t-Test for Independent Samples

Musical Performance Quality

1. Perform some preliminary computations.

Group 1		
subject i	**pretest score** X_{1i}	$(X_{1i} - \overline{X})^2$
1	14	0.06
2	14	0.06
3	18	14.17
4	12	5.00
5	13	1.53
6	18	14.17
7	17	7.64
8	18	14.17
9	14	0.06
10	13	1.53
11	11	10.47
12	17	7.64
13	13	1.53
14	13	1.53
15	8	38.88
16	15	0.58
17	14	0.06

count	**mean**	**sum**
N_1	$\overline{X}_1$	$\sum_{i=1}^{N_1}(X_{1i} - \overline{X}_1)^2$
17	14.24	119.06

Group 2		
subject i	**pretest score** X_{2i}	$(X_{2i} - \overline{X})^2$
1	20	17.36
2	19	10.03
3	18	4.69
4	10	34.03
5	23	51.36
6	9	46.69
7	14	3.36
8	11	23.36
9	18	4.69
10	21	26.69
11	14	3.36
12	21	26.69
13	14	3.36
14	14	3.36
15	12	14.69
16	14	3.36
17	12	14.69
18	21	26.69

count	**mean**	**sum**
N_2	$\overline{X}_2$	$\sum_{i=1}^{N_2}(X_{2i} - \overline{X}_2)^2$
18	15.83	318.50

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

$$s_{\bar{X}_1-\bar{X}_2} = \sqrt{\left(\frac{\sum x_1^2 + \sum x_2^2}{N_1 + N_2 - 2}\right)\left(\frac{1}{N_1} + \frac{1}{N_2}\right)} = \qquad 1.23$$

3. Compute the t-ratio.

$$t = \frac{\bar{x}_1 - \bar{x}_2}{s_{\bar{x}_1-\bar{x}_2}} = \qquad -1.30$$

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