Data4220ProjectPart2

Eric Geisler

2024-05-01

```r
library(readr)
library(dplyr)
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```r
library(ggplot2)

df = read.csv("campaign_responses.csv")
df = na.omit(df)
```

```r
df$Response <- ifelse(df$responded == "Yes", 1, 0)
df$Gender <- ifelse(df$gender == "Female", 1, 0)
df$Income_log <- log(df$annual_income)
```

```r
df
```

```
##    customer_id age gender annual_income credit_score employed marital_status
## 1            1  35   Male         65000          720      Yes        Married
## 2            2  28 Female         45000          680       No         Single
## 3            3  42   Male         85000          750      Yes        Married
## 4            4  31 Female         55000          710      Yes         Single
## 5            5  47   Male         95000          790      Yes        Married
## 6            6  25 Female         38000          630       No         Single
## 7            7  39   Male         72000          740      Yes        Married
## 8            8  33 Female         48000          670      Yes         Single
## 9            9  51   Male        110000          820      Yes        Married
## 10          10  27 Female         40000          620       No         Single
## 11          11  44   Male         90000          780      Yes        Married
## 12          12  30 Female         52000          690      Yes         Single
## 13          13  36   Male         75000          730      Yes        Married
```

```
## 14            14 29 Female           45000              660        No        Single
## 15            15 49   Male          105000              800       Yes       Married
## 16            16 26 Female           36000              610        No        Single
## 17            17 41   Male           85000              760       Yes       Married
## 18            18 32 Female           54000              700       Yes        Single
## 19            19 37   Male           80000              740       Yes       Married
## 20            20 34 Female           60000              720       Yes        Single
## 21            21 43   Male           92000              770       Yes       Married
## 22            22 28 Female           42000              640        No        Single
## 23            23 38   Male           78000              750       Yes       Married
## 24            24 31 Female           48000              680       Yes        Single
## 25            25 45   Male           98000              790       Yes       Married
## 26            26 27 Female           40000              630        No        Single
## 27            27 40   Male           85000              760       Yes       Married
## 28            28 35 Female           62000              710       Yes        Single
## 29            29 46   Male          100000              800       Yes       Married
## 30            30 29 Female           44000              650        No        Single
## 31            31 42   Male           90000              780       Yes       Married
## 32            32 33 Female           56000              690       Yes        Single
## 33            33 39   Male           82000              750       Yes       Married
## 34            34 30 Female           50000              670       Yes        Single
## 35            35 48   Male          105000              810       Yes       Married
## 36            36 25 Female           35000              600        No        Single
## 37            37 41   Male           88000              770       Yes       Married
## 38            38 34 Female           58000              700       Yes        Single
## 39            39 43   Male           95000              780       Yes       Married
## 40            40 28 Female           43000              640        No        Single
## 41            41 37   Male           80000              750       Yes       Married
## 42            42 32 Female           52000              680       Yes        Single
## 43            43 45   Male          100000              800       Yes       Married
## 44            44 30 Female           46000              660        No        Single
## 45            45 40   Male           88000              770       Yes       Married
## 46            46 36 Female           64000              720       Yes        Single
## 47            47 47   Male          102000              790       Yes       Married
## 48            48 26 Female           38000              620        No        Single
## 49            49 42   Male           90000              760       Yes       Married
## 50            50 33 Female           54000              690       Yes        Single
## 51            51 39   Male           85000              750       Yes       Married
## 52            52 31 Female           50000              680       Yes        Single
## 53            53 46   Male           98000              800       Yes       Married
## 54            54 28 Female           42000              630        No        Single
## 55            55 41   Male           90000              770       Yes       Married
## 56            56 34 Female           60000              710       Yes        Single
##    no_of_children responded Response Gender Income_log
## 1               2       Yes        1      0   11.08214
## 2               0        No        0      1   10.71442
## 3               3       Yes        1      0   11.35041
## 4               1        No        0      1   10.91509
## 5               2       Yes        1      0   11.46163
## 6               0        No        0      1   10.54534
## 7               2       Yes        1      0   11.18442
## 8               0        No        0      1   10.77896
## 9               3       Yes        1      0   11.60824
## 10              0        No        0      1   10.59663
```

```
## 11              2       Yes         1         0    11.40756
## 12              0        No         0         1    10.85900
## 13              1       Yes         1         0    11.22524
## 14              0        No         0         1    10.71442
## 15              3       Yes         1         0    11.56172
## 16              0        No         0         1    10.49127
## 17              2       Yes         1         0    11.35041
## 18              0        No         0         1    10.89674
## 19              2       Yes         1         0    11.28978
## 20              1        No         0         1    11.00210
## 21              3       Yes         1         0    11.42954
## 22              0        No         0         1    10.64542
## 23              2       Yes         1         0    11.26446
## 24              0        No         0         1    10.77896
## 25              3       Yes         1         0    11.49272
## 26              0        No         0         1    10.59663
## 27              2       Yes         1         0    11.35041
## 28              1        No         0         1    11.03489
## 29              3       Yes         1         0    11.51293
## 30              0        No         0         1    10.69194
## 31              2       Yes         1         0    11.40756
## 32              0        No         0         1    10.93311
## 33              2       Yes         1         0    11.31447
## 34              0        No         0         1    10.81978
## 35              3       Yes         1         0    11.56172
## 36              0        No         0         1    10.46310
## 37              2       Yes         1         0    11.38509
## 38              1        No         0         1    10.96820
## 39              3       Yes         1         0    11.46163
## 40              0        No         0         1    10.66896
## 41              2       Yes         1         0    11.28978
## 42              0        No         0         1    10.85900
## 43              3       Yes         1         0    11.51293
## 44              0        No         0         1    10.73640
## 45              2       Yes         1         0    11.38509
## 46              1        No         0         1    11.06664
## 47              3       Yes         1         0    11.53273
## 48              0        No         0         1    10.54534
## 49              2       Yes         1         0    11.40756
## 50              0        No         0         1    10.89674
## 51              2       Yes         1         0    11.35041
## 52              0        No         0         1    10.81978
## 53              3       Yes         1         0    11.49272
## 54              0        No         0         1    10.64542
## 55              2       Yes         1         0    11.40756
## 56              1        No         0         1    11.00210
```

Data Visualization

```r
ggplot(df, aes(x = gender, fill = responded)) +
  geom_bar() +
```

```
labs(x = "Gender", y = "Count", fill = "Response") +
ggtitle("Distribution of Response by Gender")
```

## Distribution of Response by Gender
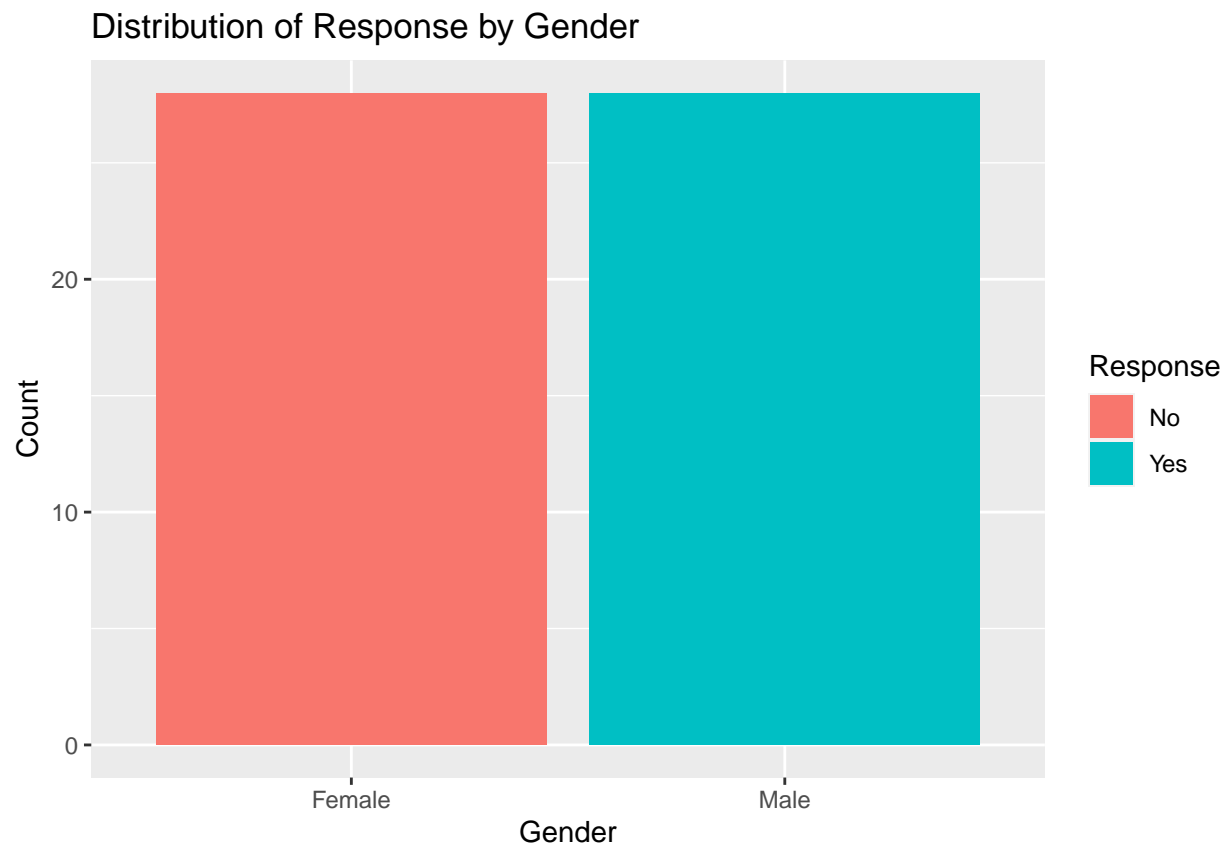

WE WILL NOT BE USING GENDER

```
ggplot(df, aes(x = responded, y = age)) +
  geom_boxplot(fill = "orange", color = "black") +
  labs(x = "Response", y = "Age") +
  ggtitle("Distribution of Age by Response")
```

Distribution of Age by Response
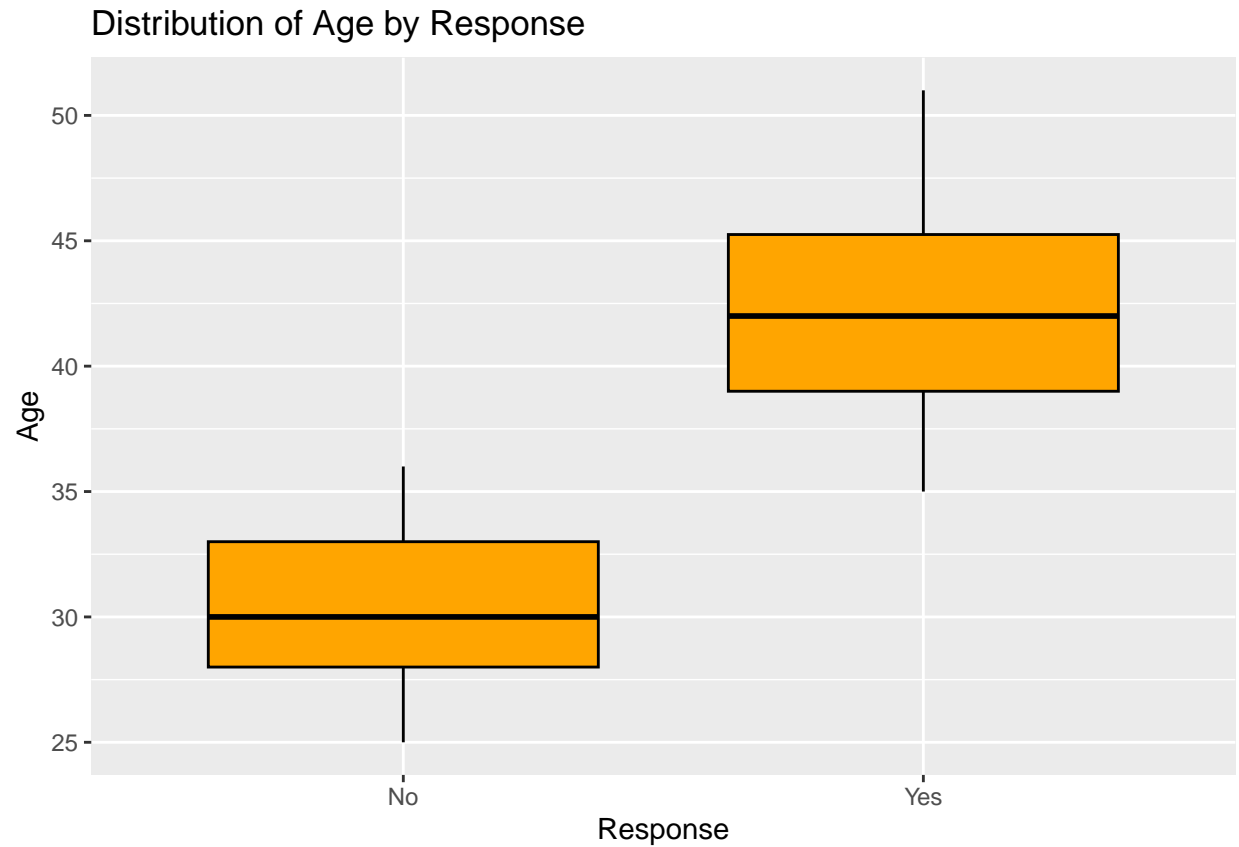

```
ggplot(df, aes(x = responded, y = annual_income)) +
  geom_boxplot(fill = "yellow", color = "black") +
  labs(x = "Response", y = "Annual Income") +
  ggtitle("Distribution of Annual Income by Response")
```

Distribution of Annual Income by Response
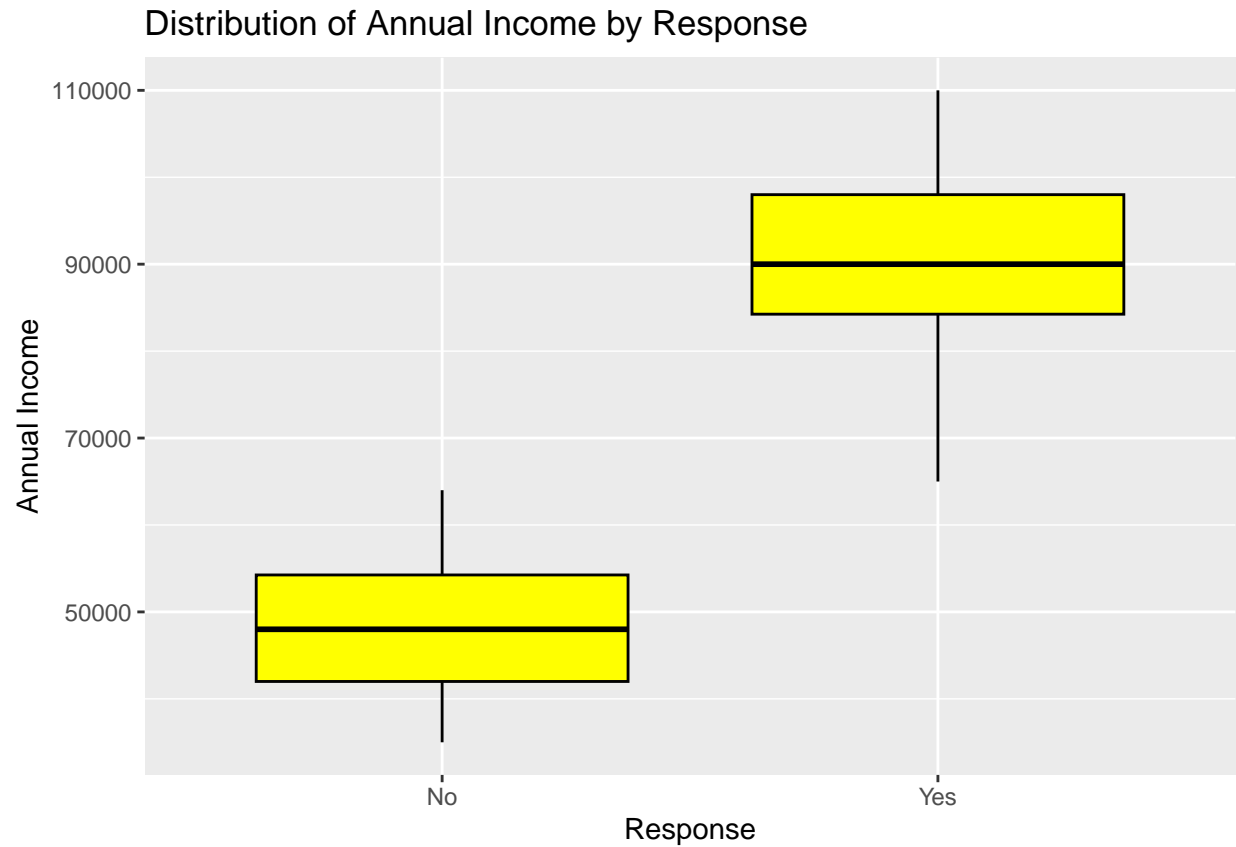

```r
ggplot(df, aes(x = as.factor(no_of_children), fill = responded)) +
  geom_bar() +
  labs(x = "Number of Children", y = "Count", fill = "Response") +
  ggtitle("Response Distribution by Number of Children")
```

Response Distribution by Number of Children
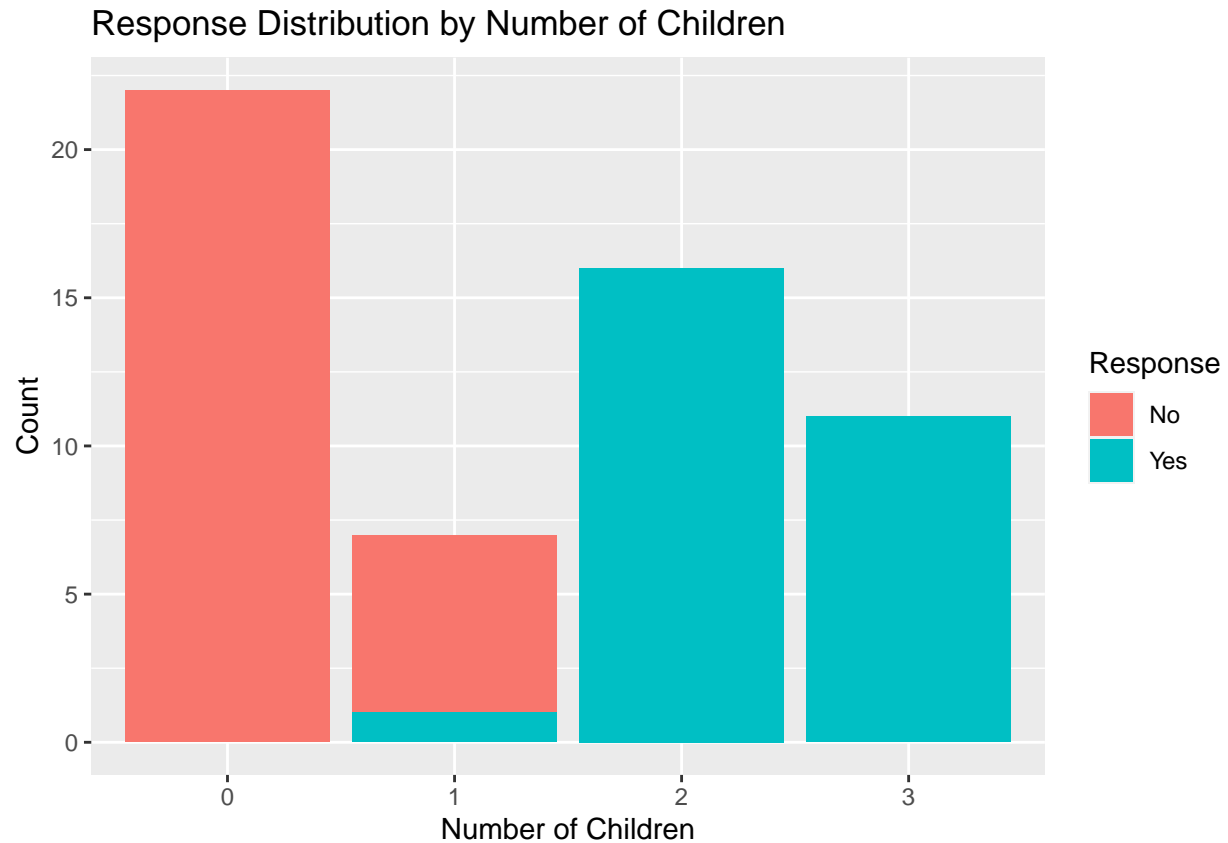
Model (all predictors)

```
model = glm(Response~no_of_children, data = df, family = binomial)
```

```
## Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
```

```
summary(model)
```

```
##
## Call:
## glm(formula = Response ~ no_of_children, family = binomial, data = df)
##
## Coefficients:
##                 Estimate Std. Error z value Pr(>|z|)
## (Intercept)       -24.51    5210.22  -0.005    0.996
## no_of_children     22.72    5210.22   0.004    0.997
##
## (Dispersion parameter for binomial family taken to be 1)
##
##     Null deviance: 77.6325  on 55  degrees of freedom
## Residual deviance:  5.7416  on 54  degrees of freedom
## AIC: 9.7416
```

```
## 
## Number of Fisher Scoring iterations: 21
```