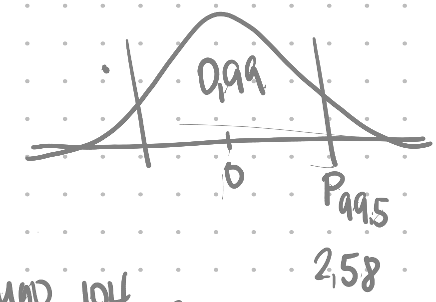
1. Se requiere calcular el tamaño de muestra para estimar μ



$$n = \frac{Z_{\alpha/2}^2\,\sigma^2}{e^2}$$

confianza: 99%

varianza — $\hat{\sigma} \approx \frac{\text{Rango}}{4} = \frac{104}{4} = 2$

error de muestreo

$|\bar{x} - \mu| < e = 5\,lb$

$$n = \frac{2{,}58^2 \times 26^2}{5^2} = 179{,}98 \simeq 180$$

R/ se deben encuestar 180 jóvenes

Tambien se requiere estimar el tamaño de muestra para estimar una proporción.

$$n = \frac{Z_{\alpha/2}^2\; pq}{e^2}$$

confianza — $Z_{\alpha/2} = 2{,}58$

varianza $\longrightarrow$ i) Prueba piloto $\hat{p}$

ii) varianza máxima

$0{,}5 \times (1-0{,}5) = 0{,}25$

error de muestreo

$$n = \frac{2{,}58^2 \times 0{,}25}{0{,}05^2} = 665{,}6 \simeq 666 \text{ jóvenes encuestar}$$

NOTA: En caso de población FINITA y tener

$\frac{n}{N} > 0{,}05$, se debe corregir el tamaño de la muestra

$$n = \frac{N \times n_0}{N + n_0 - 1}$$

2. Se requiere estimar $IC_{\mu_1-\mu_2}$ en grupos independientes

2

1

$$(\bar{x}_1-\bar{x}_2) \pm t_{\substack{v=n_1+n_2-2 \\ \alpha/2}} \, S_p\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}$$

Supuestos

- $X_1 \sim N(\mu_1, \sigma_1^2)$
- $X_2 \sim N(\mu_2, \sigma_2^2)$
- $\sigma_1^2 = \sigma_2^2$

$H_0: \sigma_1^2 = \sigma_2^2$

$H_a: \sigma_1^2 \neq \sigma_2^2$

Edep $F = \dfrac{S_1^2}{S_2^2}$

3

$$(\bar{x}_1-\bar{x}_2) \pm t_{\substack{v \\ \alpha/2}} \sqrt{\frac{S_1^2}{n_1}+\frac{S_2^2}{n_2}}$$

Supuestos

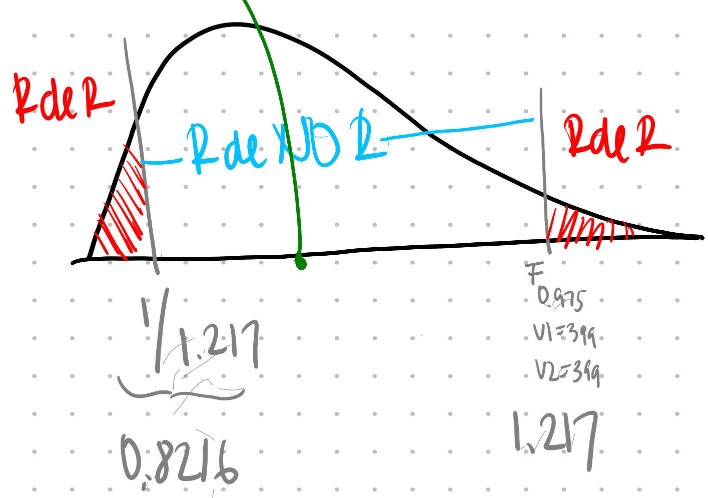
- $X_1 \sim N(\mu_1, \sigma_1^2)$
- $X_2 \sim N(\mu_2, \sigma_2^2)$
- $\sigma_1^2 \neq \sigma_2^2$

1

$H_0: \sigma_1^2 = \sigma_2^2$

$H_a: \sigma_1^2 \neq \sigma_2^2$

Edep $F = \dfrac{25^2}{28^2} = 0{,}7972$



Como el Edep cae en la RdeNOR, no se rechaza Ho, Asumo que Ho es V

Asumo que $\sigma_1^2 = \sigma_2^2$ → 2 //

$$IC_{\mu_1-\mu_2}: (\bar{X}_1-\bar{X}_2) \pm t_{\substack{v=n_1+n_2-2 \\ \alpha/2}} S_p \sqrt{\frac{1}{n_1}+\frac{1}{n_2}}$$

$$S_p^2 = \frac{(n_1-1)S_1^2+(n_2-1)S_2^2}{n_1+n_2-2} = \frac{399 \times 25^2 + 399 \times 28^2}{798} = 704{,}5$$

$$(73-63) \pm 1{,}9629 \times \sqrt{704{,}5} \times \sqrt{\frac{1}{400}+\frac{1}{400}} =$$

$$10 \pm 3{,}68 = (6{,}322 ; 13{,}678) //$$

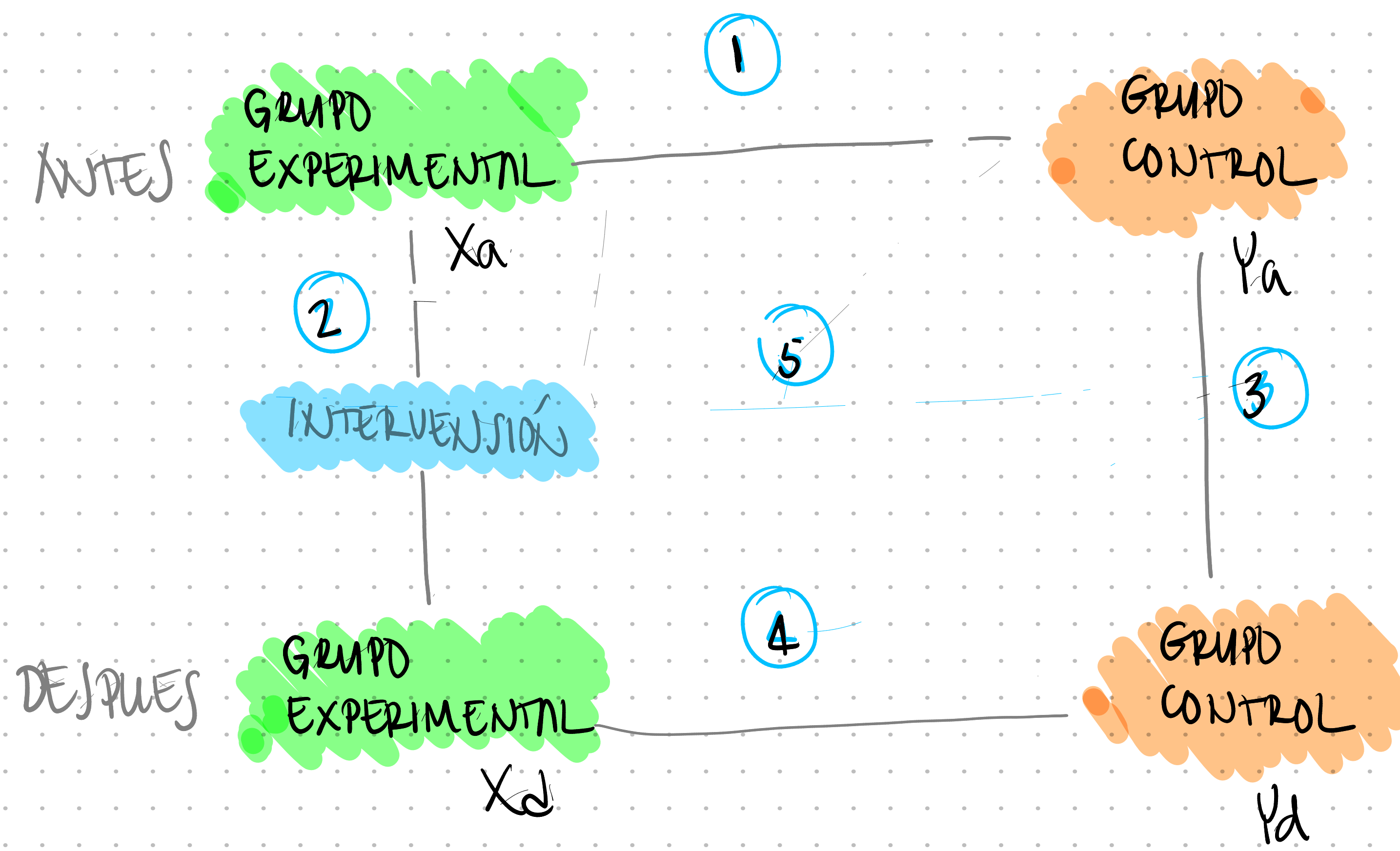
$(+,+)$

$\mu_1 > \mu_2$ ///

R/

Se puede afirmar que se ha reducido el promedio de carne entre 6,3 y 13,7 lbs con una confianza del 95%

3



1 $H_0: \mu_{xa} = \mu_{ya}$ grupos independientes

2 $H_0: \mu_{xa} = \mu_{xd}$ grupos pareados

3 $H_0: \mu_{ya} = \mu_{yd}$ grupos independientes

4 $H_0: \mu_{xd} = \mu_{yd}$ grupos pareados

$\bar{X}_a = 8{,}56$	$\bar{Y}_a = 9{,}00$
$S^2_{xa} = 16{,}78$	$S^2_{ya} = 14{,}75$
$\bar{X}_d = 2{,}89$	$\bar{Y}_d = 7{,}44$
$S^2_{xa} = 5{,}11$	$S^2_{yd} = 15{,}78$
$n_x = 9$	$n_y = 9$

1 Se requiere validar que los grupos son comparables

$H_o: \mu_{xa} = \mu_{ya}$

$H_a: \mu_{xa} \neq \mu_{ya}$

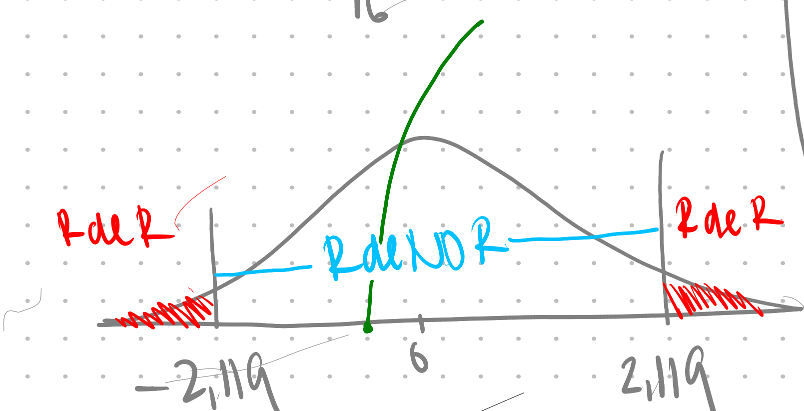
EdeP

$$T = \frac{(\bar{x}_1 - \bar{x}_2) - \Delta_0}{S_p\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \sim t_{v = n_1 + n_2 - 2}$$

$$T = \frac{(8{,}56 - 9{,}00)}{3.97 \times \sqrt{\frac{1}{9} + \frac{1}{9}}} = -0{,}235$$

$$S_p^2 = \frac{(n_1-1)S_1^2 + (n_2-1)S_2^2}{n_1 + n_2 - 2}$$

$$= \frac{8 \times 16{,}78 + 8 \times 14{,}75}{16} = 15{,}765$$

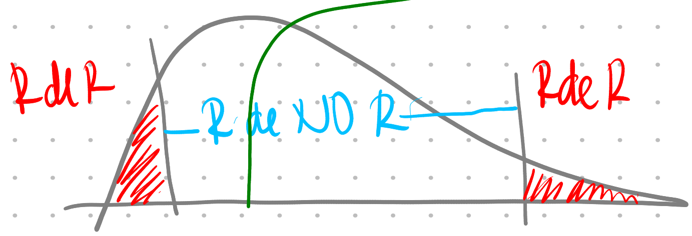


$H_o: \sigma^2_{xa} = \sigma^2_{ya}$

$H_a: \sigma^2_{xa} \neq \sigma^2_{ya}$

EdeP

$$F = \frac{S^2_{xa}}{S^2_{ya}} = \frac{4{,}10^2}{3{,}84^2} = 1{,}14$$



$F_{0{,}025}$, $v_1 = 8$, $v_2 = 8$

$F_{0{,}975}$, $v_1 = 8$, $v_2 = 8$

qf(0,025, 8,8) → 0,225

qf(0,975, 8,8) → 4.433

Asumo que $\sigma^2_{xa} = \sigma^2_{ya}$

R/ No se rechaza Ho se asume que $\mu_{xa} = \mu_{ya}$ ///

2

$H_0: \mu_{xa} = \mu_{xd}$ grupos pareados

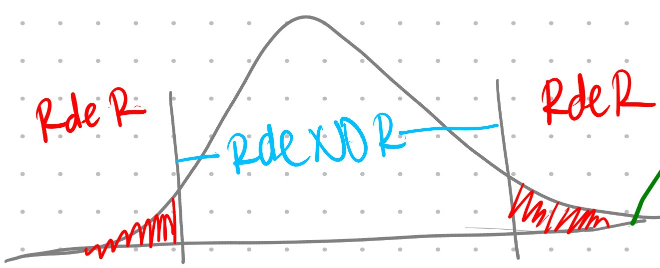
$H_a: \mu_{xa} \neq \mu_{xd}$

E de P $T = \dfrac{\bar{d} - \Delta_0}{S_d / \sqrt{n}} \sim t_{\alpha/2,\; v=n-1}$

$d_i = x_a - x_d$

d_i	
14	$\bar{d} = 5{,}67$
6	$S_d = 4{,}15$
4	
2	
-1	
8	
7	
6	
5	

$$T = \frac{5{,}67 - 0}{4{,}15 / \sqrt{9}} = 4{,}10$$



$-2{,}31$

$t_{\alpha/2}$ $v=8$

qt(0,975,8)

2,31

Rechazamos H_0

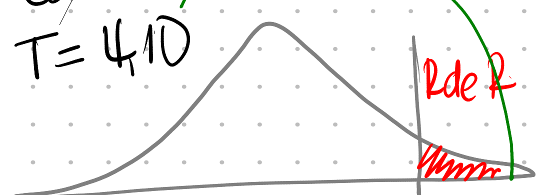
$\mu_{xa} \neq \mu_{xd}$

$H_0: \mu_{xa} \leq \mu_{xd}$

$H_a: \mu_{xa} > \mu_{xd}$

E de P

$T = 4{,}10$



t_α $v=8$

1.86

Rechazamos H_0

$\mu_{xa} > \mu_{xd}$

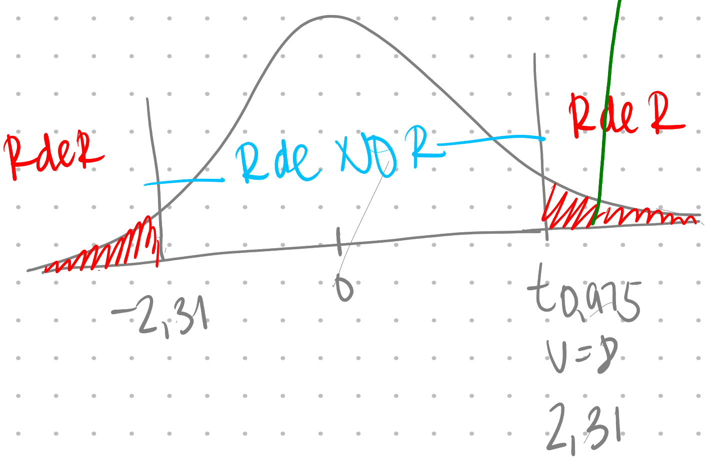
3

$H_0: \mu_{ya} = \mu_{yd}$

$H_a: \mu_{ya} \neq \mu_{yd}$

$$T = \frac{\bar{d} - \Delta_0}{S_d/\sqrt{n}} \sim t_{v=n-1}$$

$$T = \frac{1{,}56 - 0}{1{,}33/\sqrt{9}} = 3{,}52$$



Rechazamos Ho

$\mu_{ya} \neq \mu_{yd}$

grupos pareados

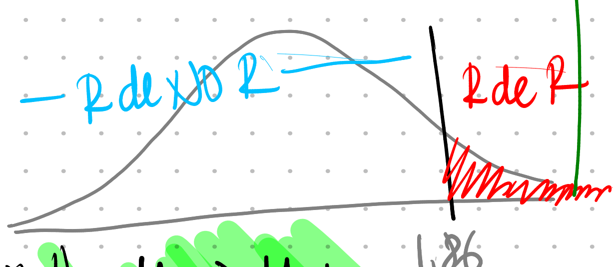
$d = y_a - y_d$

$$\left.\begin{array}{r} 1 \\ -1 \\ 2 \\ 1 \\ 2 \\ 2 \\ 1 \\ 4 \\ 2 \end{array}\right\} \quad \bar{d} = 1{,}56 \quad S_d = 1{,}33$$

$H_0: \mu_{ya} \leq \mu_{yd}$

$H_a: \mu_{ya} > \mu_{yd}$

Edep $\quad T = 3{,}52$



Rechazamos Ho, $\mu_{ya} > \mu_{yd}$

4

$H_o: \mu_{xd} = \mu_{yd}$

$H_a: \mu_{xd} \neq \mu_{yd}$

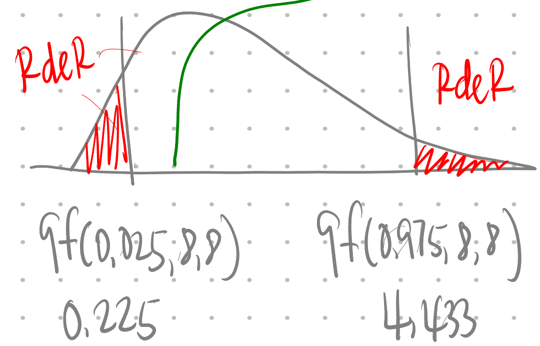
grupos independientes

$H_o: \sigma^2_{xd} = \sigma^2_{yd}$

$H_a: \sigma^2_{xa} \neq \sigma^2_{yd}$

EdeP

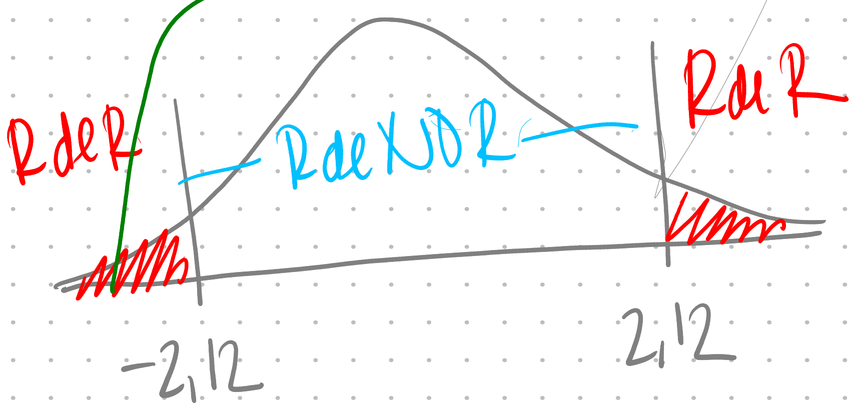
$$F = \frac{7,44}{15,78} = 0,47$$



Asumo $\sigma^2_{xd} = \sigma^2_{yd}$

EdeP

$$T = \frac{(2,89 - 7,78)}{3,55\sqrt{\frac{1}{9}+\frac{1}{9}}} = -2,92$$

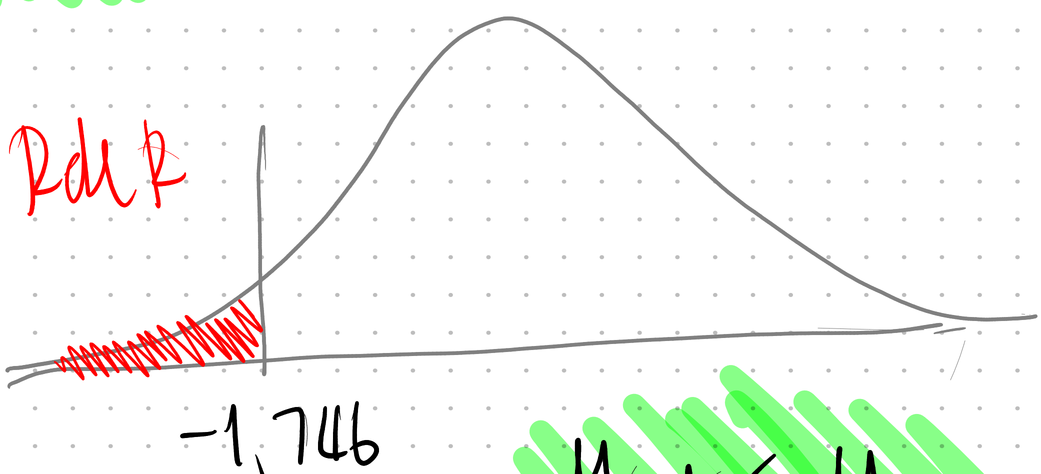


$\therefore \mu_{xa} \neq \mu_{yd}$

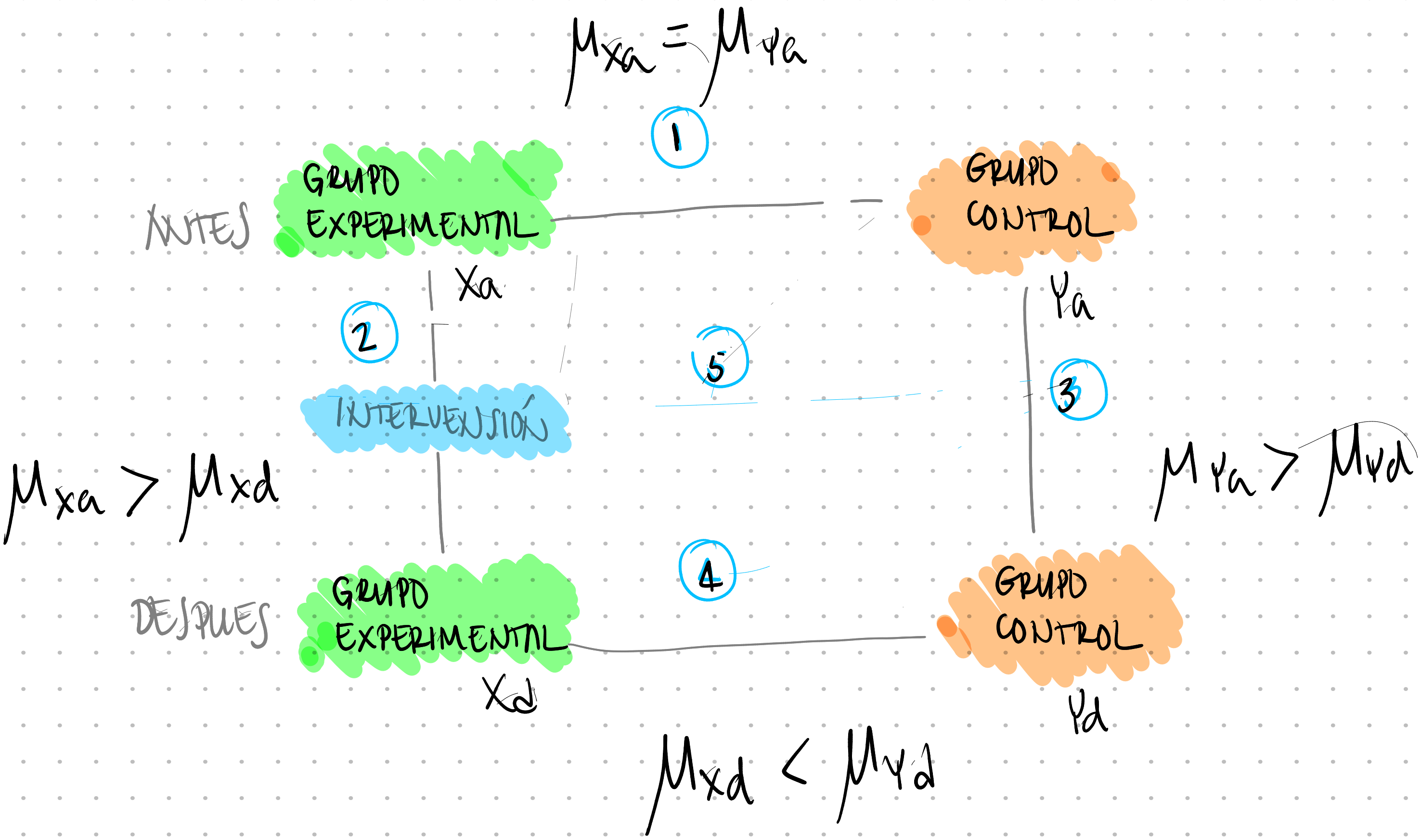
$H_o: \mu_{xd} \geq \mu_{yd}$

$H_a: \mu_{xa} < \mu_{yd}$

EdeP $T = -2,92$



$\mu_{xd} < \mu_{yd}$



con estos resultados debemos realizar una quinta prueba de hipotesis

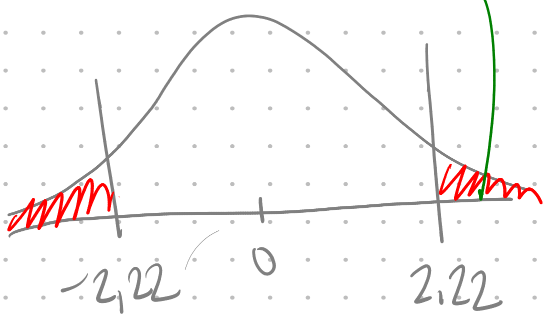
5

$H_0: \mu_{dx} = \mu_{dy}$

$H_a: \mu_{dx} \neq \mu_{dy}$

$T = 3{,}00 \sim t_{v=10.3}$

$\mu_{dx} \neq \mu_{dy}$

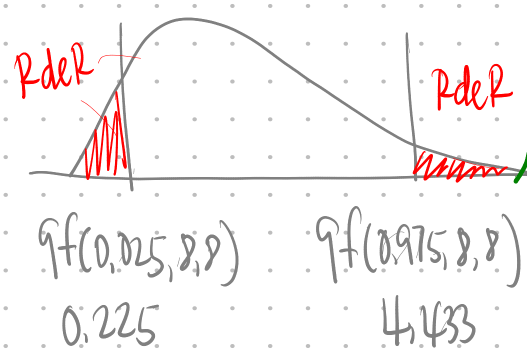


$H_0: \sigma^2_{dx} = \sigma^2_{dy}$

$H_a: \sigma^2_{dx} \neq \sigma^2_{dy}$

EdeP

$F = 7{,}05$



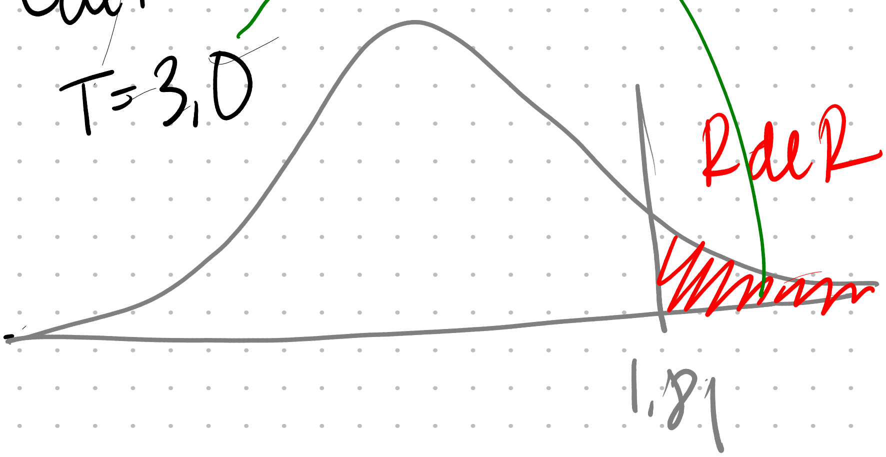
$\sigma^2_{dx} \neq \sigma^2_{dy}$

$H_0: \mu_{dx} \leq \mu_{dy}$

$H_a: \mu_{dx} > \mu_{dy}$

EdeP

$T = 3{,}0$



$\mu_{dx} > \mu_{dy}$

como $\mu_{dx} > \mu_{dy}$ podemos concluir que el tratamiento realizado al grupo experimental fue efectivo