

## Unpooled t procedure (Welch procedure)

I am using the Welch procedure since the population variance of the two samples would not be equal.

Confidence Interval:

$$t_{\alpha/2}: \quad df = \frac{\left(\frac{2.25^2}{47} + \frac{0.77^2}{44}\right)^2}{\frac{1}{47-1}\left(\frac{2.25^2}{47}\right)^2 + \frac{1}{44-1}\left(\frac{0.77^2}{44}\right)^2}$$

$$df = 57$$

$$3.03 - 1.53 \pm t_{\alpha/2} \times \sqrt{\frac{2.25 \times 2.25}{47} + \frac{0.77 \times 0.77}{44}}$$

$$1.5 \pm 2.002 \times 0.348$$

$$1.5 \pm 0.6969$$

$$(0.8031, 2.1969)$$

We can be 95% confident that the different  $\mu_1 - \mu_2$  (for unrehearsed liars and truth tellers) lies between 0.8031 and 2.1969.

Due to zero not being contained in the interval, we do not have any evidence in a difference of population means.

Hypothesis Testing:

$H_0: \mu_1 = \mu_2$  Liars do not have wordier responses to questions

$H_a: \mu_1 \neq \mu_2$  Liars have wordier responses to questions

$$t = \frac{3.03 - 1.53}{\sqrt{\frac{2.25 \times 2.25}{47} + \frac{0.77 \times 0.77}{44}}} = 4.3088$$

This test statistic lies at 4.3088 on the t distribution.

p-value = 3.279114e-05      <- pt(-4.3088, 57) in R

There is very strong evidence against the null hypothesis.

There is very strong evidence of a difference in the mean amount of unrehearsed liars than truth tellers.