moderated_regressions

2024-04-13

```
overall.resource <- rowSums(data[c(118:144,147:202)], na.rm=TRUE)
summary(overall.resource) #202.3
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##    45.0   164.0   202.0   202.3   239.0   359.0
```

```
overall.hindrance <- rowSums(data[c(203:247,249:287)], na.rm=TRUE)
summary(overall.hindrance) #159.2
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##    25.0    92.0   120.0   130.6   159.2   332.0
```

```
overall.challenge <- rowSums(data[c(288:307,309:372)], na.rm=TRUE)
summary(overall.challenge) #204.2
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
##    31.0   166.8   205.0   204.2   241.0   376.0
```

```
#centered predictors
overall.resource_center <- overall.resource - 202.3
overall.hindrance_center <- overall.hindrance - 159.2
overall.challenge_center <- overall.challenge - 204.2
```

```
cr_burn_m1 <- lm(scale(burnout) ~ scale(overall.challenge_center), data = data)
summary(cr_burn_m1)
```

```
##
## Call:
## lm(formula = scale(burnout) ~ scale(overall.challenge_center),
##     data = data)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.5584 -0.6783 -0.0309  0.6812  2.7553
##
## Coefficients:
##                                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)                    -1.330e-16  4.119e-02   0.000        1
## scale(overall.challenge_center)  1.945e-01  4.123e-02   4.718 3.01e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9818 on 566 degrees of freedom
## Multiple R-squared:  0.03784,    Adjusted R-squared:  0.03614
## F-statistic: 22.26 on 1 and 566 DF,  p-value: 3.005e-06
```

```
cr_burn_m2 <- lm(scale(burnout) ~ scale(overall.challenge_center) + scale(overall.resource), data = data
summary(cr_burn_m2)
```

```
##
## Call:
## lm(formula = scale(burnout) ~ scale(overall.challenge_center) +
##     scale(overall.resource), data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.56510 -0.66871 -0.02446  0.66917  2.79311
##
## Coefficients:
##                                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)                    -1.141e-16  4.118e-02   0.000  1.00000
## scale(overall.challenge_center)  3.311e-01  1.269e-01   2.608  0.00935 **
## scale(overall.resource)         -1.444e-01  1.269e-01  -1.137  0.25595
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9815 on 565 degrees of freedom
## Multiple R-squared:  0.04004,    Adjusted R-squared:  0.03664
## F-statistic: 11.78 on 2 and 565 DF,  p-value: 9.706e-06
```

```
cr_burn_m3 <- lm(scale(burnout) ~ scale(overall.challenge_center) + scale(overall.resource_center) + sca
summary(cr_burn_m3)
```

```
##
## Call:
## lm(formula = scale(burnout) ~ scale(overall.challenge_center) +
##     scale(overall.resource_center) + scale(overall.challenge_center *
##     overall.resource_center), data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.52773 -0.67216 -0.02142  0.67300  2.62413
##
## Coefficients:
##                                                           Estimate Std. Error
## (Intercept)                                              -1.243e-16  4.114e-02
## scale(overall.challenge_center)                           3.301e-01  1.268e-01
## scale(overall.resource_center)                           -1.404e-01  1.268e-01
## scale(overall.challenge_center * overall.resource_center)  6.185e-02  4.122e-02
##                                                          t value Pr(>|t|)
## (Intercept)                                                0.000  1.00000
## scale(overall.challenge_center)                            2.603  0.00949 **
## scale(overall.resource_center)                            -1.107  0.26864
## scale(overall.challenge_center * overall.resource_center)   1.500  0.13410
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9804 on 564 degrees of freedom
## Multiple R-squared:  0.04385,    Adjusted R-squared:  0.03877
## F-statistic: 8.622 on 3 and 564 DF,  p-value: 1.328e-05
```

```
aov_test <- anova(cr_burn_m2, cr_burn_m3)
aov_test
```

```
## Analysis of Variance Table
##
## Model 1: scale(burnout) ~ scale(overall.challenge_center) + scale(overall.resource)
## Model 2: scale(burnout) ~ scale(overall.challenge_center) + scale(overall.resource_center) +
##     scale(overall.challenge_center * overall.resource_center)
##   Res.Df    RSS Df Sum of Sq      F Pr(>F)
## 1    565 544.30
## 2    564 542.14  1    2.1636 2.2508 0.1341
```

```
cr_stress_m1 <- lm(scale(stress) ~ scale(overall.challenge_center), data = data)
summary(cr_stress_m1)
```

```
##
## Call:
## lm(formula = scale(stress) ~ scale(overall.challenge_center),
##     data = data)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.0651 -0.8399 -0.1288  0.6829  2.6429
##
## Coefficients:
##                                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)                     -8.128e-17  4.188e-02   0.000   1.0000
## scale(overall.challenge_center)  7.362e-02  4.192e-02   1.756   0.0796 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9982 on 566 degrees of freedom
## Multiple R-squared:  0.00542,    Adjusted R-squared:  0.003663
## F-statistic: 3.084 on 1 and 566 DF,  p-value: 0.07959
```

```
cr_stress_m2 <- lm(scale(stress) ~ scale(overall.challenge_center) + scale(overall.resource_center), da
summary(cr_stress_m2)
```

```
##
## Call:
## lm(formula = scale(stress) ~ scale(overall.challenge_center) +
##     scale(overall.resource_center), data = data)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.0681 -0.8402 -0.1296  0.6983  2.6602
##
## Coefficients:
##                                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)                     -7.632e-17  4.191e-02   0.000    1.000
## scale(overall.challenge_center)  1.362e-01  1.292e-01   1.054    0.292
## scale(overall.resource_center)  -6.615e-02  1.292e-01  -0.512    0.609
##
## Residual standard error: 0.9988 on 565 degrees of freedom
## Multiple R-squared:  0.005881,   Adjusted R-squared:  0.002362
## F-statistic: 1.671 on 2 and 565 DF,  p-value: 0.1889
```

```
cr_stress_m3 <- lm(scale(stress) ~ scale(overall.challenge_center) + scale(overall.resource_center) + s
summary(cr_stress_m3)
```

```
##
## Call:
## lm(formula = scale(stress) ~ scale(overall.challenge_center) +
##     scale(overall.resource_center) + scale(overall.challenge_center *
##     overall.resource_center), data = data)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.0576 -0.8359 -0.1193  0.6805  2.6125
##
## Coefficients:
##                                                          Estimate Std. Error
## (Intercept)                                             -7.695e-17  4.194e-02
## scale(overall.challenge_center)                          1.359e-01  1.293e-01
## scale(overall.resource_center)                          -6.504e-02  1.293e-01
## scale(overall.challenge_center * overall.resource_center)  1.749e-02  4.203e-02
##                                                         t value Pr(>|t|)
## (Intercept)                                               0.000    1.000
## scale(overall.challenge_center)                           1.051    0.294
## scale(overall.resource_center)                           -0.503    0.615
## scale(overall.challenge_center * overall.resource_center)   0.416    0.678
##
## Residual standard error: 0.9995 on 564 degrees of freedom
## Multiple R-squared:  0.006186,   Adjusted R-squared:  0.0009
## F-statistic:  1.17 on 3 and 564 DF,  p-value: 0.3204
```

```
cr_stress_anova <- anova(cr_stress_m2, cr_stress_m3)
cr_stress_anova
```

```
## Analysis of Variance Table
##
## Model 1: scale(stress) ~ scale(overall.challenge_center) + scale(overall.resource_center)
## Model 2: scale(stress) ~ scale(overall.challenge_center) + scale(overall.resource_center) +
##     scale(overall.challenge_center * overall.resource_center)
##   Res.Df    RSS Df Sum of Sq      F Pr(>F)
## 1    565 563.67
## 2    564 563.49  1   0.17297 0.1731 0.6775
```

```
cr_eng_m1 <- lm(scale(engagement) ~ scale(overall.challenge_center), data = data)
summary(cr_eng_m1)
```

```
##
## Call:
## lm(formula = scale(engagement) ~ scale(overall.challenge_center),
##     data = data)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.8126 -0.6306  0.0553  0.6562  2.5143
##
## Coefficients:
##                                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)                    -6.678e-17  3.926e-02   0.000        1
## scale(overall.challenge_center)  3.552e-01  3.929e-02   9.039   <2e-16 ***
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9356 on 566 degrees of freedom
## Multiple R-squared:  0.1262, Adjusted R-squared:  0.1246
## F-statistic: 81.71 on 1 and 566 DF,  p-value: < 2.2e-16
```

```
cr_eng_m2 <- lm(scale(engagement) ~ scale(overall.challenge_center) + scale(overall.resource_center), da
summary(cr_eng_m2)
```

```
##
## Call:
## lm(formula = scale(engagement) ~ scale(overall.challenge_center) +
##     scale(overall.resource_center), data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.90158 -0.57528  0.02719  0.65036  2.64982
##
## Coefficients:
##                                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)                     -1.029e-16  3.874e-02   0.000    1.000
## scale(overall.challenge_center) -1.004e-01  1.194e-01  -0.840    0.401
## scale(overall.resource_center)   4.816e-01  1.194e-01   4.033 6.25e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9233 on 565 degrees of freedom
## Multiple R-squared:  0.1506, Adjusted R-squared:  0.1476
## F-statistic: 50.09 on 2 and 565 DF,  p-value: < 2.2e-16
```

```
cr_eng_m3 <- lm(scale(engagement) ~ scale(overall.challenge_center) + scale(overall.resource_center) + s
summary(cr_eng_m3)
```

```
##
## Call:
## lm(formula = scale(engagement) ~ scale(overall.challenge_center) +
##     scale(overall.resource_center) + scale(overall.challenge_center *
##     overall.resource_center), data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.75765 -0.57171  0.05897  0.64531  2.73546
##
## Coefficients:
##                                                          Estimate Std. Error
## (Intercept)                                             -9.955e-17  3.857e-02
## scale(overall.challenge_center)                         -9.886e-02  1.189e-01
## scale(overall.resource_center)                           4.757e-01  1.189e-01
## scale(overall.challenge_center * overall.resource_center) -9.322e-02  3.865e-02
##                                                         t value Pr(>|t|)
## (Intercept)                                               0.000   1.0000
## scale(overall.challenge_center)                          -0.831   0.4061
## scale(overall.resource_center)                            4.000 7.17e-05 ***
## scale(overall.challenge_center * overall.resource_center)  -2.412   0.0162 *
## ---
```

```
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9193 on 564 degrees of freedom
## Multiple R-squared:  0.1593, Adjusted R-squared:  0.1548
## F-statistic: 35.62 on 3 and 564 DF,  p-value: < 2.2e-16
```

```
cr_eng_anova <- anova(cr_eng_m2, cr_eng_m3)
cr_eng_anova
```

```
## Analysis of Variance Table
##
## Model 1: scale(engagement) ~ scale(overall.challenge_center) + scale(overall.resource_center)
## Model 2: scale(engagement) ~ scale(overall.challenge_center) + scale(overall.resource_center) +
##     scale(overall.challenge_center * overall.resource_center)
##   Res.Df    RSS Df Sum of Sq      F  Pr(>F)
## 1    565 481.60
## 2    564 476.69  1    4.9162 5.8167 0.01619 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
hr_burn_m1 <- lm(scale(burnout) ~ scale(overall.hindrance_center), data = data)
summary(hr_burn_m1)
```

```
##
## Call:
## lm(formula = scale(burnout) ~ scale(overall.hindrance_center),
##     data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.55086 -0.68277 -0.01846  0.71524  2.50523
##
## Coefficients:
##                                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)                     -1.605e-16  4.146e-02   0.000 1.000000
## scale(overall.hindrance_center)  1.592e-01  4.150e-02   3.838 0.000138 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9881 on 566 degrees of freedom
## Multiple R-squared:  0.02536,    Adjusted R-squared:  0.02364
## F-statistic: 14.73 on 1 and 566 DF,  p-value: 0.0001383
```

```
hr_burn_m2 <- lm(scale(burnout) ~ scale(overall.hindrance_center) + scale(overall.resource_center), data
summary(hr_burn_m2)
```

```
##
## Call:
## lm(formula = scale(burnout) ~ scale(overall.hindrance_center) +
##     scale(overall.resource_center), data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.53582 -0.67321 -0.03472  0.69580  2.60264
##
## Coefficients:
```

```
##                                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)                     -1.580e-16  4.126e-02   0.000   1.0000
## scale(overall.hindrance_center)  1.017e-01  4.707e-02   2.160   0.0312 *
## scale(overall.resource_center)   1.200e-01  4.707e-02   2.549   0.0111 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9833 on 565 degrees of freedom
## Multiple R-squared:  0.03644,    Adjusted R-squared:  0.03303
## F-statistic: 10.68 on 2 and 565 DF,  p-value: 2.794e-05
```

```
hr_burn_m3 <- lm(scale(burnout) ~ scale(overall.hindrance_center) + scale(overall.resource_center) + sca
summary(hr_burn_m3)
```

```
##
## Call:
## lm(formula = scale(burnout) ~ scale(overall.hindrance_center) +
##     scale(overall.resource_center) + scale(overall.hindrance_center *
##     overall.resource_center), data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.57428 -0.68787 -0.01644  0.64831  2.69897
##
## Coefficients:
##                                                          Estimate Std. Error
## (Intercept)                                             -1.581e-16  4.105e-02
## scale(overall.hindrance_center)                          1.609e-01  5.198e-02
## scale(overall.resource_center)                           3.220e-02  5.754e-02
## scale(overall.hindrance_center * overall.resource_center) -1.336e-01  5.090e-02
##                                                         t value Pr(>|t|)
## (Intercept)                                               0.000  1.00000
## scale(overall.hindrance_center)                           3.095  0.00206 **
## scale(overall.resource_center)                            0.560  0.57596
## scale(overall.hindrance_center * overall.resource_center)  -2.625  0.00889 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9783 on 564 degrees of freedom
## Multiple R-squared:  0.04807,    Adjusted R-squared:  0.04301
## F-statistic: 9.493 on 3 and 564 DF,  p-value: 3.983e-06
```

```
hr_burn_anova <- anova(hr_burn_m2, hr_burn_m3)
hr_burn_anova
```

```
## Analysis of Variance Table
##
## Model 1: scale(burnout) ~ scale(overall.hindrance_center) + scale(overall.resource_center)
## Model 2: scale(burnout) ~ scale(overall.hindrance_center) + scale(overall.resource_center) +
##     scale(overall.hindrance_center * overall.resource_center)
##   Res.Df    RSS Df Sum of Sq      F  Pr(>F)
## 1    565 546.34
## 2    564 539.74  1    6.5963 6.8927 0.00889 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```r
hr_stress_m1 <- lm(scale(stress) ~ scale(overall.hindrance_center), data = data)
summary(hr_stress_m1)
```

```
##
## Call:
## lm(formula = scale(stress) ~ scale(overall.hindrance_center),
##     data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.04085 -0.81089 -0.09956  0.68057  2.56517
##
## Coefficients:
##                                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)                     -9.737e-17  4.177e-02   0.000   1.0000
## scale(overall.hindrance_center)  1.036e-01  4.181e-02   2.478   0.0135 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9955 on 566 degrees of freedom
## Multiple R-squared:  0.01074,    Adjusted R-squared:  0.008988
## F-statistic: 6.143 on 1 and 566 DF,  p-value: 0.01349
```

```r
hr_stress_m2 <- lm(scale(stress) ~ scale(overall.hindrance_center) + scale(overall.resource_center), da
summary(hr_stress_m2)
```

```
##
## Call:
## lm(formula = scale(stress) ~ scale(overall.hindrance_center) +
##     scale(overall.resource_center), data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.04703 -0.82026 -0.09615  0.67958  2.57956
##
## Coefficients:
##                                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)                     -9.702e-17  4.180e-02   0.000   1.0000
## scale(overall.hindrance_center)  9.555e-02  4.769e-02   2.004   0.0456 *
## scale(overall.resource_center)   1.680e-02  4.769e-02   0.352   0.7248
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9963 on 565 degrees of freedom
## Multiple R-squared:  0.01095,    Adjusted R-squared:  0.007452
## F-statistic: 3.129 on 2 and 565 DF,  p-value: 0.04454
```

```r
hr_stress_m3 <- lm(scale(stress) ~ scale(overall.hindrance_center) + scale(overall.resource_center) + s
summary(hr_stress_m3)
```

```
##
## Call:
## lm(formula = scale(stress) ~ scale(overall.hindrance_center) +
##     scale(overall.resource_center) + scale(overall.hindrance_center *
##     overall.resource_center), data = data)
```

```
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -1.92625 -0.81197 -0.09674  0.68866  2.71035
##
## Coefficients:
##                                                          Estimate Std. Error
## (Intercept)                                             -9.713e-17  4.132e-02
## scale(overall.hindrance_center)                          1.813e-01  5.232e-02
## scale(overall.resource_center)                          -1.104e-01  5.792e-02
## scale(overall.hindrance_center * overall.resource_center) -1.936e-01  5.123e-02
##                                                         t value Pr(>|t|)
## (Intercept)                                               0.000 1.000000
## scale(overall.hindrance_center)                           3.466 0.000569 ***
## scale(overall.resource_center)                           -1.906 0.057204 .
## scale(overall.hindrance_center * overall.resource_center)  -3.779 0.000174 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9848 on 564 degrees of freedom
## Multiple R-squared:  0.03538,    Adjusted R-squared:  0.03025
## F-statistic: 6.895 on 3 and 564 DF,  p-value: 0.0001449
```

```
hr_stress_anova <- anova(hr_stress_m2, hr_stress_m3)
hr_stress_anova
```

```
## Analysis of Variance Table
##
## Model 1: scale(stress) ~ scale(overall.hindrance_center) + scale(overall.resource_center)
## Model 2: scale(stress) ~ scale(overall.hindrance_center) + scale(overall.resource_center) +
##     scale(overall.hindrance_center * overall.resource_center)
##   Res.Df    RSS Df Sum of Sq     F    Pr(>F)
## 1    565 560.79
## 2    564 546.94  1    13.848 14.28 0.0001743 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
hr_eng_m1 <- lm(scale(engagement) ~ scale(overall.hindrance_center), data = data)
summary(hr_eng_m1)
```

```
##
## Call:
## lm(formula = scale(engagement) ~ scale(overall.hindrance_center),
##     data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.82213 -0.67217  0.04807  0.70920  2.59113
##
## Coefficients:
##                                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)                    -8.909e-17  4.187e-02   0.000   1.0000
## scale(overall.hindrance_center)  7.592e-02  4.191e-02   1.811   0.0706 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
## Residual standard error: 0.998 on 566 degrees of freedom
## Multiple R-squared:  0.005763,   Adjusted R-squared:  0.004006
## F-statistic: 3.281 on 1 and 566 DF,  p-value: 0.07062
```

```
hr_eng_m2 <- lm(scale(engagement) ~ scale(overall.hindrance_center) + scale(overall.resource_center), da
summary(hr_eng_m2)
```

```
##
## Call:
## lm(formula = scale(engagement) ~ scale(overall.hindrance_center) +
##     scale(overall.resource_center), data = data)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -2.66002 -0.58556  0.04292  0.63261  2.49137
##
## Coefficients:
##                                  Estimate Std. Error t value Pr(>|t|)
## (Intercept)                    -7.969e-17  3.841e-02   0.000  1.00000
## scale(overall.hindrance_center) -1.425e-01  4.381e-02  -3.253  0.00121 **
## scale(overall.resource_center)   4.551e-01  4.381e-02  10.387  < 2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.9153 on 565 degrees of freedom
## Multiple R-squared:  0.1652, Adjusted R-squared:  0.1622
## F-statistic:  55.9 on 2 and 565 DF,  p-value: < 2.2e-16
```

```
hr_eng_m3 <- lm(scale(engagement) ~ scale(overall.hindrance_center) + scale(overall.resource_center) + s
summary(hr_eng_m3)
```

```
##
## Call:
## lm(formula = scale(engagement) ~ scale(overall.hindrance_center) +
##     scale(overall.resource_center) + scale(overall.hindrance_center *
##     overall.resource_center), data = data)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -2.6643 -0.5859  0.0426  0.6313  2.5318
##
## Coefficients:
##                                                          Estimate Std. Error
## (Intercept)                                            -7.969e-17  3.843e-02
## scale(overall.hindrance_center)                        -1.349e-01  4.867e-02
## scale(overall.resource_center)                          4.438e-01  5.388e-02
## scale(overall.hindrance_center * overall.resource_center) -1.725e-02  4.766e-02
##                                                        t value Pr(>|t|)
## (Intercept)                                              0.000  1.00000
## scale(overall.hindrance_center)                         -2.771  0.00577 **
## scale(overall.resource_center)                           8.237 1.24e-15 ***
## scale(overall.hindrance_center * overall.resource_center)  -0.362  0.71751
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
## Residual standard error: 0.916 on 564 degrees of freedom
## Multiple R-squared:  0.1654, Adjusted R-squared:  0.1609
## F-statistic: 37.25 on 3 and 564 DF,  p-value: < 2.2e-16
```

```
hr_eng_anova <- anova(hr_eng_m2, hr_eng_m3)
hr_eng_anova
```

```
## Analysis of Variance Table
##
## Model 1: scale(engagement) ~ scale(overall.hindrance_center) + scale(overall.resource_center)
## Model 2: scale(engagement) ~ scale(overall.hindrance_center) + scale(overall.resource_center) +
##     scale(overall.hindrance_center * overall.resource_center)
##   Res.Df    RSS Df Sum of Sq     F Pr(>F)
## 1    565 473.34
## 2    564 473.23  1   0.10993 0.131 0.7175
```

```
options(scipen=999)  ## Suppresses scientific notation

#Challenge-Resource-Burnout

# b weights
chal.2.burn <- round(summary(cr_burn_m2)$coefficients[2, 1],2)
res.2.burn <- round(summary(cr_burn_m2)$coefficients[3, 1],2)

int.cr.3.burn <- round(summary(cr_burn_m3)$coefficients[4, 1],2)

#r squared
cr_burn_m2_r <- round(summary(cr_burn_m2)$r.squared,2)
cr_burn_m3_r <- round(summary(cr_burn_m3)$r.squared,2)

## R square change
cr_burn_anova <- anova(cr_burn_m2, cr_burn_m3)
cr_burn_r_square_change <- round(cr_burn_m3_r - cr_burn_m2_r,2)

#Challenge-Resource-Stress

# b weights
chal.2.stress <- round(summary(cr_stress_m2)$coefficients[2, 1],2)
res.2.stress <- round(summary(cr_stress_m2)$coefficients[3, 1],2)

int.cr.3.stress <- round(summary(cr_stress_m3)$coefficients[4, 1],2)

#r squared
cr_stress_m2_r <- round(summary(cr_stress_m2)$r.squared,2)
cr_stress_m3_r <- round(summary(cr_stress_m3)$r.squared,2)

## R square change
cr_stress_anova <- anova(cr_stress_m2, cr_stress_m3)
cr_stress_r_square_change <- round(cr_stress_m3_r - cr_stress_m2_r,2)

#Challenge-Resource-Engagement

# b weights
chal.2.eng <- round(summary(cr_eng_m2)$coefficients[2, 1],2)
```

```r
res.2.eng <- round(summary(cr_eng_m2)$coefficients[3, 1],2)

int.cr.3.eng <- round(summary(cr_eng_m3)$coefficients[4, 1],2)

#r squared
cr_eng_m2_r <- round(summary(cr_eng_m2)$r.squared,2)
cr_eng_m3_r <- round(summary(cr_eng_m3)$r.squared,2)

## R square change
cr_eng_anova <- anova(cr_eng_m2, cr_eng_m3)
cr_eng_r_square_change <- round(cr_eng_m3_r - cr_eng_m2_r,2)
```

```r
options(scipen=999)  ## Suppresses scientific notation

#Hindrance-Resource-Burnout

# b weights
hind.2.burn <- round(summary(hr_burn_m2)$coefficients[2, 1],2)
res.2hr.burn <- round(summary(hr_burn_m2)$coefficients[3, 1],2)

int.hr.3.burn <- round(summary(hr_burn_m3)$coefficients[4, 1],2)

#r squared
hr_burn_m2_r <- round(summary(hr_burn_m2)$r.squared,2)
hr_burn_m3_r <- round(summary(hr_burn_m3)$r.squared,2)

## R square change
hr_burn_anova <- anova(hr_burn_m2, hr_burn_m3)
hr_burn_r_square_change <- round(hr_burn_m3_r - hr_burn_m2_r,2)

#Hindrance-Resource-Stress

# b weights
hind.2.stress <- round(summary(hr_stress_m2)$coefficients[2, 1],2)
res.2hr.stress <- round(summary(hr_stress_m2)$coefficients[3, 1],2)

int.hr.3.stress <- round(summary(hr_stress_m3)$coefficients[4, 1],2)

#r squared
hr_stress_m2_r <- round(summary(hr_stress_m2)$r.squared,2)
hr_stress_m3_r <- round(summary(hr_stress_m3)$r.squared,2)

## R square change
hr_stress_anova <- anova(hr_stress_m2, hr_stress_m3)
hr_stress_r_square_change <- round(hr_stress_m3_r - hr_stress_m2_r,2)

#Hindrance-Resource-Engagement

# b weights
hind.2.eng <- round(summary(hr_eng_m2)$coefficients[2, 1],2)
res.2hr.eng <- round(summary(hr_eng_m2)$coefficients[3, 1],2)

int.hr.3.eng <- round(summary(hr_eng_m3)$coefficients[4, 1],2)
```

Table 1:

DV	Step	Model	b	DeltaR
Burnout	1	Challenge	0.33	
		Resource	-0.14	0.04 **
	2	Challenge X Resource	0.06	0

Table 2:

DV	Step	Model	Beta	R	DeltaR
Engagement	1	Challenge	-0.1		
		Resource	0.48	0.15	
	2	Challenge X Resource	-0.09	0.16	0.01
Stress	1	Challenge	0.14		
		Resource	-0.07	0.01	
	2	Challenge X Resource	0.02	0.01	0
Burnout	1	Challenge	0.33		
		Resource	-0.14	0.04	
	2	Challenge X Resource	0.06	0.04	0

```
#r squared
hr_eng_m2_r <- summary(hr_eng_m2)$r.squared
hr_eng_m3_r <- summary(hr_eng_m3)$r.squared

## R square change
hr_eng_anova <- anova(hr_eng_m2, hr_eng_m3)
hr_eng_r_square_change <- sigfill(hr_eng_m3_r - hr_eng_m2_r)
```

```
#I'm not touching this script - using it as a model and making two new chunks
library(kableExtra)

DV <- c("Burnout","","")
Step <- c("1", "","2")
Model <- c("Challenge", "Resource", "Challenge X Resource")
b <- c(chal.2.burn,res.2.burn,int.cr.3.burn)
DeltaR <- c("",paste(cr_burn_m2_r,"**"),cr_burn_r_square_change)

regtable <- cbind(DV, Step, Model, b, DeltaR)

papaja::apa_table(regtable)
```

```
library(kableExtra)

DV <- c("Engagement","","", "Stress","","", "Burnout","","")
Step <- c("1", "","2", "1", "","2", "1", "","2")
Model <- c("Challenge", "Resource", "Challenge X Resource", "Challenge", "Resource", "Challenge X Resou
Beta <- c(chal.2.eng, res.2.eng, int.cr.3.eng, chal.2.stress, res.2.stress, int.cr.3.stress, chal.2.bur
R <- c("", cr_eng_m2_r, cr_eng_m3_r, "", cr_stress_m2_r, cr_stress_m3_r, "", cr_burn_m2_r, cr_burn_m3_r
DeltaR <- c("","",cr_eng_r_square_change, "","",cr_stress_r_square_change, "","",cr_burn_r_square_chang

regtable <- cbind(DV, Step, Model, Beta, R, DeltaR)
papaja::apa_table(regtable)
```

Table 3:

DV	Step	Model	β	R^2	ΔR^2
Engagement	1	Hindrance	-0.14 **		
		Resource	0.46 **	0.17 **	
	2	Hindrance X Resource	-0.02	0.17 **	0.00
Stress	1	Hindrance	0.10 *		
		Resource	0.02 **	0.01 *	
	2	Hindrance X Resource	-0.19 **	0.04 **	0.03 **
Burnout	1	Hindrance	0.10 *		
		Resource	0.12 *	0.04 **	
	2	Hindrance X Resource	-0.13 **	0.05 **	0.01 **

Note. * = p < .05; ** = p < .01

```
library(kableExtra)

DV <- c("Engagement","","", "Stress","","", "Burnout","","")
Step <- c("1", "","2", "1", "","2", "1", "","2")
Model <- c("Hindrance", "Resource", "Hindrance X Resource", "Hindrance", "Resource", "Hindrance X Resou
Beta <- c(paste(hind.2.eng,"**"), paste(res.2hr.eng,"**"), int.hr.3.eng, paste(sigfill(hind.2.stress),"
R2 <- c("", paste(round(hr_eng_m2_r,2),"**"), paste(round(hr_eng_m3_r,2),"**"), "", paste(hr_stress_m2_
#DeltaR <- c("",paste(hr_eng_m2_r,"**"),hr_eng_r_square_change, "",paste(hr_stress_m2_r,"**"),hr_stress
DeltaR <- c("","",hr_eng_r_square_change, "","",paste(hr_stress_r_square_change,"**"), "","",paste(hr_bu
regtable <- as.data.frame(cbind(DV, Step, Model, Beta, R2, DeltaR))

colnames(regtable)[4] <- "$\\beta$"
colnames(regtable)[5] <- "$R^2$"
colnames(regtable)[6] <- "$\\Delta R^2$"

#kableExtra::kable(regtable,
#                  format="latex",
#                  escape=FALSE)

papaja::apa_table(regtable,
                  escape=FALSE,
                  note="* = p < .05; ** = p < .01")
```

```
# How to get delta symbol and superscript
#https://cran.r-project.org/web/packages/reporter/vignettes/reporter-super.html#:~:text=To%20get%20supe
```