**Graded Assignment 3**

**To: Dr.Bingenheimer**

**From: Jaclyn Batts**

**RE: The Impact of a Psychological Well-Being Module on Depression Outcomes: Controlling for Confounding and Examining Moderating Effects**

**Date:03/25/2025**

**Table 1: Descriptives/Frequency Statistics (n=850)**

|  |  |  |
| --- | --- | --- |
| **Variables** | **Mean or Count** | **SD or %** |
| **Gender** |  |  |
| **Male** | **373** | **43.9** |
| **Female** | **477** | **56.1** |
| **Race** |  |  |
| **Non-Hispanic White** | **202** | **23.8** |
| **Non-Hispanic Black** | **406** | **47.8** |
| **Hispanic or Latino** | **112** | **13.2** |
| **Asian** | **115** | **13.5** |
| **Other** | **15** | **1.8** |
| **Not a College Graduate** | **132** | **15.5** |
| **College Graduate** | **718** | **84.5** |
| **Not Enrolled in Psych Well-Being Module** | **778** | **91.5** |
| **Enrolled in Psych Well-Being Module** | **72** | **8.5** |
| **CES-D Depression Scale Score Pretest** | **9.86** | **8.437** |
| **Jobs Stress Pretest** | **1.6792** | **0.55645** |
| **Social Support Pretest** | **36.20** | **6.585** |
| **CES-D Depression Scale Score Posttest** | **9.53** | **7.911** |

According to Table 1, the employee sample population is predominantly female, with a significant proportion of Black participants. Most individuals in the sample are college graduates. Additionally, there is a much smaller proportion of employees enrolled in the Psych module. Based on these statistics, the hypothesis that gender effects on depressive symptoms impact enrollment appears to be supported. Further analysis is needed to test this hypothesis. See below.

**Table 2: Logistic regression results for six potential confounders individually and jointly predicting enrollment (Enroll).**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Variable** | **Individual Model** | | | **Multivariable Logistic Regression Model** | | |
| **Female** | **B= 0.420** | **p=0.104** | **Constant:**  **-2.633** | **B=**  **0.417,** | **p=0.126** | **Constant(B)=**  **-2.809 for entire model** |
| **Race: Dummy Variables**  **Reference Group: Non-Hispanic White** |  |  | **Constant(B):**  **-2.677 for Race:Dummy Variables** |  |  |  |
| **Non-Hispanic Black** | **B=0.316** | **p=0.348** |  | **B=0.336** | **p=0.333** |  |
| **Hispanic or Latino** | **B=0.239** | **p=0.595** |  | **B=0.056** | **p=0.905** |  |
| **Asian** | **B=0.617** | **p=0.133** |  | **B=0.328** | **p=0.458** |  |
| **Other Race/Ethnicity** | **B=0.805** | **p=0.321** |  | **B=0.343** | **p=0.705** |  |
| **Job Stress Pretest** | **B=0.741** | **p=.001** | **Constant(B):**  **-3.696** | **B=0.310** | **p=0.196** |  |
| **Social Support Pretest** | **B=-0.058** | **p=0.003** | **Constant(B):**  **-0.339** | **B=-0.043** | **p=0.038** |  |
| **College Graduate** | **B=0.142** | **p=0.688** | **Constant(B):**  **-2.501** | **B=0.178** | **p=0.637** |  |
| **CES-D Depression Scale Score Pretest** | **B=0.072** | **p=0.000** | **Constant(B):**  **-3.263** | **B=0.063** | **p=0.000** |  |

**Notes:**

* **B (coefficient):** Represents the estimated effect of each variable on birth weight
* **p (p-value):** Indicates statistical significance. A value **< 0.05** suggests a significant relationship

Based on Table 2, three variables meet the first criterion for confounding: the Job Stress Pretest, the Social Support Pretest, and the CES-D Depression Scale Score Pretest, as these were statistically significant with p-values less than 0.05. According to the multivariable logistic regression, the Social Support Pretest remained significant when controlling for other factors. Variables that were not significant and did not meet the criterion included Gender, race, and college graduates, suggesting that they do not impact employees enrolled in the psychological well-being modue.

**Table 3: Linear regression results for six potential confounders individually and jointly predicting (DepressPost).**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Variable** | **Individual Model** | | | **Multivariable Linear Regression Model** | | |
| **Female** | **B= 1.125** | **p=0.040** | **Constant:**  **8.898** | **B=**  **0.867** | **p=**  **0.081** | **Constant(B)=**  **5.551 for entire model** |
| **Race: Dummy Variables**  **Reference Group: Non-Hispanic White** |  |  | **Constant(B):**  **-9.366 for Race:Dummy Variables** |  |  |  |
| **Non-Hispanic Black** | **B=-0.110** | **p=0.872** |  | **B=**  **-0.075** | **p=**  **0.901** |  |
| **Hispanic or Latino** | **B=0.330** | **p=0.723** |  | **B=**  **-0.335** | **p=**  **0.684** |  |
| **Asian** | **B=0.955** | **p=0.302** |  | **B=**  **-0.118** | **p=**  **0.886** |  |
| **Other Race/Ethnicity** | **B=2.434** | **p=0.251** |  | **B=**  **0.893** | **p=**  **0.633** |  |
| **Job Stress Pretest** | **B=3.162** | **p=.000** | **Constant(B):**  **4.220** | **B=**  **1.265** | **p=**  **0.006** |  |
| **Social Support Pretest** | **B=-0.177** | **p=0.000** | **Constant(B):**  **15.935** | **B=-**  **-0.083** | **p=**  **0.033** |  |
| **College Graduate** | **B=0.896** | **p=0.232** | **Constant(B):**  **8.773** | **B=**  **0.628** | **p=**  **0.352** |  |
| **CES-D Depression Scale Score Pretest** | **B=0.436** | **p=0.000** | **Constant(B):**  **5.229** | **B=**  **0.397** | **p=0.000** |  |

According to Table 3, the linear regression results identified the second criterion for confounding, which includes the pretest scores for the CES-D Depression Scale, Job Stress, and Social Support, as they are significantly associated with the dependent variable (DepressPost). These confounders reinforce the evaluators' concerns that increased job stress, decreased social support, and higher depression scores influence outcomes, underscoring the need for statistical control over these factors.

**Table 4: ANCOVA and t-test Results for Posttest Depression Scores**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Variables** | **Equal Variances Assumed?** | **Test Statistic (t or F)** | **Significance (p)** | **Mean Square** |
| **Enrolled vs Not Enrolled (DepressPost)** | **Yes** | **t=0.487** | **p=0.974** |  |
| **DepressPre** |  | **f=207.70** | **p<0.001** | **9845.316** |
| **JobStrPre** |  | **f=9.53** | **p=0.002** | **451.68** |
| **SocSupPre** |  | **f=3.75** | **p=0.053** | **177.72** |
| **Enroll** |  | **f=19.92** | **p<0.001** | **944.07** |
| **Levene’s Test** |  | **f=0.04** | **0.83** |  |

Based on the t-test, there is no significant difference in post-test depressive symptoms when confounders are not controlled. However, after adjusting for depression, job stress, and social support, employees reported lower post-test depression scores, suggesting that the intervention was effective once the confounders were controlled.

**Table 5: Testing for Gender Differences in the Effect of Psychological Module Enrollment on Depression Outcomes**

|  |  |  |  |
| --- | --- | --- | --- |
| **Variables** | **Coeff.(B)** | **Test Statistic (t)** | **Significance** |
| **Model 1 (Unadjusted)** |  |  |  |
| **Constant** | 8.943 | 21.104 | 0.000 |
| **Participant Gender** | 1.067 | 1.872 | 0.062 |
| **Enrolled in Psych Well-Being Module** | -0.663 | -0.405 | 0.686 |
| **Gender x Enrollment Interaction** | 0.802 | 0.394 | 0.694 |
| **Model 2 (Adjusted)** |  |  |  |
| **Constant** | 6.168 | 3.644 | 0.000 |
| **Participant Gender** | 0.785 | 1.545 | 0.123 |
| **Enrolled in Psych Well-Being Module** | -5.762 | -3.959 | 0.000 |
| **Gender x Enrollment Interaction** | 2.658 | 1.497 | 0.135 |
| **CES-D Depression Scale Score Pretest** | 0.435 | 14.422 | 0.000 |
| **Job Stress Pretest** | 1.277 | 2.831 | 0.005 |
| **Social Support Pretest** | -0.088 | -2.316 | 0.021 |

Based on Model 1, when confounders are not controlled, there is no significant difference in enrollment between genders. Moreover, after adjusting for confounders, there remains no statistical significance. This suggests that the intervention affected both male and female employees similarly.

**Table 6: Interaction Between Mean-Centered Baseline Depression and Module Enrollment on Depression Outcomes**

|  |  |  |  |
| --- | --- | --- | --- |
| **Variables** | **Coeff.(B)** | **Test Statistic (t)** | **Significance** |
| **Model 1 (No Covariates)** |  |  |  |
| **Constant** | 9.876 | 39.826 | 0.000 |
| **DepressPreCent (mean-centered)** | 0.521 | 16.049 | 0.000 |
| **Enrolled in Psych Well-Being Module** | -2.197 | -2.273 | 0.023 |
| **DepressPre x Enrollment Interaction** | -0.266 | -3.675 | 0.000 |
| **Model 2 (Adjusted)** |  |  |  |
| **Constant** | 10.186 | 6.122 | 0.000 |
| **DepressPreCent (mean-centered)** | 0.487 | 14.569 | 0.000 |
| **Enrolled in Psych Well-Being Module** | -2.505 | -2.603 | 0.009 |
| **DepressPre x Enrollment Interaction** | -0.254 | -3.530 | 0.000 |
| **Job Stress Pretest** | 1.329 | 2.974 | 0.003 |
| **Social Support Pretest** | -0.070 | -1.891 | 0.059 |

Based on Table 6, Model 1 shows that the module is more effective for individuals with depressive symptoms. In Model 2, the interaction remains statistically significant. The evaluator hypothesized that individuals with higher initial depressive symptoms would find the module effective, and the results provide strong evidence for improving employee mental health outcomes.