t-Test for Independent Samples

Musical Performance Anxiety

1. Perform some preliminary computations.

Group 1		
subject i	**posttest score** X_{1i}	$(X_{1i} - \overline{X})^2$
1	15	1.53
2	19	7.64
3	22	33.23
4	17	0.58
5	13	10.47
6	17	0.58
7	16	0.06
8	14	5.00
9	22	33.23
10	19	7.64
11	13	10.47
12	13	10.47
13	15	1.53
14	12	17.94
15	16	0.06
16	16	0.06
17	17	0.58

count	**mean**	**sum**
N_1	$\overline{X}_1$	$\sum_{i=1}^{N_1}(X_{1i} - \overline{X}_1)^2$
17	16.24	141.06

Group 2		
subject i	posttest score X_{2i}	$(X_{2i} - \overline{X})^2$
1	14	1.63
2	13	5.19
3	16	0.52
4	14	1.63
5	18	7.41
6	15	0.08
7	20.5	27.27
8	19	13.85
9	11	18.30
10	16	0.52
11	13	5.19
12	10	27.85
13	15	0.08
14	17	2.97
15	17	2.97
16	18	7.41
17	15.5	0.05
18	13	5.19

count	mean	sum
N_2	$\overline{X}_2$	$\sum_{i=1}^{N_2} (X_{2i} - \overline{X}_2)^2$
18	15.28	128.11

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

$$s_{\bar{X}_1-\bar{X}_2} = \sqrt{\left(\frac{\sum x_1^2 + \sum x_2^2}{N_1 + N_2 - 2}\right)\left(\frac{1}{N_1} + \frac{1}{N_2}\right)} = \qquad 0.97$$

3. Compute the t-ratio.

$$t = \frac{\bar{x}_1 - \bar{x}_2}{s_{\bar{x}_1-\bar{x}_2}} = \qquad 0.99$$

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 0.99, one would accept the null hypothesis and conclude that the difference between means is not statistically significant.