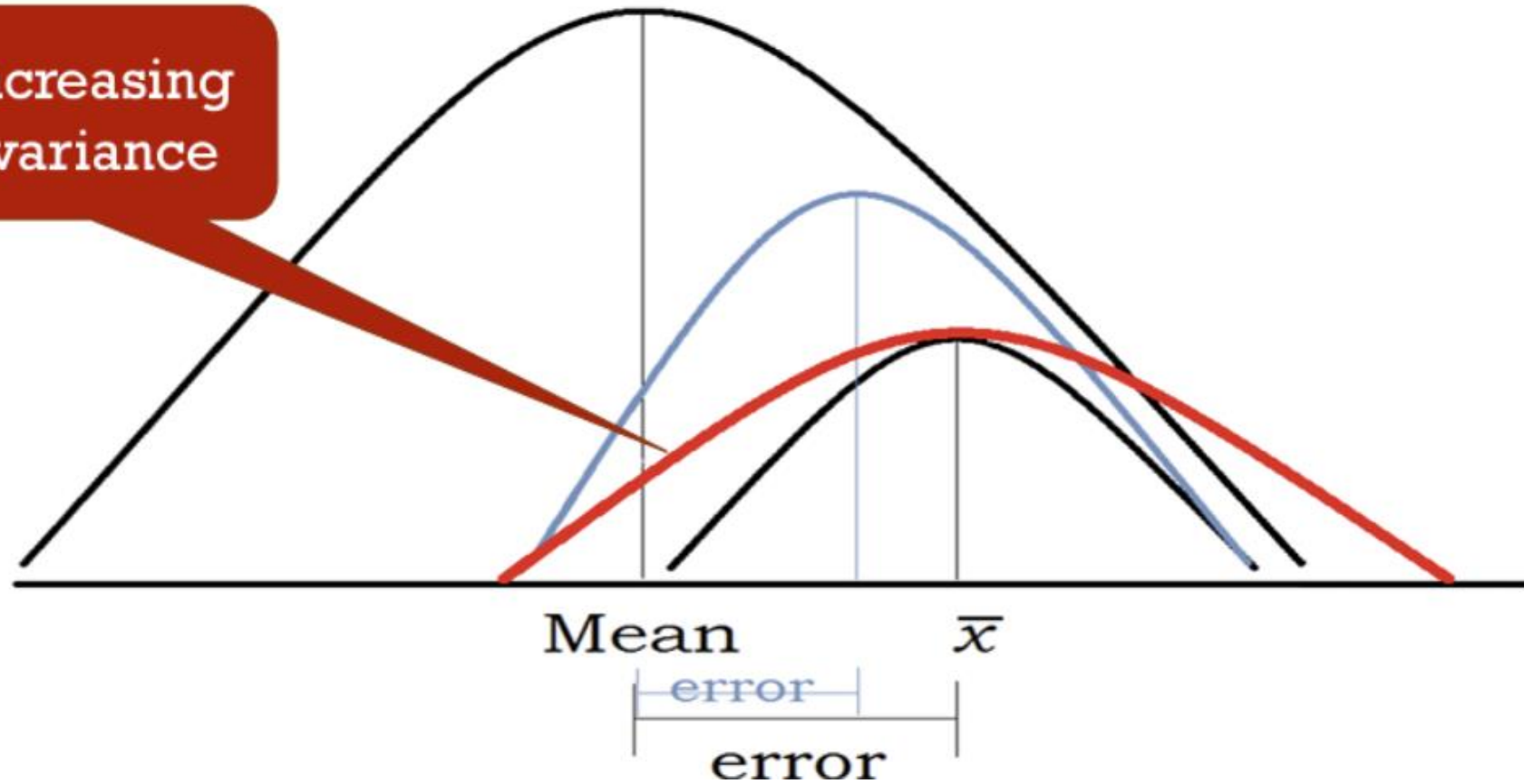
Why $n - 1$?

So how can we increase our chances of including the population mean in a smaller sample?



Why $n - 1$?

By increasing
the variance



Why $n - 1$?

$$\sigma^2 = \frac{\sum (X - \bar{X})^2}{N}$$

$$s^2 = \frac{\sum (X - \bar{X})^2}{N - 1}$$

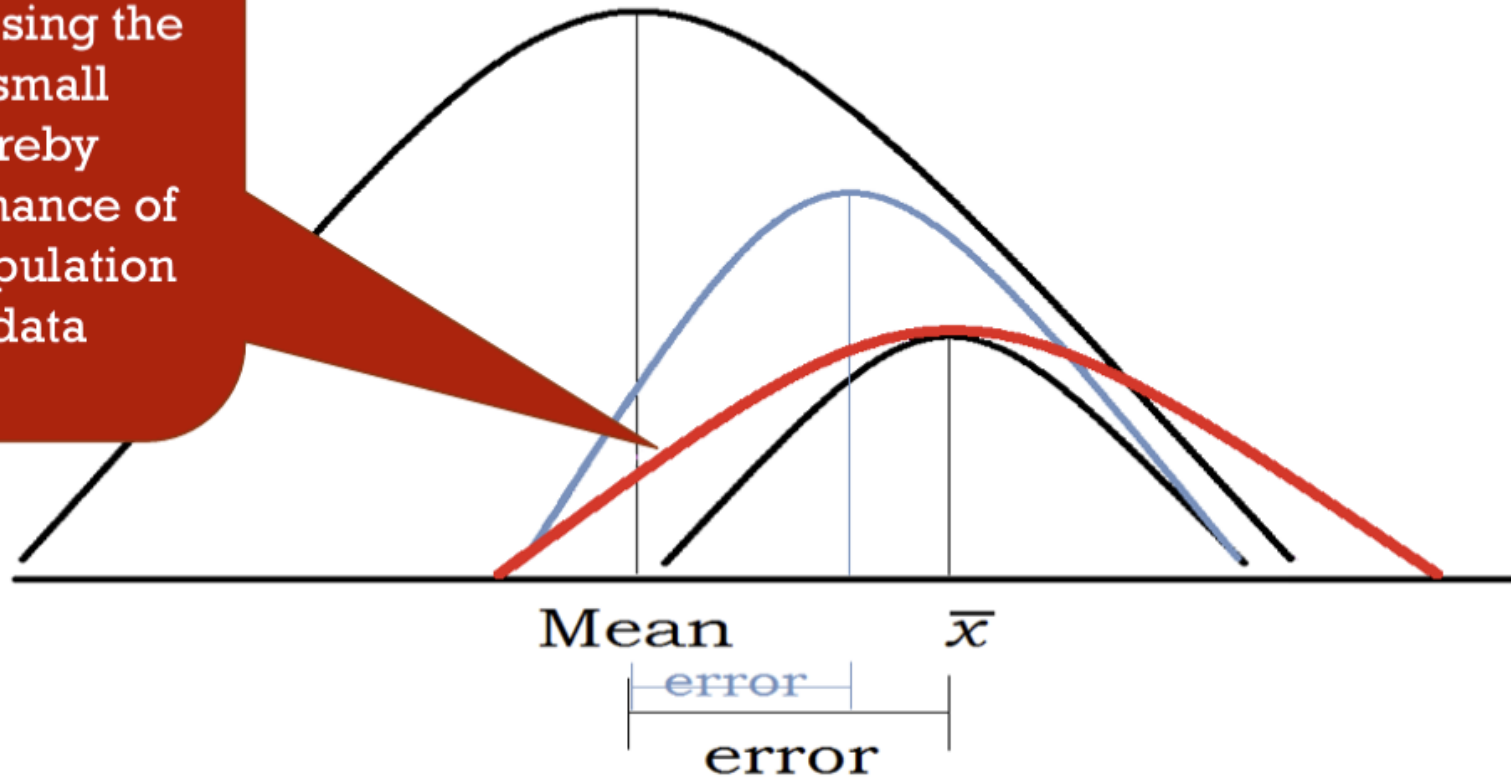
Population & Sample Size	$240 / n$	$240 / (n - 1)$
4	60	80
6	40	48
8	30	34.2
10	24	21.8
20	12	12.6

Assume $\sum (X - \bar{X})^2 = 240$



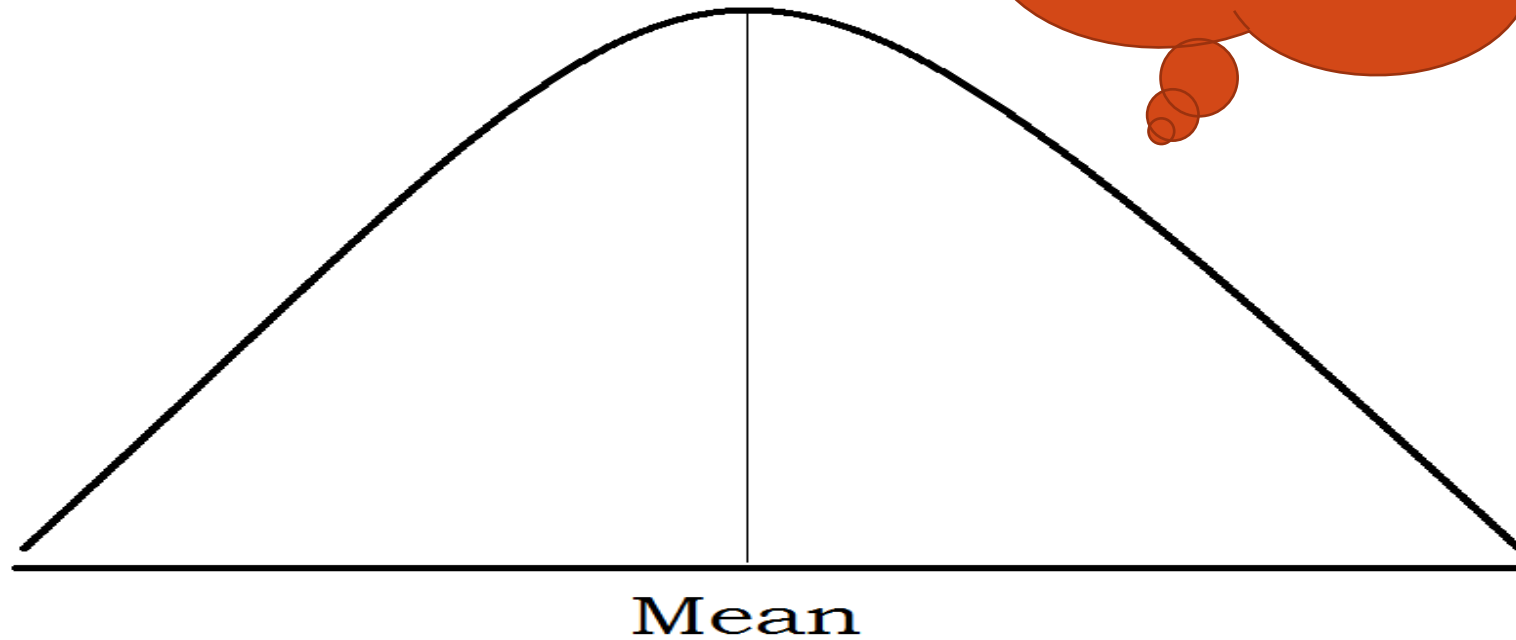
Why $n - 1$?

By using $n - 1$, we are effectively increasing the variance (for small samples), thereby increasing our chance of including the population mean in our data



Why $n - 1$?

So why not use $n - 1$
for all calculations?



Why $n - 1$?

Because there is no error (*due to sample size*) when analyzing entire population data

