Trails Analysis

## Data Wrangling

design\_matrix <- read.csv("https://raw.githubusercontent.com/ryangifford/discrete\_choice\_experiment/master/Data/design\_matrix.csv") # importing the matrix design (see matrix design file)  
  
survey <- read.csv("https://raw.githubusercontent.com/ryangifford/discrete\_choice\_experiment/master/Data/Rexburg%20Trails\_CE.csv") %>%   
 select(c1:c9, res, id) %>%   
 pivot\_longer(cols = starts\_with("c"), names\_to = "question\_num", values\_to = "Key")  
  
# importing the survey data, selecting the choice experiment questions + resident status + id,   
# making each observatoin an individual row. Key is block num, question num, and alt. num.   
  
dat <- right\_join(design\_matrix, survey, by = "Key")

<https://stats.idre.ucla.edu/r/dae/logit-regression/>

logit <- glm(Teton ~ Dirt + Gravel + Paved + Dist + Cost + as.factor(res), data = dat)  
  
summary(logit)

##   
## Call:  
## glm(formula = Teton ~ Dirt + Gravel + Paved + Dist + Cost + as.factor(res),   
## data = dat)  
##   
## Deviance Residuals:   
## Min 1Q Median 3Q Max   
## -1.0344 -0.1674 0.1004 0.2902 0.5130   
##   
## Coefficients:  
## Estimate Std. Error t value Pr(>|t|)   
## (Intercept) 0.167370 0.043045 3.888 0.000112 \*\*\*  
## Dirt 0.915414 0.052338 17.490 < 2e-16 \*\*\*  
## Gravel 1.015133 0.054268 18.706 < 2e-16 \*\*\*  
## Paved 1.039309 0.053987 19.251 < 2e-16 \*\*\*  
## Dist -0.316187 0.018386 -17.197 < 2e-16 \*\*\*  
## Cost -0.003327 0.000353 -9.424 < 2e-16 \*\*\*  
## as.factor(res)2 -0.033574 0.031448 -1.068 0.286130   
## as.factor(res)3 -0.100903 0.049345 -2.045 0.041314 \*   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## (Dispersion parameter for gaussian family taken to be 0.1283725)  
##   
## Null deviance: 149.679 on 598 degrees of freedom  
## Residual deviance: 75.868 on 591 degrees of freedom  
## (4 observations deleted due to missingness)  
## AIC: 480.2  
##   
## Number of Fisher Scoring iterations: 2

confint(logit)

## Waiting for profiling to be done...

## 2.5 % 97.5 %  
## (Intercept) 0.083002621 0.251736760  
## Dirt 0.812833032 1.017994217  
## Gravel 0.908769409 1.121496343  
## Paved 0.933496045 1.145121178  
## Dist -0.352222013 -0.280151599  
## Cost -0.004018374 -0.002634711  
## as.factor(res)2 -0.095210396 0.028062348  
## as.factor(res)3 -0.197617193 -0.004187952

## Plot

ggplot(newdata3, aes(x = gre, y = PredictedProb)) + geom\_ribbon(aes(ymin = LL,  
 ymax = UL, fill = rank), alpha = 0.2) + geom\_line(aes(colour = rank),  
 size = 1)

## Math Notations

$$

## Tables

### Choice Attribute Table

#dat <- read.csv("C:\\Users\\Ryan\\Desktop\\Choice Experiment\\discrete\_choice\_experiment\\Data\\choices.csv")   
  
dat\_att <- read.csv("https://raw.githubusercontent.com/ryangifford/discrete\_choice\_experiment/master/Data/choices.csv") # this is a .csv with the all the attributes and levels  
  
  
  
flextable(dat\_att) %>% # this creates the table in word  
 align(part = "all") %>% # left align  
 set\_caption(caption = "Rail Trail") %>%   
 font(fontname = "Times New Roman", part = "all") %>%   
 fontsize(size = 12, part = "body") %>%   
 # add footer if you want  
 # add\_footer\_row(values = "\* p < 0.05. \*\* p < 0.01. \*\*\* p < 0.001.",   
 # colwidths = 4) %>%   
 theme\_booktabs() %>% # default theme  
 autofit() %>%   
 bg(i = c(1,3,5,7,9), bg = "#F7F7F7") %>%   
 hline(i = c(3,6)) %>%   
 vline(j = 2) %>%   
 add\_header\_row(  
 values = c("Rail Trail", "Teton Trail"),  
 colwidths = c(2, 2)) %>%   
 align(align = "center", part = "header") %>%   
 line\_spacing(space = .5, part = "all")

Rail Trail

| Rail Trail | | Teton Trail | |
| --- | --- | --- | --- |
| Attributes | Levels | Attributes.1 | Levels.1 |
| Length (miles) | 0.36 | Length (miles) | 0.49 |
|  | 0.89 |  | 1.68 |
|  | 1.06 |  | 3.09 |
| Cost ($) | 20 | Cost ($) | 26 |
|  | 48 |  | 91 |
|  | 57 |  | 167 |
| Surface | Dirt | Surface | Dirt |
|  | Crushed Stone |  | Crushed Stone |
|  | Asphalt |  | Asphalt |

dat\_key <- read.csv("https://raw.githubusercontent.com/ryangifford/discrete\_choice\_experiment/master/Data/Coding%20Key.csv") # this is a .csv with the all the attributes and levels  
  
  
  
flextable(dat\_key) %>% # this creates the table in word  
 align(part = "all") %>% # left align  
 set\_caption(caption = "Rail Trail") %>%   
 font(fontname = "Times New Roman", part = "all") %>%   
 fontsize(size = 12, part = "body") %>%   
 # add footer if you want  
 # add\_footer\_row(values = "\* p < 0.05. \*\* p < 0.01. \*\*\* p < 0.001.",   
 # colwidths = 4) %>%   
 theme\_booktabs() %>% # default theme  
 autofit() %>%   
 bg(i = c(1,3,5,7,9,11,13,15,17,19,21,23,25,27,29), bg = "#F7F7F7") %>%   
 hline(i = c(3,9,11,17)) %>%   
 vline(j = c(1,2,3,4,5)) %>%   
 align(align = "center", part = "header") %>%   
 line\_spacing(space = .5, part = "all")

Rail Trail

| Demographic.Variable | Mean | Std..Dev. | Coding | X..of.Sample | N |
| --- | --- | --- | --- | --- | --- |
| Resident Status |  |  | 1 = Full Time Rexburg Resident | 38.81 | 67 |
|  |  |  | 2 = BYU-Idaho Student | 49.25 |  |
|  |  |  | 3 = Other | 11.94 |  |
| Age in years | 1.92 | 1.24 | 1 = 18-24 | 53.85 | 65 |
|  |  |  | 2 = 25-34 | 20.00 |  |
|  |  |  | 3 = 35-44 | 10.77 |  |
|  |  |  | 4 = 45-54 | 12.31 |  |
|  |  |  | 5 = 55-64 | 1.54 |  |
|  |  |  | 6 = 65+ | 1.54 |  |
| Gender | 0.64 | 0.48 | 0 = Male | 34.82 | 67 |
|  |  |  | 1 = Female | 64.18 |  |
| Education (Highest Level) | 4.03 | 1.14 | 1 = Less than High School | 1.49 | 67 |
|  |  |  | 2 = High School/GED | 43.28 |  |
|  |  |  | 3 = Some College | 16.42 |  |
|  |  |  | 4 = Associates | 31.34 |  |
|  |  |  | 5 = Bachelors | 5.97 |  |
|  |  |  | 6 = Doctorate | 1.49 |  |
| Gross Annual Income | 4.48 | 3.80 | 1 = Less than $10,000 | 25.40 | 63 |
|  |  |  | 2 = $10,000 - $19,999 | 22.22 |  |
|  |  |  | 3 = $20,000 - $29,999 | 9.52 |  |
|  |  |  | 4 = $30,000 - $39,999 | 9.52 |  |
|  |  |  | 5 = $40,000 - $49,999 | 4.76 |  |
|  |  |  | 6 = $50,000 - $59,999 | 0.00 |  |
|  |  |  | 7 = $60,000 - $69,999 | 1.59 |  |
|  |  |  | 8 = $70,000 - $79,999 | 4.76 |  |
|  |  |  | 9 = $80,000 - $89,999 | 3.17 |  |
|  |  |  | 10 = $90,000 - $99,999 | 4.76 |  |
|  |  |  | 11 = $100,000 - $149,999 | 9.52 |  |
|  |  |  | 12 = More than $150,000 | 4.76 |  |