**Assignment 2: General Linear Model**

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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] | *Standard Error* | *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] | 0.417 | -0.21 | [-0.36, -0.05] | .04 | [-.02, .10] | -.15 |  |
| CONS\_summed | -0.26\*\* | [-0.38, -0.15] | 0.0581 | -0.35 | [-0.51, -0.20] | .12 | [.02, .21] | -.37\*\* |  |
| SPP\_summed | 0.20\*\* | [0.10, 0.30] | 0.0526 | 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.

**Table 3**

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

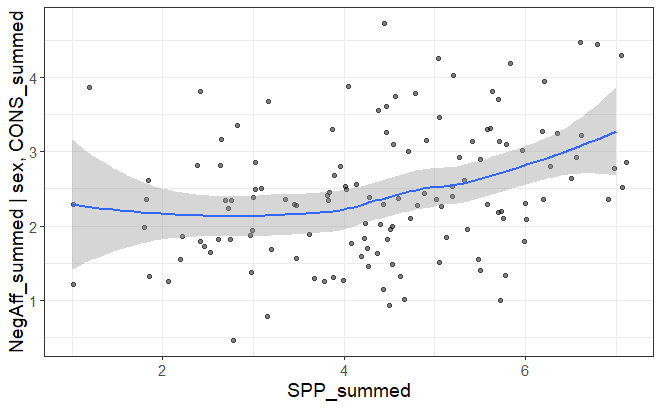
|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Predictor | *b* | *b*  95% CI  [LL, UL] | *beta* | *beta*  95% CI  [LL, UL] | *sr2* | *sr2*  95% CI  [LL, UL] | *r* | Fit | Difference |
| (Intercept) | 4.07\*\* | [3.44, 4.69] |  |  |  |  |  |  |  |
| CONS\_summed | -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.

While the full model is clealy superior, one more step is required to Because of the correlations found between each of the variables, an AVP will be built to control for sex and conscientiousness to better visualize the unique variance contributed by SPP.

**Figure 1**

*The unique variance contributed by SPP to negative affect while controlling for sex and conscientiousness.*



As seen in the AVP, once we control for sex and conscientiousness, there remains a relationship between SPP and negative affect. Thus, socially-prescribed perfectionism is a reliable predictor of negative affect over and above sex and conscientiousness. However, it is worth noting that this is a small relationship, with the difference between a score of 0 and 6 SPP corresponding to an increase of only 1 in negative affect. Given the wording of H2, I would not consider this a "meaningful" difference. Thus, H2 is not confirmed, and socially-prescribed perfectionism is not a reliable predictor of negative affect over and above sex and conscientiousness in a meaningful way.