**Factorial ANOVA**

**Repeated measures two-way ANOVA**

Students’ levels of anxiety were measured based on two sources, examinations and social interaction. Both factors were measured pre- and post-activity. Each measurement used a scale of 1 to 10, 1 being the lowest and 10 being the highest. One of the factors is the source of anxiety; the other is time before and after the activity.

Perform a repeated measures two-way ANOVA to analyze the individual and interaction effects of activity and time on the students’ anxiety levels (on the Repeated-measures two-way ANOVA csv file).

|  |  |  |  |
| --- | --- | --- | --- |
| PreExam\_Anxiety | PostExam\_Anxiety | PreSocial\_Anxiety | PostSocial\_Anxiety |
| 6 | 5 | 9 | 7 |
| 9 | 6 | 6 | 4 |
| 5 | 3 | 8 | 5 |
| 6 | 2 | 5 | 5 |
| 6 | 5 | 9 | 6 |
| 3 | 3 | 7 | 5 |
| 9 | 6 | 7 | 5 |
| 4 | 2 | 4 | 3 |
| 8 | 5 | 6 | 5 |
| 7 | 2 | 8 | 4 |

**Between-Subjects ANOVA**

During a period of lockdown for COVID-19, wellbeing is broken down according to social class and environs. Class: 1 = poor, 2 = working class, 3 = middle class, 4 = upper middle/upper class.

Environs: 1 = urban, 2 = suburban, 3 = rural

The results are as follows (in the Between Subjects ANOVA csv file):

|  |  |  |
| --- | --- | --- |
| Wellbeing | Class | Environs |
| 109 | 1 | 1 |
| 110 | 1 | 1 |
| 110 | 1 | 2 |
| 112 | 1 | 2 |
| 116 | 1 | 3 |
| 114 | 1 | 3 |
| 110 | 2 | 1 |
| 115 | 2 | 1 |
| 110 | 2 | 2 |
| 111 | 2 | 2 |
| 112 | 2 | 3 |
| 115 | 2 | 3 |
| 108 | 3 | 1 |
| 109 | 3 | 1 |
| 111 | 3 | 2 |
| 109 | 3 | 2 |
| 114 | 3 | 3 |
| 119 | 3 | 3 |
| 110 | 4 | 1 |
| 108 | 4 | 1 |
| 114 | 4 | 2 |
| 112 | 4 | 2 |
| 120 | 4 | 3 |
| 117 | 4 | 3 |

Test to see if there is a difference in the wellbeing scores according to the factors considered.

**Mixed ANOVA**

In this (completely imaginary) study, dementia patients in their 80s are given half hour talking sessions, later followed by a memory test. All participants have discussions both with an artificial intelligence 'friend' and, at another time, with a member of staff. While the content matter is the same, the context differs for each group of patients: time context 1 is set within the individuals' youth; time context 2 is set in middle age; the setting for context 3 is when the individuals were in their 70s.

|  |  |  |  |
| --- | --- | --- | --- |
| Patient | Time context | RoboFriend | Human |
| 1 | 3 | 23 | 24 |
| 2 | 3 | 24 | 23 |
| 3 | 3 | 25 | 28 |
| 4 | 2 | 30 | 38 |
| 5 | 2 | 28 | 36 |
| 6 | 2 | 26 | 35 |
| 7 | 1 | 31 | 34 |
| 8 | 1 | 32 | 36 |
| 9 | 1 | 29 | 39 |

Conduct a mixed ANOVA and identify which factors are associated with clinical outcomes.