# CONFIDENCE INTERVALS
# HYPOTHESES TESTING

**INTERVAL: TEST STATISTIC: *n* NEEDED:**

## ONE POPULATION MEAN

$$\bar{x} \pm t_c \times \frac{s}{\sqrt{n}} \qquad \frac{\bar{x}-\mu_0}{s/\sqrt{n}} \qquad \left(\frac{z_c \times s}{E}\right)^2$$

DISTRIBUTION: $t_{n-1}$ ($z$ WHEN SAMPLE SIZE IS LARGE OR EXACT F GIVEN)

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## DIFFERENCE OF TWO POPULATION MEANS

LARGE SAMPLES

$$\bar{x}_1-\bar{x}_2 \pm z_c \times \sqrt{\frac{s_1^2}{n_1}+\frac{s_2^2}{n_2}} \qquad \frac{\bar{x}_1-\bar{x}_2}{\sqrt{\frac{s_1^2}{n_1}+\frac{s_2^2}{n_2}}}$$

(NORMAL $z$ )

## SMALL SAMPLES

$$\bar{x}_1 - \bar{x}_2 \pm t_c \times \sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \times \sqrt{\frac{(n_1 - 1)\, s_1^2 + (n_2 - 1)\, s_2^2}{n_1 + n_2 - 2}}$$

$$\frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \cdot \sqrt{\frac{(n_1 - 1) s_1^2 + (n_2 - 1) s_2^2}{n_1 + n_2 - 2}}}$$

( $t$ WITH $n_1 + n_2 - 2$ DEGREES OF FREEDOM)

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## PAIRED SAMPLES

$$\frac{\bar{d}}{s_d}\sqrt{n}$$

( $t$ WITH $n - 1$ DEGREES OF FREEDOM, OR $z$ - LARGE SAMPLES)

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## ONE POPULATION PROPORTION

$$\hat{p} \pm z_c \times \sqrt{\frac{\hat{p} \times \hat{q}}{n}}$$

$$\frac{\hat{p} - p_0}{\sqrt{\frac{p_0 \times q_0}{n}}}$$

$$\hat{p} \times \hat{q} \times \left(\frac{z_c}{E}\right)^2$$

OR $\frac{1}{4}\times\left(\frac{z_c}{E}\right)^2$

IF NO PRELIMINARY ESTIMATE AVAILABLE

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**DIFFERENCE OF TWO POP. PROPORTIONS**

$$\hat{p}_1-\hat{p}_2 \pm z_c\cdot\sqrt{\frac{\hat{p}_1\hat{q}_1}{n_1}+\frac{\hat{p}_2\hat{q}_2}{n_2}}$$

$$\frac{\hat{p}_1-\hat{p}_2}{\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}\cdot\sqrt{\hat{p}\cdot\hat{q}}}$$

( $\hat{p}$ IS THE <u>POOLED</u> SAMPLE PROPORTION)

# REGRESSION AND CORRELATION

## SAMPLE SLOPE AND INTERCEPT

$$b=\frac{SP_{xy}}{SS_x}$$

$$a=\bar{y}-b\cdot\bar{x}$$

## RESIDUAL STANDARD DEVIATION

$$s_r=\sqrt{\frac{SS_y-b\cdot SP_{xy}}{n-2}}$$

PREDICTION INTERVAL

$$a + b \cdot x_0 \pm t_c \cdot s_r \cdot \sqrt{1 + \frac{1}{n} + \frac{(x_0 - \bar{x})^2}{SS_x}}$$

( $t$ WITH $n$ - 2 DEGREES OF FREEDOM)

SAMPLE CORRELATION COEFFICIENT

$$r \equiv \frac{SP_{xy}}{\sqrt{SS_x \cdot SS_y}}$$

COEFFICIENT OF DETERMINATION: $r^2$

TESTING $H_0: \$ = 0$ ..... TEST STATISTIC:

$$\frac{b}{s_r} \cdot \sqrt{SS_x}$$

( $t$ WITH $n$ - 2 DEGREES OF FREEDOM)