**Assignment 2: General Linear Model**

Steven Jackson

Dalhousie University

Department of Psychiatry

Dr. Igor Yakovenko

April 6th, 2024

This report summarizes the findings from an analysis of several personality constructs and their relationship to negative affect (i.e., low mood) in males and females. Participant data was collected using self-report forms: socially-prescribed perfectionism was collected using the Multidimensional Perfectionism Scale Short form (Socially Prescribed Subscale [3 year version]); conscientiousness was collected using the Ten Item Personality Measure (Conscientiousness Subscale [3 year version]); and negative affect was collected using the PANAS negative affect scale (3 year version). The next section will briefly describe the steps taken to prepare the dataset for analysis; for a reproducible analysis, please see the supplementary materials.

The data was obtained and cloned from a GitHub repository (<https://github.com/iyakoven/PSYR6003-Assignment-2>). Missing values were removed using the na.omit function in base R. Sex, formerly a string variable with options ‘Female’ and ‘Male, was dummy-coded into a numerical variable with 0 denoting female sex and 1 denoting male sex. The conscientiousness item tipm.CONS2.3y was reverse coded so it could be combined with tipm.CONS1.3y, as the former indicates disorganization and carelessness and the latter indicates dependability and self-discipline. Next, the mean scores for socially-prescribed perfectionism, conscientiousness, and negative affect were calculated by finding the mean score of each scale (i.e., total score divided by number of items). The results are of the analysis described below.

Hypothesis 1 states that sex, conscientiousness, and SPP predict negative affect, was tested using a general linear model with one numerical outcome and three numerical predictors. The assumptions of normality of residuals, linearity, homoscedasticity, and independence of observations were all met. Lastly, there are three possible outliers. While it would be possible to conduct a sensitivity analysis to be sure, they do not look very far from the rest of the data, and will be included for this analysis for the sake of data completeness.

Sex predicts negative affect in that being female predicts having more negative affect (b = -0.56 [-0.96, -0.15]). Conscientiousness negatively predicts negative affect (b = -0.26 [-0.38, -0.15]). Socially prescribed perfectionism predicts negative affect (b = 0.20 [0.10, 0.30]). The model as a whole predicts negative affect (R^2 = 0.269 [.14, 0.40]); hypothesis #1 is confirmed. Table 1 below summarizes the regression analysis herein.

**Table 1**

*Regression results using negative affect as the outcome and sex, conscientiousness, and socially prescribed perfectionism as predictors.*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Predictor | *b* | *b*  95% CI  [LL, UL] | *beta* | *beta*  95% CI  [LL, UL] | *sr2* | *sr2*  95% CI  [LL, UL] | *r* | Fit |
| (Intercept) | 2.97\*\* | [2.14, 3.79] |  |  |  |  |  |  |
| sex | -0.56\*\* | [-0.97, -0.15] | -0.21 | [-0.36, -0.05] | .04 | [-.02, .10] | -.15 |  |
| CONS\_summed | -0.26\*\* | [-0.38, -0.15] | -0.35 | [-0.51, -0.20] | .12 | [.02, .21] | -.37\*\* |  |
| SPP\_summed | 0.20\*\* | [0.10, 0.30] | 0.29 | [0.14, 0.45] | .08 | [.00, .16] | .36\*\* |  |
|  |  |  |  |  |  |  |  | *R2*  = .269\*\* |
|  |  |  |  |  |  |  |  | 95% CI[.13,.37] |
|  |  |  |  |  |  |  |  |  |

*Note.* A significant *b*-weight indicates the beta-weight and semi-partial correlation are also significant. *b* represents unstandardized regression weights. *beta* indicates the standardized regression weights. *sr2* represents the semi-partial correlation squared. *r* represents the zero-order correlation. *LL* and *UL* indicate the lower and upper limits of a confidence interval, respectively.  
\* indicates *p* < .05. \*\* indicates *p* < .01.

Table 2 details the bivariate correlations between sex, conscientiousness, and socially prescribed perfectionism. There are notable correlations between nearly every variable pair except for sex and socially prescribed perfectionism; we will therefore require a second analysis to examine the isolated effect of socially prescribed perfectionism (H2).

Table 2

*Means, standard deviations, and correlations with confidence intervals*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | *M* | *SD* | 1 | 2 | 3 |
|  |  |  |  |  |  |
| 1. NegAff\_summed | 2.44 | 0.97 |  |  |  |
|  |  |  |  |  |  |
| 2. CONS\_summed | 5.01 | 1.31 | -.37\*\* |  |  |
|  |  |  | [-.51, -.22] |  |  |
|  |  |  |  |  |  |
| 3. SPP\_summed | 4.38 | 1.42 | .36\*\* | -.19\* |  |
|  |  |  | [.20, .50] | [-.35, -.02] |  |
|  |  |  |  |  |  |
| 4. sex | 0.15 | 0.36 | -.15 | -.17\* | -.00 |
|  |  |  | [-.31, .03] | [-.33, -.00] | [-.18, .17] |
|  |  |  |  |  |  |

*Note.* *M* and *SD* are used to represent mean and standard deviation, respectively. Values in square brackets indicate the 95% confidence interval for each correlation. The confidence interval is a plausible range of population correlations that could have caused the sample correlation (Cumming, 2014). \* indicates *p* < .05. \*\* indicates *p* < .01.

The full model has a lower AIC and BIC, as well as a Bayes Factor of over 100, indicating that it is 'decisively' a much better fit than the reduced model. Thus, we can conclude that H2 is confirmed, and socially-prescribed perfectionism is a reliable predictor of negative affect over and above sex and conscientiousness. Table 3 below summarizes the comparison between the reduced and full models.

**Table 3**

*Regression results comparing the reduced and full models, respectively.*

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Predictor | *b* | *b*  95% CI  [LL, UL] | *beta* | *beta*  95% CI  [LL, UL] | *sr2* | *sr2*  95% CI  [LL, UL] | *r* | Fit | Difference |
| (Intercept) | 4.07\*\* | [3.44, 4.69] |  |  |  |  |  |  |  |
| CONS\_summed | -0.31\*\* | [-0.42, -0.19] | -0.41 | [-0.57, -0.25] | .16 | [.05, .28] | -.37\*\* |  |  |
| sex | -0.59\*\* | [-1.02, -0.16] | -0.22 | [-0.38, -0.06] | .05 | [-.02, .11] | -.15 |  |  |
|  |  |  |  |  |  |  |  | *R2*  = .186\*\* |  |
|  |  |  |  |  |  |  |  | 95% CI[.07,.29] |  |
|  |  |  |  |  |  |  |  |  |  |
| (Intercept) | 2.97\*\* | [2.14, 3.79] |  |  |  |  |  |  |  |
| CONS\_summed | -0.26\*\* | [-0.38, -0.15] | -0.35 | [-0.51, -0.20] | .12 | [.02, .21] | -.37\*\* |  |  |
| SPP\_summed | 0.20\*\* | [0.10, 0.30] | 0.29 | [0.14, 0.45] | .08 | [.00, .16] | .36\*\* |  |  |
| sex | -0.56\*\* | [-0.97, -0.15] | -0.21 | [-0.36, -0.05] | .04 | [-.02, .10] | -.15 |  |  |
|  |  |  |  |  |  |  |  | *R2*  = .269\*\* | Δ*R2*  = .083\*\* |
|  |  |  |  |  |  |  |  | 95% CI[.13,.37] | 95% CI[.00, .16] |
|  |  |  |  |  |  |  |  |  |  |

*Note.* A significant *b*-weight indicates the beta-weight and semi-partial correlation are also significant. *b* represents unstandardized regression weights. *beta* indicates the standardized regression weights. *sr2* represents the semi-partial correlation squared. *r* represents the zero-order correlation. *LL* and *UL* indicate the lower and upper limits of a confidence interval, respectively.  
\* indicates *p* < .05. \*\* indicates *p* < .01.

In conclusion, socially-prescribed perfectionism predicts negative affect above and beyond what is predicted by sex and conscientiousness. It is therefore an important personality construct to consider when evaluating contributors to low mood.