The Effect of Demographic, Socioeconomic, and Family Factors on Marketing

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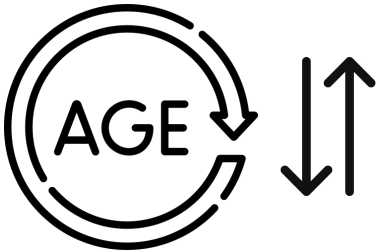
Data Problems!

Can we predict responses to a marketing campaign based on age, income, and number of children?



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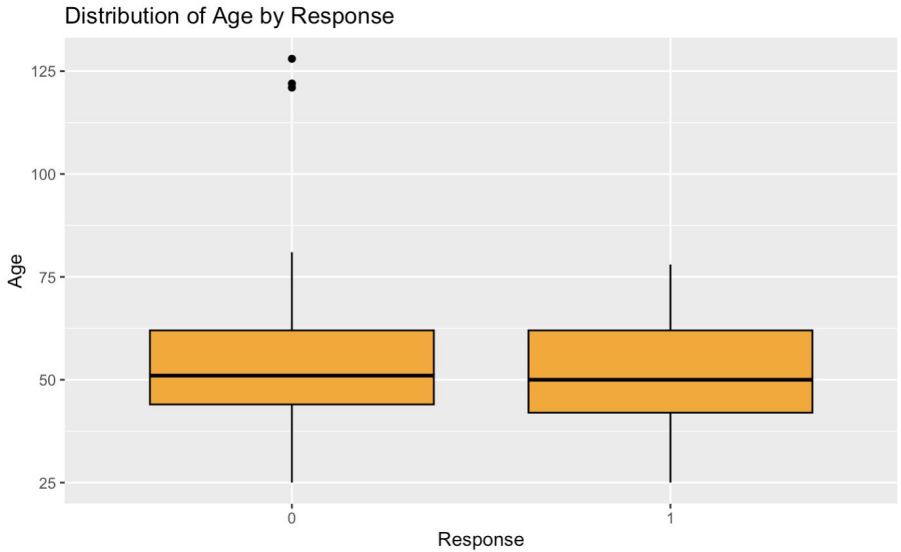
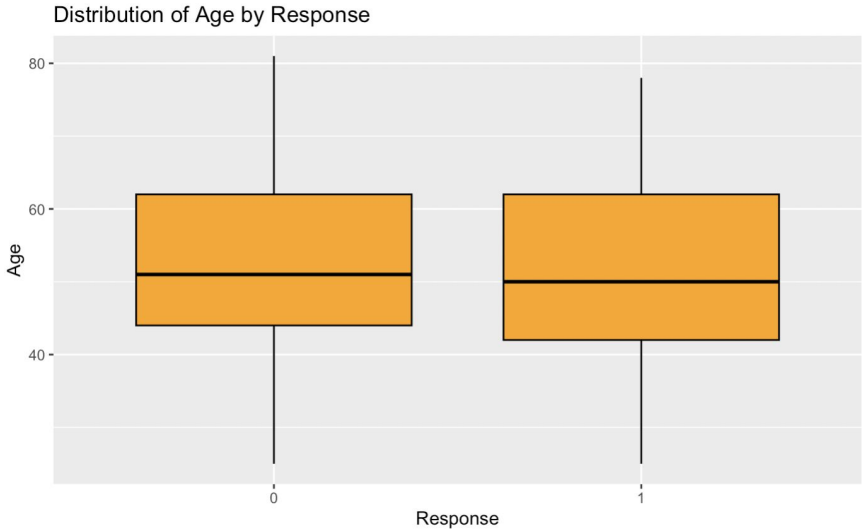
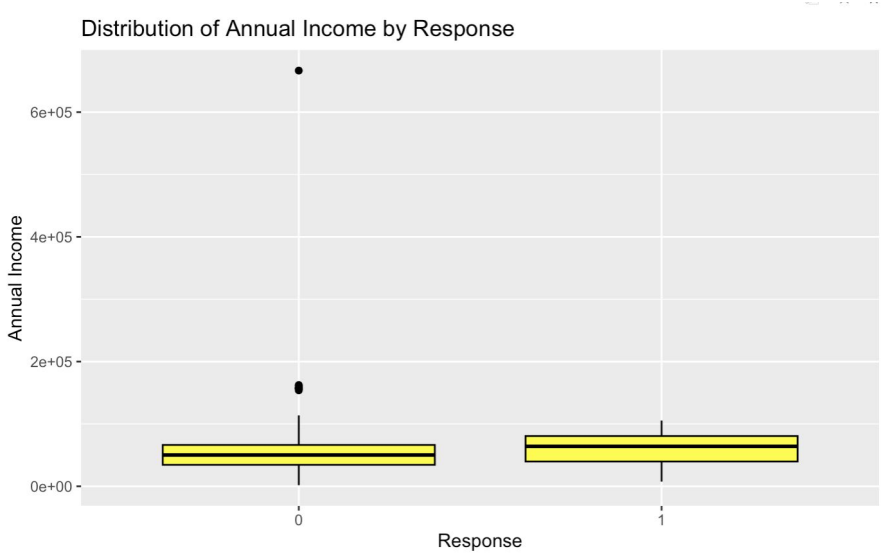
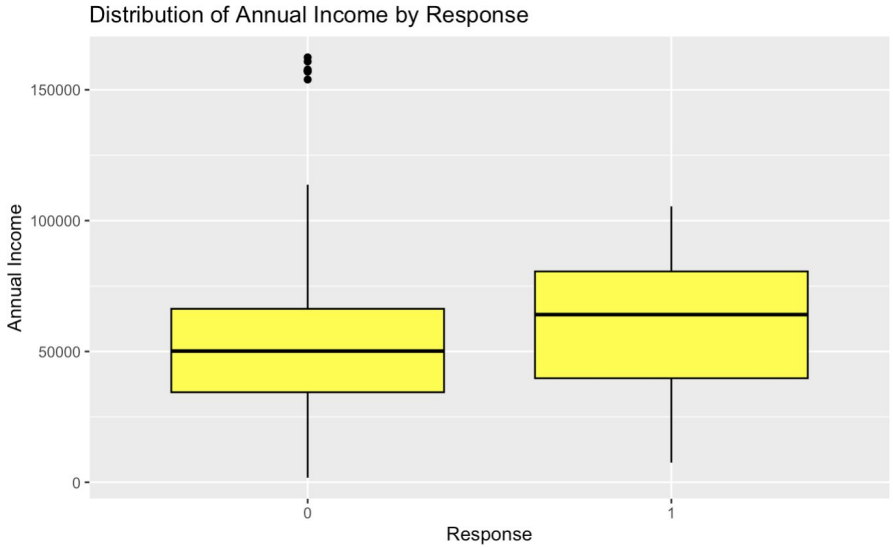
Age - Removing Outliers



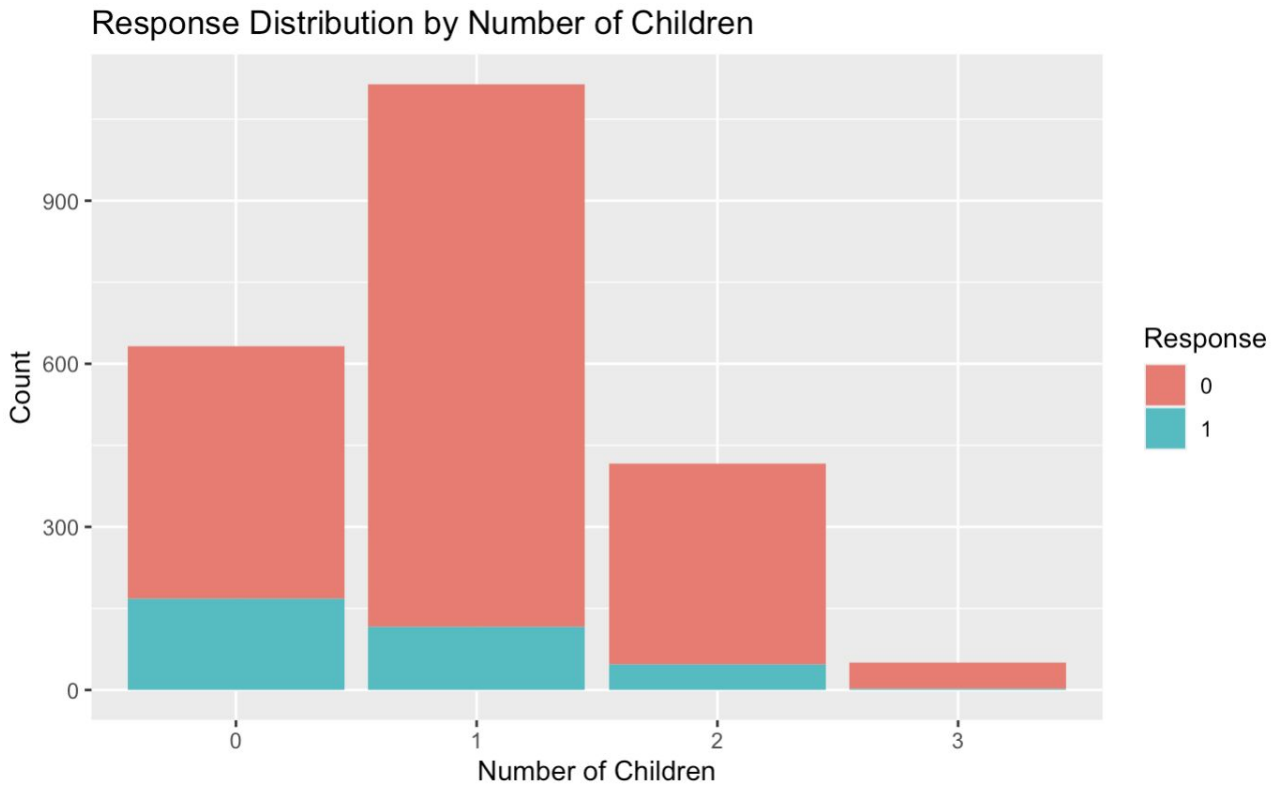


Income - Removing Outliers





Children in Household



Predictors

Age: Not Significant (p-value: .145)

Income: **Significant** (p value: .000001)

Number of Children: **Significant** (p-value: .0000001)

Interpreting The Model

log(odds) = -1.732 + -0.007418*Age + 0.00001455*Income + -0.5063*ChildrenHome

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Call:
glm(formula = Response ~ Age + Income + ChildrenHome, family = binomial,
    data = df)

Coefficients:
              Estimate Std. Error z value Pr(>|z|)
(Intercept)  -1.732e+00  3.094e-01  -5.597 2.18e-08 ***
Age          -7.418e-03  5.091e-03  -1.457    0.145
Income        1.455e-05  2.999e-06   4.851 1.23e-06 ***
ChildrenHome -5.063e-01  9.638e-02  -5.254 1.49e-07 ***
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Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 1874.2  on 2211  degrees of freedom
Residual deviance: 1783.4  on 2208  degrees of freedom
AIC: 1791.4

Number of Fisher Scoring iterations: 5
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Age

The negative sign of the estimate indicates that the chance of a positive response to a marketing campaign decreases with Age.

Based on our model, for an individual with one year higher of an age and the same income and number of children in the home, we predict that their odds of providing a positive response to a marketing campaign are multiplied by exp(-0.007418), or .993.

Income

The positive sign of the estimate indicates that the chance of a positive response to a marketing campaign increases with income.

Based on our model, for an individual with one unit higher of an income and the same age and number of children in the home, we predict that their odds of providing a positive response to a marketing campaign are multiplied by exp(0.00001455), or 1.00.

Number of Children

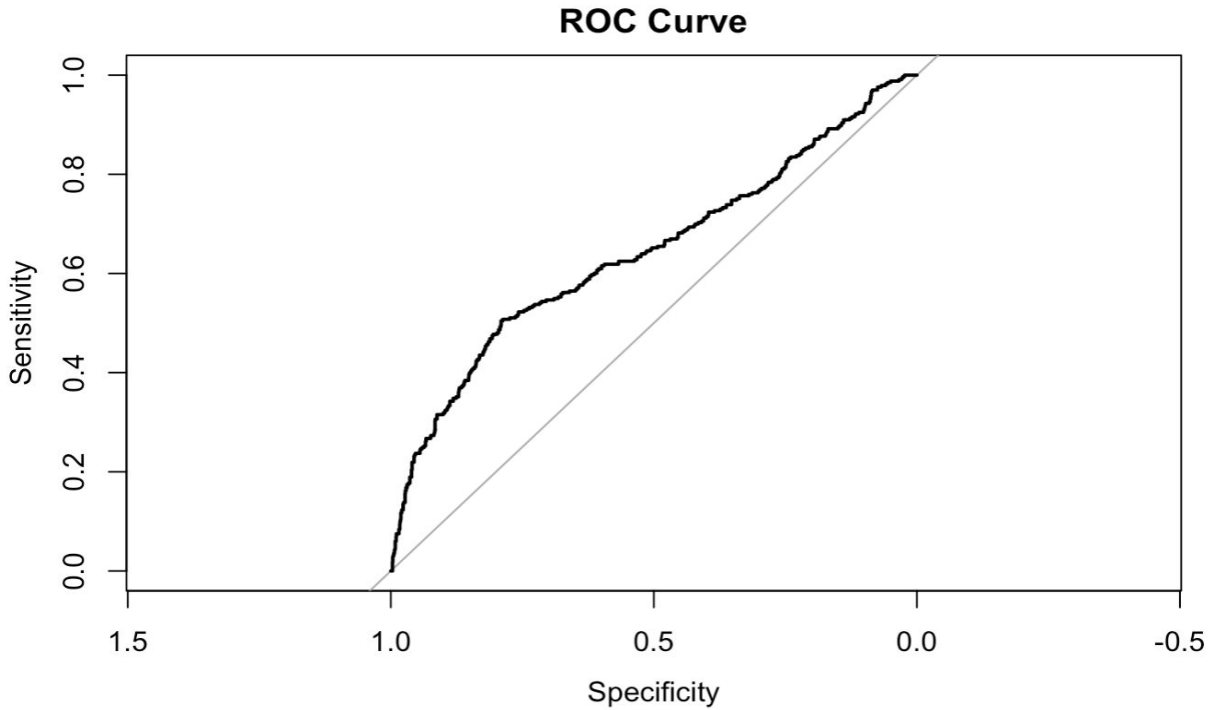
The negative sign of the estimate indicates that the chance of a positive response to a marketing campaign decreases with the number of children in a given household.

Based on our model, for an individual with one more child in the home and the same age and income, we predict that their odds of providing a positive response to a marketing campaign are multiplied by exp(-0.5063), or .603.

Confidence Interval

	2.5 %	97.5 %
(Intercept)	-2.344936e+00	-1.131455e+00
Age	-1.744111e-02	2.529468e-03
Income	8.707621e-06	2.047939e-05
ChildrenHome	-6.975226e-01	-3.195552e-01

Area Under Curve: .6439



Predictions (Version 1: 50%)

	Predicted	
Actual	0	1
0	1875	4
1	333	0

Accuracy: 84.76%

Precision: 0%

Recall: 0%

Predictions (Version 2: 30%)

	Predicted	
Actual	0	1
0	1835	44
1	292	41

Accuracy: 84.81%

Precision: 48.23%

Recall: 12.31%