Mod 8 Individual Assignment

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For this assignment, you will use the dataset provided to conduct a conjoint analysis.

Load the three datasets - Design, Levels and Response - onto the environment. The data is a survey result for backpack features. The attributes are capacity(40L, 60L, 90L), color(Black, Red and Blue) and rain cover attachment(Y and N).

```
Design <- read.csv(file = "Design.csv")
Levels <- read.csv(file = "Levels.csv")
Response <- read.csv(file = "Response.csv")
```

Question 1

1A - Obtain the parameters of the traditional Conjoint Analysis for a single respondent.(Use caModel())

1B - Describe the product profile that adds the most utility to the first respondent

```
#1A
model=caModel(Response[1,], Design)
model
```

```
##
## Call:
## lm(formula = frml)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -6.6111 -3.7222  0.4167  2.8194  9.0556
##
## Coefficients:
##                       Estimate Std. Error t value Pr(>|t|)
## (Intercept)              9.500      1.300   7.307 9.39e-06 ***
## factor(x$Capacity)1     -0.500      1.839  -0.272    0.790
## factor(x$Capacity)2      1.167      1.839   0.635    0.538
```

```
## factor(x$Color)1       -2.667      1.839  -1.450    0.173
## factor(x$Color)2        0.500      1.839   0.272    0.790
## factor(x$RainCover)1   -1.389      1.300  -1.068    0.306
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 5.516 on 12 degrees of freedom
## Multiple R-squared:  0.2464, Adjusted R-squared:  -0.06758
## F-statistic: 0.7848 on 5 and 12 DF,  p-value: 0.5799
```

Answer 1B caModel from above estimates parameters of conjoint analysis model for one respondent. The above result was a vector of estimated parameters of ** traditional conjoint analysis ** model. the co-efficients indicate the impact of each factor level on the consumer choice.

Product profile having Capacity of 60L(Capacity 2) and of color red(Color 2) and having no raincover attachment (RainCover 1) adds most utility to first respondent

Question 2

2A - Obtain the partworths for each factor level for the first 5 respondents.(Use - caPartUtilities())

```
partutil <- caPartUtilities(y = Response[1:5,], x = Design, z = Levels)
partutil
```

```
##      intercept    40L    60L    90L  Black    Red   Blue      Y      N
## [1,]       9.5 -0.500  1.167 -0.667 -2.667  0.500  2.167 -1.389  1.389
## [2,]       9.5 -3.500  1.167  2.333 -3.000  3.500 -0.500  2.278 -2.278
## [3,]       9.5 -0.167  1.500 -1.333 -1.833  1.500  0.333  2.500 -2.500
## [4,]       9.5 -0.500 -2.167  2.667 -0.500  0.833 -0.333  0.056 -0.056
## [5,]       9.5  3.000 -3.333  0.333  1.833 -1.333 -0.500  0.722 -0.722
```

Partial utilities are as shown above for the first 5 respondents for each factor level with intercept on first place

Question 3

3A - Obtain the utilities of the factor levels.(Use caUtilities())

3B - Describe the best product profile.

```
#3A
util <- caUtilities(y = Response, x = Design, z = Levels)
```

```
##
## Call:
## lm(formula = frml)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -9,4289 -4,5411 -0,0256  4,4544  9,2456
##
## Coefficients:
##                       Estimate Std. Error t value Pr(>|t|)
## (Intercept)           9,50000    0,17280  54,977   <2e-16 ***
## factor(x$Capacity)1   0,38000    0,24437   1,555   0,1203
## factor(x$Capacity)2  -0,14333    0,24437  -0,587   0,5577
## factor(x$Color)1     -0,46667    0,24437  -1,910   0,0565 .
## factor(x$Color)2      0,05333    0,24437   0,218   0,8273
## factor(x$RainCover)1  0,13556    0,17280   0,784   0,4330
## ---
## Signif. codes:  0 '***' 0,001 '**' 0,01 '*' 0,05 '.' 0,1 ' ' 1
##
## Residual standard error: 5,184 on 894 degrees of freedom
## Multiple R-squared:  0,008267,   Adjusted R-squared:  0,00272
## F-statistic:  1,49 on 5 and 894 DF,  p-value: 0,1903
```

```
util
```

```
## [1]  9.50000000  0.38000000 -0.14333333 -0.23666667 -0.46666667  0.05333333
## [7]  0.41333333  0.13555556 -0.13555556
```

Answer 3B The best product profile is the one having most positive co-efficients which are 40 L capacity, color red and Rain Cover attachment is present (Capacity 1, Color 2 and RainCover 1)

```r
#Conjoint Analysis shows estimated impact on utility by each of the factor levels and also the importan
analysis <- Conjoint(Response, Design, Levels)
```

```
##
## Call:
## lm(formula = frml)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -9,4289 -4,5411 -0,0256  4,4544  9,2456
##
## Coefficients:
##                       Estimate Std. Error t value Pr(>|t|)
## (Intercept)            9,50000    0,17280  54,977   <2e-16 ***
## factor(x$Capacity)1    0,38000    0,24437   1,555   0,1203
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## Residual standard error: 5,184 on 894 degrees of freedom
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## F-statistic:  1,49 on 5 and 894 DF,  p-value: 0,1903
```

```
## [1] "Part worths (utilities) of levels (model parameters for whole sample):"
##      levnms    utls
## 1 intercept     9,5
## 2       40L    0,38
## 3       60L -0,1433
## 4       90L -0,2367
## 5     Black -0,4667
## 6       Red  0,0533
## 7      Blue  0,4133
## 8         Y  0,1356
## 9         N -0,1356
## [1] "Average importance of factors (attributes):"
## [1] 38,49 39,51 22,00
## [1] Sum of average importance:  100
## [1] "Chart of average factors importance"
```

Question 4

4A - Obtain the importance of each of the factors.(Use caImportance())

4B - Create a dataframe of the factors and their importances and print the same

```
#4A
Importance <- caImportance(Response, Design)
Factor <- c("Capacity","Color","Rain Cover Attachment")
#4B
FactorImp <- as.data.frame(cbind(Factor,Importance))
FactorImp
```

```
##                   Factor Importance
## 1               Capacity      38.49
## 2                  Color      39.51
## 3 Rain Cover Attachment         22
```