

SPSS Analysis Using General Linear Model – Repeated Measures Solitary Confinement Experiment

The data are from an experiment run to evaluate the effect of solitary confinement on brain activity of prisoners, i.e. frequency of brain waves. There are two factors of interest: the between subjects factor (Solitary Confinement – Yes/No) and the within subjects factor (Day – 1, 4, 7). The subjects, prisoners, are repeatedly measured on days 1, 4, and 7. There are five columns in the SPSS Data Table: Solitary, Prisoner, Day1, Day4 and Day7.

| Solitary Confinement | Prisoner | Day 1 | Day 4 | Day 7 |
|----------------------|----------|-------|-------|-------|
| Yes | 1 | 14 | 7 | 6 |
| Yes | 2 | 24 | 16 | 14 |
| Yes | 3 | 21 | 10 | 7 |
| Yes | 4 | 20 | 14 | 13 |
| Yes | 5 | 15 | 5 | 2 |
| Yes | 6 | 17 | 6 | 3 |
| Yes | 7 | 16 | 11 | 9 |
| Yes | 8 | 10 | 8 | 5 |
| Yes | 9 | 6 | 3 | 0 |
| Yes | 10 | 32 | 20 | 19 |
| No | 11 | 20 | 20 | 17 |
| No | 12 | 16 | 15 | 17 |
| No | 13 | 15 | 17 | 14 |
| No | 14 | 20 | 17 | 19 |
| No | 15 | 14 | 16 | 15 |
| No | 16 | 13 | 13 | 13 |
| No | 17 | 4 | 6 | 6 |
| No | 18 | 22 | 22 | 21 |
| No | 19 | 21 | 21 | 22 |
| No | 20 | 13 | 12 | 14 |

You will need to use Analyze – General Linear Model – Repeated Measures

- Within subject factor name: Day
Number of Levels: 3
Click on Define
- Add Day1, Day4 and Day7 as Within-Subjects Variables.
- Add Solitary as the Between-Subjects Factor(s).
- The Model should be Full Factorial (this is the default).
- Click on Post Hoc and select LSD and put Solitary under Post Hoc tests for.
Click on Continue.
- Click on OK.

Some of the output from this analysis appears below.

Tests of Within-Subjects Effects

Measure: MEASURE_1

| Source | | Type III Sum of Squares | df | Mean Square | F | Sig. |
|-----------------------|---------------------------|-------------------------|-----------|----------------|---------------|-------------|
| Day | Sphericity Assumed | 256.900 | 2 | 128.450 | 45.335 | .000 |
| | Greenhouse-Geisser | 256.900 | 1.467 | 175.153 | 45.335 | .000 |
| | Huynh-Feldt | 256.900 | 1.653 | 155.387 | 45.335 | .000 |
| | Lower-bound | 256.900 | 1.000 | 256.900 | 45.335 | .000 |
| Day * Solitary | Sphericity Assumed | 260.433 | 2 | 130.217 | 45.959 | .000 |
| | Greenhouse-Geisser | 260.433 | 1.467 | 177.562 | 45.959 | .000 |
| | Huynh-Feldt | 260.433 | 1.653 | 157.524 | 45.959 | .000 |
| | Lower-bound | 260.433 | 1.000 | 260.433 | 45.959 | .000 |
| Error(Day) | Sphericity Assumed | 102.000 | 36 | 2.833 | | |
| | Greenhouse-Geisser | 102.000 | 26.401 | 3.864 | | |
| | Huynh-Feldt | 102.000 | 29.759 | 3.428 | | |
| | Lower-bound | 102.000 | 18.000 | 5.667 | | |

Rather than doing comparisons, SPSS automatically calculates linear and quadratic contrasts for the within-subjects factor. The two F-tests indicate that both the linear and quadratic contrasts are statistically significant. This means that as Day increases, mean brain wave frequency changes in a way that is both linear and curved.

Tests of Within-Subjects Contrasts

Measure: MEASURE_1

| Source | Day | Type III Sum of Squares | df | Mean Square | F | Sig. |
|----------------|-----------|-------------------------|----|-------------|--------|------|
| Day | Linear | 235.225 | 1 | 235.225 | 64.104 | .000 |
| | Quadratic | 21.675 | 1 | 21.675 | 10.853 | .004 |
| Day * Solitary | Linear | 235.225 | 1 | 235.225 | 64.104 | .000 |
| | Quadratic | 25.208 | 1 | 25.208 | 12.622 | .002 |
| Error(Day) | Linear | 66.050 | 18 | 3.669 | | |
| | Quadratic | 35.950 | 18 | 1.997 | | |

Tests of Between-Subjects Effects

Measure: MEASURE_1

Transformed Variable: Average

| Source | Type III Sum of Squares | df | Mean Square | F | Sig. |
|-----------------|-------------------------|-----------|----------------|--------------|-------------|
| Intercept | 11426.400 | 1 | 11426.400 | 127.733 | .000 |
| Solitary | 248.067 | 1 | 248.067 | 2.773 | .113 |
| Error | 1610.200 | 18 | 89.456 | | |

Warnings

Post hoc tests are not performed for Solitary because there are fewer than three groups.