t-Test for Independent Samples

Musical Performance Anxiety

1. Perform some preliminary computations.

Group 1		
subject i	**pretest score** X_{1i}	$(X_{1i} - \overline{X})^2$
1	17	4.24
2	16	1.12
3	13	3.77
4	11	15.53
5	12	8.65
6	8	48.18
7	18	9.36
8	13	3.77
9	16	1.12
10	19	16.47
11	16	1.12
12	15	0.00
13	16	1.12
14	20	25.59
15	16	1.12
16	18	9.36
17	10	24.42

count	**mean**	**sum**
N_1	$\overline{X}_1$	$\sum_{i=1}^{N_1}(X_{1i} - \overline{X}_1)^2$
17	14.94	174.94

Group 2		
subject *i*	**pretest score** X_{2i}	$(X_{2i} - \overline{X})^2$
1	18	3.06
2	14	5.06
3	15	1.56
4	17	0.56
5	16	0.06
6	15	1.56
7	24	60.06
8	18	3.06
9	14	5.06
10	15	1.56
11	16	0.06
12	10	39.06
13	14	5.06
14	17	0.56
15	19	7.56
16	18	3.06
17	18	3.06
18	14.5	3.06

count	**mean**	**sum**
N_2	$\overline{X}_2$	$\sum_{i=1}^{N_2}(X_{2i} - \overline{X}_2)^2$
18	16.25	143.13

2. Calculate a pooled estimate of standard error of the difference between two means.

$$s_{\bar{X}_1-\bar{X}_2} = \sqrt{\left(\frac{\sum x_1^2 + \sum x_2^2}{N_1 + N_2 - 2}\right)\left(\frac{1}{N_1} + \frac{1}{N_2}\right)} = \qquad 1.05$$

3. Compute the t-ratio.

$$t = \frac{\bar{x}_1 - \bar{x}_2}{s_{\bar{x}_1-\bar{x}_2}} = \qquad -1.25$$

4. Evaluate the null hypothesis.

H_o: $\mu_{x_1} = \mu_{x_2}$

H_A: $\mu_{x_1} \neq \mu_{x_2}$

With 33 degrees of freedom, the critical t value of 2.042 is required for significance at the .05 level for a two-tailed test.

Since the obtained t-value is - 1.25, one would accept the null hypothesis and conclude that the difference between means is not statistically significant.