PSYC 8100: Exam 1

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Contents

1: NASA-TLX

1a) Data Analyses (R)

Load & Examine the dataset

```r
# Load the dataset
dat1 <- read.csv('Data/chemical.csv', header = T)

# Examine the data
str(dat1)
```

```
## 'data.frame':    25 obs. of  6 variables:
##  $ mental     : num  5.6 5.37 5.84 4.08 6.93 6.05 5.15 4.99 6 5.15 ...
##  $ physical   : num  5.87 5.26 4.97 3.25 5.52 5.11 4.47 4.53 4.75 5.09 ...
##  $ temporal   : num  6.19 5.56 6.67 5.21 5.49 5.32 5.56 5.1 5.36 5.2 ...
##  $ performance: num  6.16 5.26 6.04 5.36 5.35 5.84 6.96 4.51 6 4.87 ...
##  $ effort     : num  6.14 4.83 6.12 5.63 6.03 6.36 5.15 6.04 5.37 6.57 ...
##  $ frustration: num  5 5.99 4.99 3.73 5.03 4.55 5.65 4.84 5.08 4.67 ...
```

```r
summary(dat1)
```

```
##      mental         physical        temporal      performance         effort     
##  Min.   :4.08   Min.   :3.250   Min.   :4.210   Min.   :4.050   Min.   :4.280  
##  1st Qu.:5.04   1st Qu.:4.190   1st Qu.:5.200   1st Qu.:5.230   1st Qu.:5.120  
##  Median :5.47   Median :4.620   Median :5.550   Median :5.430   Median :5.430  
##  Mean   :5.45   Mean   :4.646   Mean   :5.603   Mean   :5.479   Mean   :5.503  
##  3rd Qu.:5.84   3rd Qu.:5.110   3rd Qu.:6.100   3rd Qu.:5.840   3rd Qu.:6.030  
##  Max.   :6.93   Max.   :5.870   Max.   :6.980   Max.   :6.960   Max.   :6.570  
##   frustration   
##  Min.   :3.430  
##  1st Qu.:4.030  
##  Median :4.700  
##  Mean   :4.602  
##  3rd Qu.:5.030  
##  Max.   :5.990
```

```r
# Examine the means and standard deviations of each NASA-TLX dimension
# (mental demand, physical demand, temporal demand, performance, effort, and frustration)
mean(dat1$mental)
```

```
## [1] 5.4504
```

```r
mean(dat1$physical)
```

```
## [1] 4.646
```

```r
mean(dat1$temporal)
```

```
## [1] 5.6032
```

```r
mean(dat1$performance)
```

```
## [1] 5.4792
```

```r
mean(dat1$effort)
```

```
## [1] 5.5032
```

```r
mean(dat1$frustration)
```

```
## [1] 4.6024
```

```r
sd(dat1$mental)
```

```
## [1] 0.6003296
```

```r
sd(dat1$physical)
```

```
## [1] 0.6684933
```

```r
sd(dat1$temporal)
```

```
## [1] 0.7453675
```

```r
sd(dat1$performance)
```

```
## [1] 0.6554256
```

```r
sd(dat1$effort)
```

```
## [1] 0.5719027
```

```r
sd(dat1$frustration)
```

```
## [1] 0.6983688
```

Conduct a Test

Now we will conduct a t-test to compare the sample mean from mental demand (5.45) with the sample mean from previous publishing involving normal workload (4.5).

```r
t.test(dat1$mental, mu = 4.5)
```

```
##
##  One Sample t-test
##
## data:  dat1$mental
## t = 7.9157, df = 24, p-value = 3.805e-08
## alternative hypothesis: true mean is not equal to 4.5
## 95 percent confidence interval:
##  5.202596 5.698204
## sample estimates:
## mean of x
##    5.4504
```

Now we will conduct a t-test to compare the sample mean from physical demand (4.646) with the sample mean from previous publishing involving normal workload (4.5).

```r
t.test(dat1$physical, mu = 4.5)
```

```
##
##  One Sample t-test
##
## data:  dat1$physical
## t = 1.092, df = 24, p-value = 0.2857
## alternative hypothesis: true mean is not equal to 4.5
## 95 percent confidence interval:
##  4.37006 4.92194
## sample estimates:
## mean of x
##     4.646
```

Now we will conduct a t-test to compare the sample mean from temporal demand (5.60) with the sample mean from previous publishing involving normal workload (4.5).

```r
t.test(dat1$temporal, mu = 4.5)
```

```
##
##  One Sample t-test
##
## data:  dat1$temporal
## t = 7.4004, df = 24, p-value = 1.218e-07
## alternative hypothesis: true mean is not equal to 4.5
## 95 percent confidence interval:
##  5.295527 5.910873
## sample estimates:
## mean of x
##    5.6032
```

Now we will conduct a t-test to compare the sample mean from performance (5.48) with the sample mean from previous publishing involving normal workload (4.5).

```r
t.test(dat1$performance, mu = 4.5)
```

```
##
##  One Sample t-test
##
## data:  dat1$performance
## t = 7.47, df = 24, p-value = 1.039e-07
## alternative hypothesis: true mean is not equal to 4.5
## 95 percent confidence interval:
##  5.208654 5.749746
## sample estimates:
## mean of x
##    5.4792
```

Now we will conduct a t-test to compare the sample mean from effort (5.50) with the sample mean from previous publishing involving normal workload (4.5).

```
t.test(dat1$effort, mu = 4.5)
```

```
##
##  One Sample t-test
##
## data:  dat1$effort
## t = 8.7707, df = 24, p-value = 5.967e-09
## alternative hypothesis: true mean is not equal to 4.5
## 95 percent confidence interval:
##  5.26713 5.73927
## sample estimates:
## mean of x
##    5.5032
```

Now we will conduct a t-test to compare the sample mean from frustration (4.60) with the sample mean from previous publishing involving normal workload (4.5).

```
t.test(dat1$frustration, mu = 4.5)
```

```
##
##  One Sample t-test
##
## data:  dat1$frustration
## t = 0.73314, df = 24, p-value = 0.4706
## alternative hypothesis: true mean is not equal to 4.5
## 95 percent confidence interval:
##  4.314128 4.890672
## sample estimates:
## mean of x
##    4.6024
```

Assess Positive Association

Now, we will check for the possibility of positive association between mental, physical, and temporal demands.

1b) Summary of Analyses

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2: Summer Youth Development Program

Data Analyses (SPSS)

See Attached Document (SPSS_02.jpg).

2a) Discuss any Validity Issues

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2b) Summary of Analyses

...

3: CSSA Predicted Job Performance

3a) Data Analyses (R)

Load & Examine the Dataset

```r
# Load the dataset
dat3 <- read.csv('Data/valid.csv', header = T)

# Examine the data
str(dat3)
```

```
## 'data.frame':    184 obs. of  3 variables:
##  $ l.name: chr  "Tehero" "Pena" "Freyschlag" "Lewis" ...
##  $ cssa  : int  23 28 30 21 28 28 32 24 29 26 ...
##  $ perf  : int  34 37 42 27 34 32 36 37 32 30 ...
```

```r
summary(dat3)
```

```
##     l.name               cssa           perf      
##  Length:184         Min.   :13.0   Min.   :24.00  
##  Class :character   1st Qu.:23.0   1st Qu.:32.00  
##  Mode  :character   Median :25.0   Median :34.00  
##                     Mean   :25.1   Mean   :34.06  
##                     3rd Qu.:28.0   3rd Qu.:37.00  
##                     Max.   :36.0   Max.   :44.00  
```

```r
# Compute the correlation between CSSA scores and Performance levels.
cor(dat3$cssa, dat3$perf)
```

```
## [1] 0.5699847
```

The mean of *cssa* and *perf* is 25.1 and 34.06, respectively. Because $r = 0.57$, it appears that there is a positive association between *cssa* and *perf*. As *cssa* increases, *perf* increases as well.

Calculate the Prediction

```r
# Predict Job Performance using CSSA scores
pred <- lm(perf ~ cssa, data = dat3)
summary(pred)
```

```
##
## Call:
## lm(formula = perf ~ cssa, data = dat3)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -7.4697 -1.9523 -0.1091  1.8735  7.8561
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept) 20.63342    1.45219  14.208   <2e-16 ***
## cssa         0.53485    0.05715   9.359   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 3.052 on 182 degrees of freedom
## Multiple R-squared:  0.3249, Adjusted R-squared:  0.3212
## F-statistic: 87.58 on 1 and 182 DF,  p-value: < 2.2e-16
```

```r
# Find the r-squared value
summary(pred)$r.squared
```

```
## [1] 0.3248825
```

```r
# Interpret the regression slope.
pred$coefficients
```

```
## (Intercept)        cssa
##  20.6334230   0.5348452
```

```r
# Predicted job performance if CSSA score = 10
predict(pred, new=list(cssa = 10))
```

```
##        1
## 25.98188
```

3b) Summary of Analyses

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4: Training Program for Caregivers

4a) Data Analyses (by hand)

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4b) Calculate Degrees of Freedom

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4c) Summary of Analyses

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