

Repeated Measures ANOVA

Descriptives

CI %: 95

Level	N	M	SD	SE	Lower	Upper
1	4	2.000	2.449	1.225	-1.898	5.898
2	4	6.000	2.449	1.225	2.102	9.898
Total	8	4.000	3.117	1.102	1.394	6.606

Tests of Within Subjects Effects

Source	SS	df	MS	F	p	Eta-Sq
Factor	32.000	1	32.000	10.667	0.047	0.780
Error	24.667	6	4.111			

Tests of Between Subjects Effects

Source	SS	df	MS
Error	27.000	3	9.000

Between-subjects error refers to the average differences across the participants of the study. This Sum of Squares is not easily determined from the summary statistics output, but rather from the data (and the calculations are therefore not shown here). However:

$$df_{SUBJECTS} = \#subjects - 1 = 3$$

The "Mean Square" is the usual ratio of the Sum of Squares to the degrees of freedom.

The "F" statistic is a ratio of the effect and within-subjects error variance estimates:

$$F = \frac{MS_{EFFECT}}{MS_{ERROR}} = \frac{32.000}{3.000} = 10.667$$

An F with 1 and 3 df that equals 10.667 has a two-tailed probability of .047, a statistically significant finding.

These descriptive statistics are calculated separately for each level or condition. Because sample sizes are equal, a grand mean can be determined by averaging these two level means:

$$M_{TOTAL} = (M_{LEVEL} + M_{LEVEL})/2 = (2.000 + 6.000)/2 = 4.000$$

The statistics for the effect ("Factor") are functions of the means of the levels or conditions and the sample sizes:

$$SS_{EFFECT} = \sum n_{LEVEL}(M_{LEVEL} - M_{TOTAL})^2$$

$$SS_{EFFECT} = 4(2.0 - 4.0)^2 + 4(6.0 - 4.0)^2 = 32.000$$

$$df_{EFFECT} = \#levels - 1 = 1$$

The "Mean Square" is the usual ratio of the Sum of Squares to the degrees of freedom.

$$MS_{EFFECT} = \frac{SS_{EFFECT}}{df_{EFFECT}} = \frac{32.000}{1} = 32.000$$

The within-subjects "Error" is a function of variabilities of the separate levels or conditions of the factor and the "between-subjects error" given above. Because SS for each level can be determined ($SS = SD^2 \times df$, which equals 18.000 for each of the two outcomes):

$$SS_{ERROR} = SS_1 + SS_2 - SS_{SUBJECTS}$$

$$SS_{ERROR} = 18.000 + 18.000 - 27.000 = 9.000$$

$$df_{ERROR} = df_1 + df_2 - df_{SUBJECTS} = 3 + 3 - 3 = 3.000$$

The "Mean Square" is the usual ratio of the Sum of Squares to the degrees of freedom.

The partial "Eta-Squared" statistic is a ratio of the effect and the total group variability ("Sum of Squares") estimates:

$$Partial \eta^2 = \frac{SS_{EFFECT}}{SS_{EFFECT} + SS_{ERROR}}$$

$$Partial \eta^2 = \frac{32.000}{32.000 + 9.000} = 0.780$$

Thus, 78.0% of the variability in Outcome scores (after removing individual differences) is accounted for by the repeated measures.