Population Parameters

$$\beta = \quad \alpha = \quad \sigma_e =$$

Draw one real sample

Real sample

$n =$

Construct its **sample distribution**.

Imagined sample

Imagined sample

Imagined sample

Imagined sample

....

and calculate its sample statistic

$b =$

b

b

b

b

Imagine (or simulate) drawing many other samples, each with their own sample distribution and sample statistic.

Gather all the sample statistics into an *imagined* **sampling distribution**.
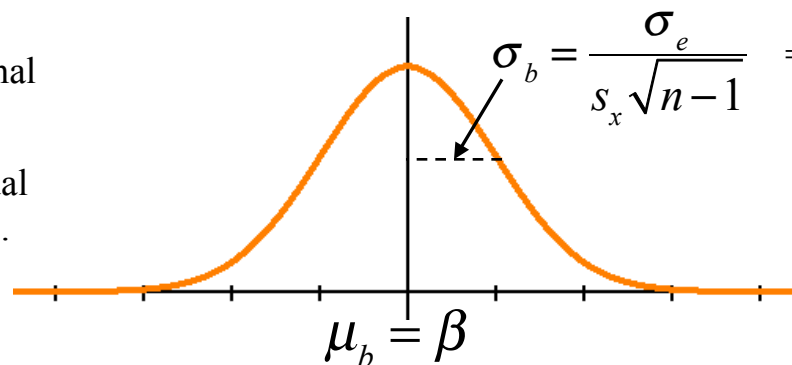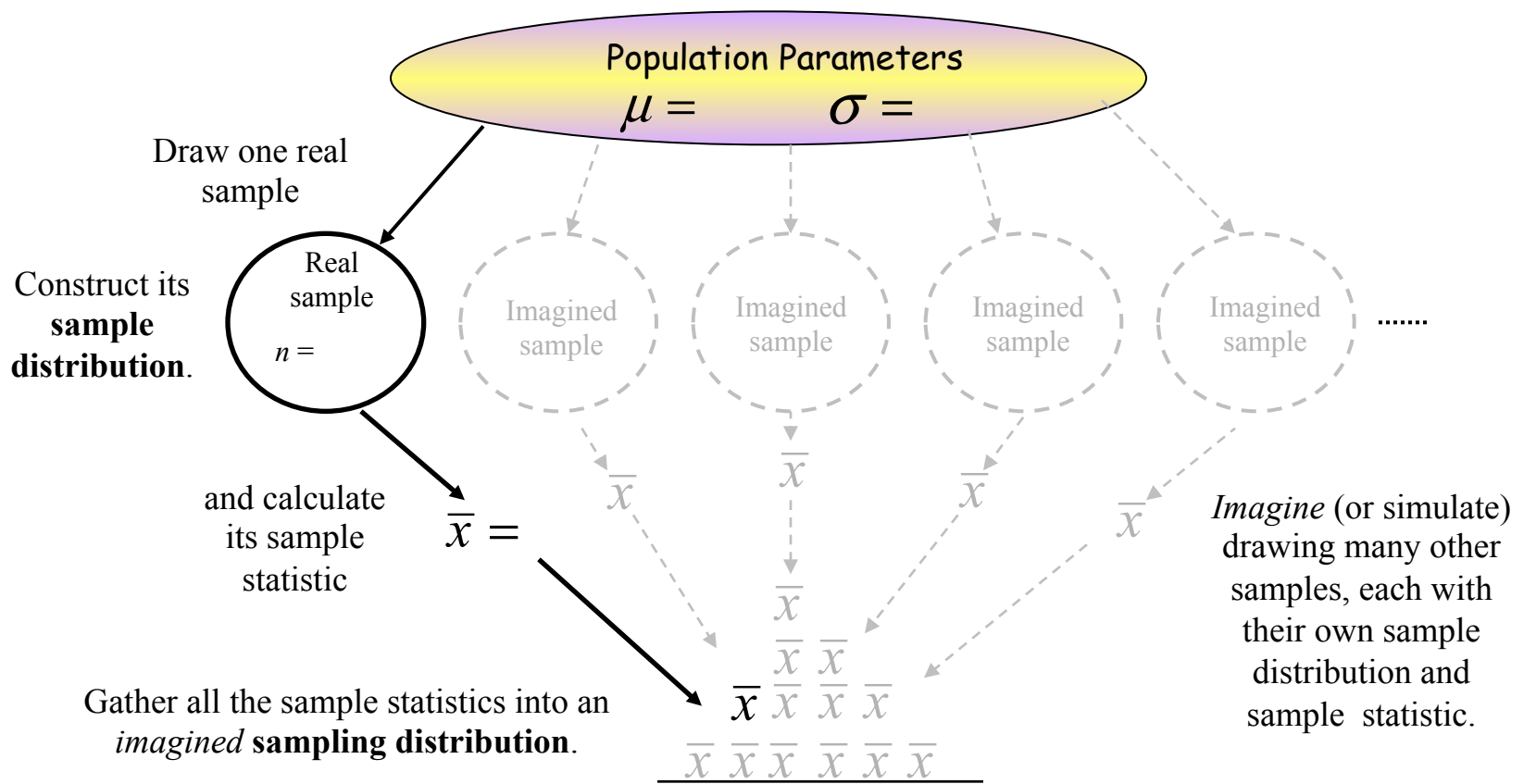
b b b b

b b b b b b

Conditions for Linear Regression

__ Linear - Scatterplot straight enough.

__ Independent data. (10% condition for sampling without replacement from finite population.)

__ Normal – residuals nearly normal with no outliers.

__ Equal Variance – check for equal scatter in residuals for all x-values.

__ Random – Random sample or random assignment

Central Limit Theorem

$$\sigma_b = \frac{\sigma_e}{s_x \sqrt{n-1}} \quad = \text{standard deviation}$$

$$\mu_b = \beta$$

The mean of the Normal model will be the population parameter

Population Parameter

$$p =$$

Draw one real sample

Real sample

$$n =$$

Construct its **sample distribution**.

Imagined sample

Imagined sample

Imagined sample

Imagined sample

....

$\hat{p}$ $\hat{p}$ $\hat{p}$ $\hat{p}$

and calculate its sample statistic

$$\hat{p} =$$

$\hat{p}$
$\hat{p}$ $\hat{p}$
$\hat{p}$ $\hat{p}$ $\hat{p}$ $\hat{p}$
$\hat{p}$ $\hat{p}$ $\hat{p}$ $\hat{p}$ $\hat{p}$ $\hat{p}$

Gather all the sample statistics into an *imagined* **sampling distribution**.

Imagine (or simulate) drawing many other samples, each with their own sample distribution and sample statistic.

Conditions:

__ 10% condition

__ Normal Condition

$np \geq 10$ and $n(1-p) \geq 10$

$$\sqrt{\frac{p(1-p)}{n}} = \text{with standard deviation}$$

$$p = \text{The mean of the sampling distribution will be the population parameter}$$

Population Parameters

$\mu =$ $\sigma =$

Draw one real sample

Construct its **sample distribution**.

Real sample

$n =$

Imagined sample

Imagined sample

Imagined sample

Imagined sample

....

and calculate its sample statistic

$\bar{x} =$

$\bar{x}$ $\bar{x}$ $\bar{x}$ $\bar{x}$

Imagine (or simulate) drawing many other samples, each with their own sample distribution and sample statistic.

Gather all the sample statistics into an *imagined* **sampling distribution**.

$\bar{x}$ $\bar{x}$

$\bar{x}$ $\bar{x}$ $\bar{x}$ $\bar{x}$

$\bar{x}$ $\bar{x}$ $\bar{x}$ $\bar{x}$ $\bar{x}$ $\bar{x}$

Central Limit Theorem

Conditions:

__ 10% condition

__ Normal Condition

$n \geq 30$ if population not Normal

(or unknown)

$$SD(\bar{x}) = \frac{\sigma}{\sqrt{n}}$$ standard deviation

The mean of the sampling distribution will be the population parameter

$$\mu_{\bar{x}} = \mu$$