# PSYR6003 Assignment 4

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**Hypotheses**

**H1:** Extraversion will be positively associated with satisfaction with life

**H2:** Neuroticism will be negatively associated with satisfaction with life

**H3:** The effects will be similar for both level 1 and level 2

**Method**

**Analytic Plan**

Mean scale scores will be computed for extraversion, neuroticism, and satisfaction with life for each timepoint prior to analysis, with data to be arranged in long formant. Participants with missing values will not be excluded prior to analysis.

A linear mixed effect model using extraversion and neuroticism and predictors, satisfaction with life as an outcome, and participant id as the clustering variable will be used in order to test all hypotheses. Nested model comparisons will be performed to determine whether each predictor (i.e., extraversion and neuroticism) should be analyzed with a random or fixed slope, with the model best fitting the data being used for the main analysis. Maximum Likelihood, as opposed to Random Estimates Maximum Likelihood, will be used in order to be able to perform model comparisons. R2 and ICCvalues will be used to interpret the model.

Prior to analysis, univariate distributions of study variables will be visualized, and model assumptions (i.e., linearity, homoskedascity, normality) will be checked.

**Results**

**Descriptive Statistics**

Mean, standard deviation, and bivariate correlations for all variables of interest are depicted in Table 1. Neuroticism had a moderate negative association with both extraversion and satisfaction with life, whereas extraversion and satisfaction with life had a moderate positive association with each other.

**Statistical Assumptions & Data Analysis**

All assumptions for linear mixed effects modelling were met: the histogram of the residuals followed a uniform bell shape, indicating normality and both the residual dependence plot and the S-L plot depicted fairly flat lines, meeting linearity and homoscedascity assumptions.

Nested model comparisons indicated that both predictors (i.e., extraversion and neuroticism) should be modelled using random slopes. As a result, the model for the main analysis was as follows:

Satisfaction with Life = b0 + b1\*Extraversion + b2\*Neuroticism + r1\*Extraversion + r2\*Neuroticism + r0 + e

**Hypotheses 1 & 2**

Model estimates and summaries are displayed in Table 1. In line with our hypotheses, extraversion was positively associated with satisfaction with life, whereas neuroticism was negatively associated with satisfaction with life. Specifically, higher extraversion was related to increases in satisfaction with life, but high neuroticism was related to decreases in satisfaction with life.

As for cluster effects, the ICC score suggests that extraversion and neuroticism vary more between participants than within a participant over time, as approximately 26% of the variation is accounted for by the clusters. However, our model does not account for any variability between subjects, given the negative R2 value. Thus, the aforementioned associations may not have a meaningful effect and that our results are not in line with our third hypothesis.

**Table 1**

*Descriptive Statistics and Bivariate Correlates for Study variables*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Variable | *M* | *SD* | 1 | 2 |
|  |  |  |  |  |
| 1. Extraversion | 4.18 | 1.52 |  |  |
|  |  |  |  |  |
| 2. Neuroticism | 3.49 | 1.54 | -.33 |  |
|  |  |  | [-.36, -.31] |  |
|  |  |  |  |  |
| 3. Satisfaction with Life | 4.43 | 1.61 | .38 | -.45 |
|  |  |  | [.35, .41] | [-.47, -.43] |
|  |  |  |  |  |

**Table 2**

*Main Analysis Model Summary*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Effects | | B | 95%CI | SE |
|  | |  |  |  |
| Fixed Effects | |  |  |  |
| Intercept | | 4.51 | [4.27, 4.74] | 0.12 |
| Extraversion | | 0.16 | [0.13, 0.19] | 0.02 |
| Neuroticism | | -0.21 | [-0.24, -0.18] | 0.02 |
|  | |  |  |  |
| Random Effects | |  |  |  |
| Intercept | | 1.42 | - | - |
| Extraversion | | 0.14 | - | - |
| Neuroticism | | 0.19 | - | - |
| Residual | | 0.70 | - | - |
|  |  |  |  |  |
| Model Statistics | |  |  |  |
|  | |  |  |  |
| R2 | |  |  |  |
| Intercept |  | -0.06 |  |  |
| Residual |  | 0.26 |  |  |
|  |  |  |  |  |
| ICC |  | 0.74 |  |  |
|  |  |  |  |  |

*Note.* Participant ID is used as the model cluster variable