

Ice Cream Analysis Report

Executive Summary

An ice cream company wants to boost its margin profits through formulating differential pricing strategies and carrying out effective coupon promotion activities. To help them achieve their goal, we analyzed a transaction dataset containing transaction features such as 'price paid', 'total spend', product features such as 'flavor', 'size', and demographic features of households such as 'income', 'age', and we build multiple regression models to explore factors that will impact customers' willingness to pay, dictated by 'price paid per unit'. Moreover, we design Difference-in-Difference analysis to help them study the causal effect of coupons to different customer groups, which is not obtainable by simply building regression models.

Major findings of our analysis are as follows:

- (1) Product features such as flavor and size have significant impacts on customers' willingness to pay
- (2) Demographic features of households such as income, region and household size have significant impacts on customers' willingness to pay
- (3) Positive interaction exists between coupon and central region regarding impacts on 'price per unit'

Recommendations are given as follows:

- (1) Apply differential pricing strategies to different flavors of ice cream, different regions and customers with different levels of income
- (2) Collect panel data and conduct Difference-in-Difference analysis to analyze causal effects of coupon to different customer groups, through which they can improve the effectiveness of promotion activities

Introduction

An ice cream company is seeking ways to formulate differential pricing strategies for different customer groups and improve coupon promotion activities to maximize margin profits. To help them achieve the goal, our analysis will mainly focus on building linear regression models to explore factors that might impact customers' willingness to pay and providing recommendations on making smarter pricing strategies based on customer segmentations. Moreover, we also suggest other statistic methods to help them better explore how to enhance the efficiency of their promotion activities such as offering coupons to customers with high purchase potential more precisely.

Data Characteristics and Exploration

The dataset contains 2,1975 rows of transaction records along with demographic information of 6385 households. There are 37 variables in total, among which transaction data such as price paid, coupon value, features of products such as flavor, size and quantity of ice cream and demographic data of households such as income, region, race, age, gender are included.

We calculate 'price per unit' for each deal as target variable Y and use other variables as explanatory variables X. Then we conducted exploratory analysis on relations between target variable and other variables. Here are what we found. Among all the explanatory variables, 'coupon value' positively correlated with 'price per unit', indicating that higher coupon value may encourage customers to pay higher price per unit.

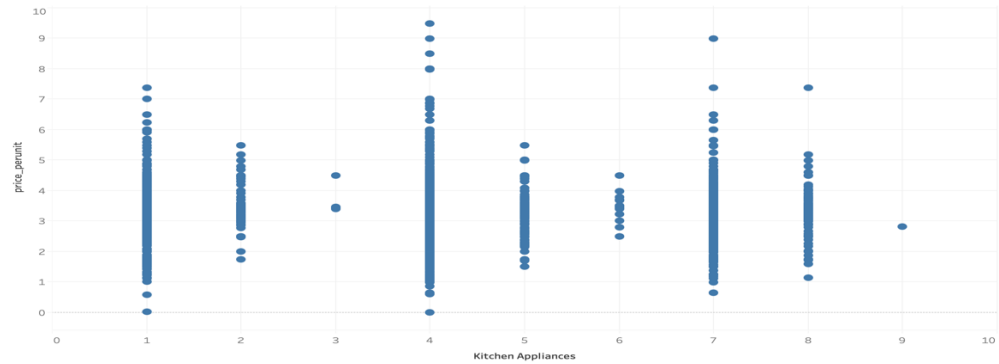
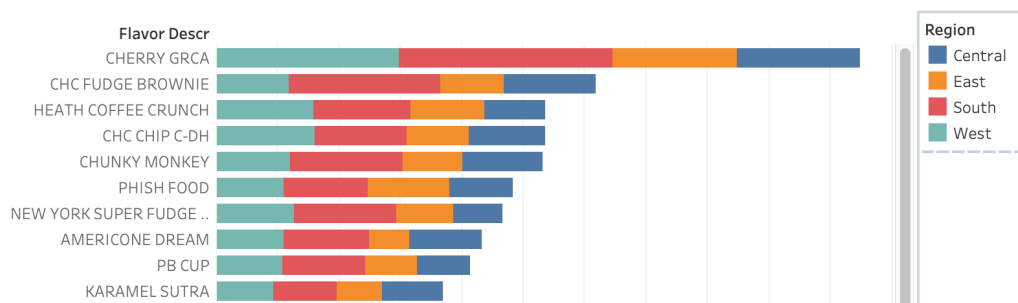


Chart above shows that 'price per unit' also varies a lot when the household owns different kinds of kitchen appliances such as microwave and dishwasher, showing that families holding different machines may have different purchasing power.



Also, as the horizontal bar chart shows, 'Cherry Grca' is the most popular flavor across all regions, but different regions have different preference for different ice cream flavors.

Model Selection, Evaluation and Interpretation

Multiple regression model is chosen in this case since it enables us not only to identify the significance of each independent variable but also to quantify the degree of impact on the dependent variable of our interest, thereby increasing the power of interpretation. 'Price per unit' is chosen as target variable Y to reflect customers' willingness to pay since it eliminates the effects of quantity on price. 15 variables such as 'flavor', 'coupon', 'marital status', 'Hispanic origin' are chosen as independent variables.

After creating dummy variables for categorical variables, there are 69 independent variables in total.

Results of the primary regression model shows that whether the household is from a Hispanic origin or whether it has dishwasher or not are two regressors with insignificant p-value. These two variables should be removed because they do not influence target variables. Moreover, variables such as whether there is a promotion, household composition, age, and presence of children are added as they are logically significant and have high correlations with 'price per unit'.

However, in order to improve the performance of the model and minimize the possibility of overfitting and underfitting, stepwise regression method is deployed. And 13 independent variables out of 16 are retained. Moreover, interaction terms of 'coupon per unit' across region, and 'coupon per unit' across race which have statistically significant impact on 'price per unit' are added.

According to the final model, the features of ice cream such as flavor and size do have significant impacts on target variable. Specifically, some flavors increase customers' willingness to pay higher price. Assuming the cost of the production hold constant, the company is advised to produce more ice creams with popular flavors among customers. In addition, there are several demographic variables showing statistically significant impacts on 'price per unit'. Variables such as income, region, and household size are of operational use. For example, these demographic characteristics can be utilized by the company to segment customers and apply differential pricing strategies.

Since we included 76 independent variables in total, it is possible that some unnecessary variables with little explanatory power are mistakenly included in the model.

Based on the significant level of 95%, the false positive rate is approximately 8%, which means that approximately 3 out of 32 significant variables under the significant level of 95% are in fact non-significant. Since 3 false positive variables seems acceptable, we keep the criteria of 95% significance level.

Coupons can help almost every business type and size. A successful coupon marketing strategy not only drives sales, but also helps build brand image. The scatter plot of coupon value and price per unit shows a strong positive correlation. Therefore, it is beneficial to focus on studying the causal effects of coupon value with difference-in-difference (DID) technique. In order to further validate both the significance and the direction of the impact of certain variables that might be vital in our implementation of strategy, we designed a difference-in-difference (DID) experiment to identify the causal relationship between those variables and 'price per unit'. To do the DID analysis, customers are divided into two groups based on region. Then take months (June, July, and August) in summer quarter in one year as the panel data since a year is too long to conduct an experiment and sales of ice cream varies greatly across quarters. For the pre-intervention period, the company does not give any coupon, and gives coupon to the treatment group, for example, households with children, at the middle of July. By performing DID analysis described above for two groups individually, we can get the effects of giving coupon on them. After that, comparison of the effects will reveal customers in which region should be given coupons to maximize the margins.

Recommendation

Based on our analysis, in order to fully exploit customers' surplus, the company can apply different pricing strategy to different flavors of ice cream, location, and

customers with different levels of income. Specifically, the company can increase the price of ice cream with coffee flavor, ice cream sold in east region, and target coupon at customer with lower income.

In addition, there exists positive interaction between coupon and central region of impact on 'price per unit'. In other words, handing out coupon can bring company more business value in the central region, therefore company is advised to target the coupon at customers who lives in central region.

Conclusion

In this report, we aim to provide analysis support for formulating differential pricing strategies and effective promotion coupon activities. We build multiple regression models to explore factors that impact customers' willingness to pay and we found that flavor and size of ice cream do have significant impacts on customers' willingness to pay. Demographic variables such as income, region and household size show statistically significant impact on customers' willingness to pay.

Based on the findings, we provide four recommendations:

- (1) set higher prices for popular flavors of ice cream, for example, coffee flavor
- (2) set higher prices in regions where customers' willingness to pay is higher, for example, east region
- (3) give out more coupons to customers with lower income, for example, students
- (4) collect panel data and carry out Difference-In-Difference analysis to study coupon's causal effect on customers of different age groups or region groups and give out coupons to groups with higher positive effect

Appendix

a. Equation of the Final model:

$$\begin{aligned}\log(\text{PricePerUnit}) = & \beta_0 + \beta_1 \text{Size} + \beta_2 \text{CouponPerUnit} + \beta_3 \text{HasPromotion} + \beta_4 \text{Region} \\ & + \beta_5 \text{Flavor} + \beta_6 \text{UseCoupon} + \beta_7 \text{HouseholdComposition} + \beta_8 \text{HouseholdIncome} \\ & + \beta_9 \text{Microwave} + \beta_{10} \text{SFH} + \beta_{11} \text{Race} + \beta_{12} \text{HouseholdSize} + \beta_{13} \text{TVCablb} \\ & + \beta_{14} \text{CouponPerUnit} * \text{Region} + \beta_{15} \text{CouponPerUnit} * \text{Rac} \\ & + \text{intercept} + \epsilon_t\end{aligned}$$

ice_cream_modified.R

user

2020-01-09

```
#### Purchases of Ice Cream
ice = read.csv("ice_cream.csv")

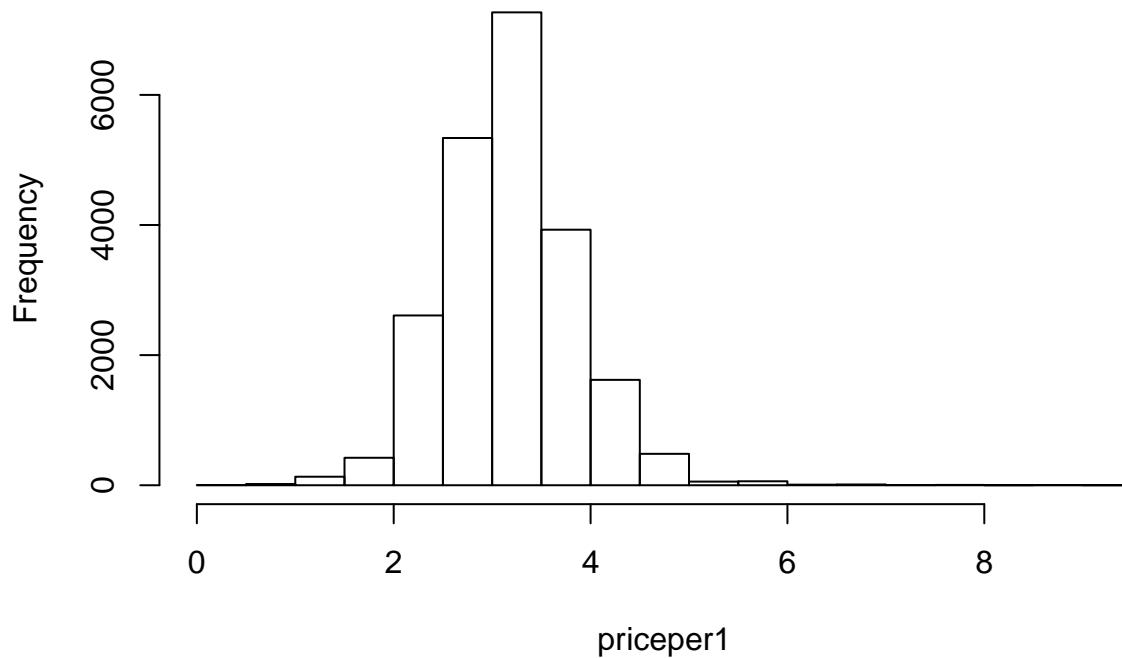
## explore
names(ice)

## [1] "quantity" "price_paid_deal"
## [3] "price_paid_non_deal" "coupon_value"
## [5] "promotion_type" "total_spent"
## [7] "size1_descr" "flavor_descr"
## [9] "formula_descr" "household_id"
## [11] "household_size" "household_income"
## [13] "age_of_female_head" "age_of_male_head"
## [15] "age_and_presence_of_children" "male_head_employment"
## [17] "female_head_employment" "male_head_education"
## [19] "female_head_education" "marital_status"
## [21] "male_head_occupation" "female_head_occupation"
## [23] "household_composition" "race"
## [25] "hispanic_origin" "region"
## [27] "scantrack_market_identifier" "projection_factor"
## [29] "fips_state_code" "fips_county_code"
## [31] "census_tract_county_code" "type_of_residence"
## [33] "kitchen_appliances" "tv_items"
## [35] "female_head_birth" "male_head_birth"
## [37] "household_internet_connection"

## create a new variable for price per unit
priceper1 = (ice$price_paid_deal + ice$price_paid_non_deal) / ice$quantity
y <- log(1 + priceper1)

#####Added Code#####
## Check the distribution of price per unit before and after log transformation #
hist(priceper1) #
```

Histogram of priceper1



```
hist(y) #
#####

## collect some variables of interest
## create a data.frame
x <- ice[,c("flavor_descr", "size1_descr", "household_income", "household_size")]

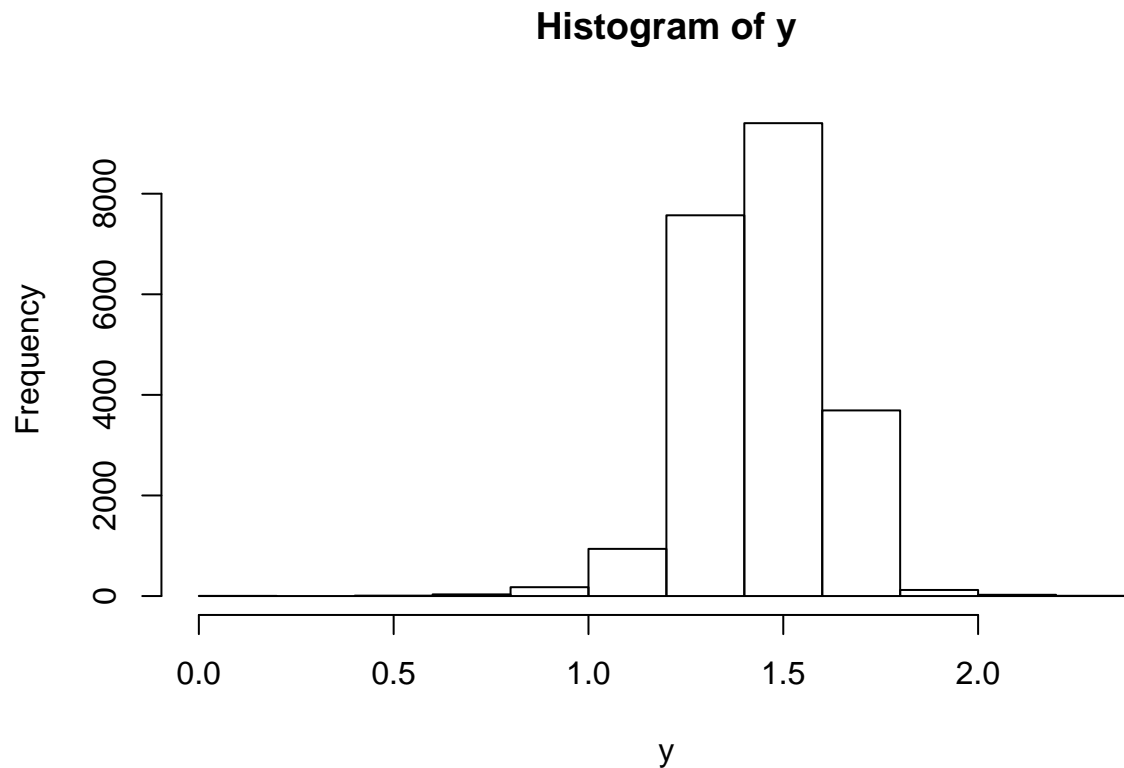
## releve 'flavor' to have baseline of vanilla
x$flavor_descr <- relevel(x$flavor_descr, "VAN")
## coupon usage
x$usecoup = factor(ice$coupon_value > 0)
x$couponper1 <- ice$coupon_value / ice$quantity
## organize some demographics
x$region <- factor(ice$region, levels=1:4, labels=c("East", "Central", "South", "West"))
x$married <- factor(ice$marital_status==1)
x$race <- factor(ice$race, levels=1:4, labels=c("white", "black", "asian", "other"))
x$microwave <- ice$kitchen_appliances %in% c(1,4,5,7)
x$sfh <- ice$type_of_residence == 1
x$internet <- ice$household_internet_connection == 1
x$tvcbale <- ice$tv_items > 1

#####Added Code#####
## Add new variables to the regression model #
promo <- ice$promotion_type #
promo[is.na(promo)] <- 0 #
x$haspromo <- factor(promo > 0) #
```

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x$household_composition <- factor(ice$household_composition) #
x$age_and_presence_of_children <- ice$age_and_presence_of_children #
### Run Stepwise Regression #
df <- data.frame(cbind(y,x)) #
model <- lm(y ~ ., data = df) #
k <- olsrr::ols_step_both_p(model, prem = 0.10, pent = 0.10, details = TRUE) #

```



```

## Stepwise Selection Method
## -----
##
## Candidate Terms:
##
## 1. flavor_descr
## 2. size1_descr
## 3. household_income
## 4. household_size
## 5. usecoup
## 6. couponper1
## 7. region
## 8. married
## 9. race
## 10. microwave
## 11. sfh
## 12. internet
## 13. tvcable

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```

## 14. haspromo
## 15. household_composition
## 16. age_and_presence_of_children
##
## We are selecting variables based on p value...
##
##
## Stepwise Selection: Step 1
##
## - size1_descr added
##
##
##                      Model Summary
## -----
## R                      0.261      RMSE                      0.151
## R-Squared              0.068      Coef. Var                10.424
## Adj. R-Squared         0.068      MSE                      0.023
## Pred R-Squared         0.068      MAE                      0.114
## -----
## RMSE: Root Mean Square Error
## MSE: Mean Square Error
## MAE: Mean Absolute Error
##
##
##                      ANOVA
## -----
##              Sum of      DF      Mean Square      F      Sig.
##              Squares
## -----
## Regression      36.544         1      36.544      1599.674      0.0000
## Residual       501.938      21972         0.023
## Total          538.482      21973
## -----
##
##
##                      Parameter Estimates
## -----
##              model      Beta      Std. Error      Std. Beta      t      Sig      lower      upper
## -----
##              (Intercept)  1.445         0.001         1404.937      0.000      1.443      1.447
## size1_descr32.0 MLOZ    0.317         0.008         0.261      39.996      0.000      0.302      0.333
## -----
##
##
## Stepwise Selection: Step 2
##
## - couponper1 added
##
##
##                      Model Summary
## -----
## R                      0.292      RMSE                      0.150
## R-Squared              0.085      Coef. Var                10.325
## Adj. R-Squared         0.085      MSE                      0.022
## Pred R-Squared         0.085      MAE                      0.113
## -----
## RMSE: Root Mean Square Error

```

MSE: Mean Square Error
MAE: Mean Absolute Error

##

ANOVA

##	##	Sum of	##	Mean Square	F	Sig.
##	##	Squares	DF			
##	Regression	46.010	2	23.005	1026.333	0.0000
##	Residual	492.472	21971	0.022		
##	Total	538.482	21973			

##

##

Parameter Estimates

##	##	model	Beta	Std. Error	Std. Beta	t	Sig	lower	upper
##	##	(Intercept)	1.440	0.001		1374.015	0.000	1.438	1.442
##	##	size1_descr32.0 MLOZ	0.318	0.008	0.261	40.482	0.000	0.303	0.334
##	##	couponper1	0.040	0.002	0.133	20.550	0.000	0.036	0.044

##

##

##

##

Model Summary

##	##	R	0.292	RMSE	0.150
##	##	R-Squared	0.085	Coef. Var	10.325
##	##	Adj. R-Squared	0.085	MSE	0.022
##	##	Pred R-Squared	0.085	MAE	0.113

##

RMSE: Root Mean Square Error

MSE: Mean Square Error

MAE: Mean Absolute Error

##

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```
##
##
## Stepwise Selection: Step 3
##
## - haspromo added
##
```

```
##
##              Model Summary
## -----
```

## R	0.314	RMSE	0.149
## R-Squared	0.099	Coef. Var	10.251
## Adj. R-Squared	0.099	MSE	0.022
## Pred R-Squared	0.098	MAE	0.113

```
## -----
```

```
## RMSE: Root Mean Square Error
## MSE: Mean Square Error
## MAE: Mean Absolute Error
##
```

```
##
##              ANOVA
## -----
```

##	Sum of	DF	Mean Square	F	Sig.
##	Squares				
## Regression	53.111	3	17.704	801.34	0.0000
## Residual	485.371	21970	0.022		
## Total	538.482	21973			

```
## -----
```

```
##
##              Parameter Estimates
## -----
```

##	model	Beta	Std. Error	Std. Beta	t	Sig.	lower	upper
##								
##	(Intercept)	1.454	0.001		1103.702	0.000	1.452	1.457
##	size1_descr32.0 MLOZ	0.309	0.008	0.254	39.545	0.000	0.294	0.325
##	couponper1	0.051	0.002	0.168	25.028	0.000	0.047	0.055
##	haspromoTRUE	-0.038	0.002	-0.120	-17.928	0.000	-0.042	-0.034

```
## -----
```

```
##
##              Model Summary
## -----
```

## R	0.314	RMSE	0.149
## R-Squared	0.099	Coef. Var	10.251
## Adj. R-Squared	0.099	MSE	0.022
## Pred R-Squared	0.098	MAE	0.113

```
## -----
```

```
## RMSE: Root Mean Square Error
## MSE: Mean Square Error
## MAE: Mean Absolute Error
##
```

```
##
##              ANOVA
## -----
```

##	Sum of	DF	Mean Square	F	Sig.
##	Squares				

```

## -----
## Regression      53.111          3      17.704      801.34      0.0000
## Residual       485.371      21970      0.022
## Total          538.482      21973
## -----
##
##                               Parameter Estimates
## -----
##              model      Beta      Std. Error      Std. Beta      t      Sig      lower      upper
## -----
##              (Intercept)      1.454          0.001          1103.702      0.000      1.452      1.457
## size1_descr32.0 MLOZ      0.309          0.008          0.254      39.545      0.000      0.294      0.325
##              couponper1      0.051          0.002          0.168      25.028      0.000      0.047      0.055
##              haspromoTRUE     -0.038          0.002          -0.120     -17.928      0.000     -0.042     -0.034
## -----
##
##
##
## Stepwise Selection: Step 4
##
## - region added
##
##                               Model Summary
## -----
## R              0.324          RMSE              0.148
## R-Squared       0.105          Coef. Var        10.215
## Adj. R-Squared  0.105          MSE              0.022
## Pred R-Squared  0.104          MAE              0.112
## -----
## RMSE: Root Mean Square Error
## MSE: Mean Square Error
## MAE: Mean Absolute Error
##
##                               ANOVA
## -----
##              Sum of
##              Squares          DF      Mean Square      F      Sig.
## -----
## Regression      56.531          6          9.422      429.439      0.0000
## Residual       481.951      21967          0.022
## Total          538.482      21973
## -----
##
##                               Parameter Estimates
## -----
##              model      Beta      Std. Error      Std. Beta      t      Sig      lower      upper
## -----
##              (Intercept)      1.477          0.002          615.754      0.000      1.473      1.482
## size1_descr32.0 MLOZ      0.303          0.008          0.249      38.809      0.000      0.288      0.319
##              couponper1      0.051          0.002          0.168      25.229      0.000      0.047      0.055
##              haspromoTRUE     -0.041          0.002          -0.129     -19.097      0.000     -0.045     -0.037
##              regionCentral     -0.029          0.003          -0.078     -9.580      0.000     -0.035     -0.023
##              regionSouth     -0.034          0.003          -0.100    -11.860      0.000     -0.040     -0.028
##              regionWest     -0.019          0.003          -0.054     -6.513      0.000     -0.025     -0.013

```

```

## -----
##
##
##
##           Model Summary
## -----
## R                0.324      RMSE                0.148
## R-Squared        0.105      Coef. Var            10.215
## Adj. R-Squared   0.105      MSE                 0.022
## Pred R-Squared   0.104      MAE                 0.112
## -----
## RMSE: Root Mean Square Error
## MSE: Mean Square Error
## MAE: Mean Absolute Error
##
##           ANOVA
## -----
##           Sum of
##           Squares      DF      Mean Square      F      Sig.
## -----
## Regression      56.531         6         9.422    429.439    0.0000
## Residual       481.951      21967         0.022
## Total          538.482      21973
## -----
##
##           Parameter Estimates
## -----
##           model      Beta      Std. Error      Std. Beta      t      Sig      lower      upper
## -----
## (Intercept)      1.477         0.002             615.754    0.000      1.473      1.482
## size1_descr32.0 MLOZ  0.303         0.008             38.809    0.000      0.288      0.319
## couponper1       0.051         0.002             25.229    0.000      0.047      0.055
## haspromoTRUE     -0.041         0.002             -19.097    0.000     -0.045     -0.037
## regionCentral    -0.029         0.003             -9.580    0.000     -0.035     -0.023
## regionSouth     -0.034         0.003             -11.860    0.000     -0.040     -0.028
## regionWest      -0.019         0.003             -6.513    0.000     -0.025     -0.013
## -----
##
##
##
## Stepwise Selection: Step 5
##
## - flavor_descr added
##
##           Model Summary
## -----
## R                0.339      RMSE                0.147
## R-Squared        0.115      Coef. Var            10.170
## Adj. R-Squared   0.113      MSE                 0.022
## Pred R-Squared   -Inf      MAE                 0.111
## -----
## RMSE: Root Mean Square Error
## MSE: Mean Square Error
## MAE: Mean Absolute Error

```



```

##
##                                ANOVA
## -----
##              Sum of
##              Squares          DF      Mean Square      F      Sig.
## -----
## Regression      61.841          55          1.124      51.704      0.0000
## Residual        476.641        21918          0.022
## Total           538.482        21973
## -----
##
##                                Parameter Estimates
## -----
##              model      Beta      Std. Error      Std. Beta      t      Sig
## -----
##              (Intercept)      1.509      0.007      223.644      0.000
##              size1_descr32.0 MLOZ      0.302      0.008      0.248      37.323      0.000
##              couponper1      0.050      0.002      0.167      25.034      0.000
##              haspromoTRUE      -0.043      0.002      -0.134      -19.786      0.000
##              regionCentral      -0.026      0.003      -0.069      -8.496      0.000
##              regionSouth      -0.031      0.003      -0.091      -10.747      0.000
##              regionWest      -0.018      0.003      -0.052      -6.282      0.000
##              flavor_descrAMERICONE DREAM      -0.029      0.008      -0.037      -3.576      0.000
##              flavor_descrBANANA SPLIT      -0.047      0.009      -0.049      -5.314      0.000
##              flavor_descrBLACK & TAN      -0.095      0.030      -0.020      -3.135      0.002
##              flavor_descrBROWNIE BATTER      -0.007      0.014      -0.004      -0.495      0.620
##              flavor_descrBUTTER PECAN      -0.010      0.012      -0.007      -0.890      0.373
##              flavor_descrCAKE BATTER      -0.045      0.010      -0.038      -4.559      0.000
##              flavor_descrCHC      -0.002      0.016      -0.001      -0.093      0.926
##              flavor_descrCHC ALMOND NOUGAT      -0.019      0.015      -0.009      -1.258      0.208
##              flavor_descrCHC CHIP C-DH      -0.028      0.008      -0.039      -3.555      0.000
##              flavor_descrCHC FUDGE BROWNIE      -0.032      0.008      -0.048      -4.182      0.000
##              flavor_descrCHERRY GRCA      -0.034      0.007      -0.063      -4.618      0.000
##              flavor_descrCHUBBY HUBBY      -0.013      0.011      -0.010      -1.213      0.225
##              flavor_descrCHUNKY MONKEY      -0.039      0.008      -0.053      -4.869      0.000
##              flavor_descrCINNAMON BUNS      -0.051      0.009      -0.054      -5.794      0.000
##              flavor_descrCOFFEE      0.028      0.021      0.009      1.348      0.178
##              flavor_descrCREME BRULEE      -0.053      0.009      -0.048      -5.590      0.000
##              flavor_descrDOUBLE CHC FUDGE SWR      0.019      0.148      0.001      0.130      0.896
##              flavor_descrDUBLIN MUDSLIDE      -0.018      0.010      -0.015      -1.806      0.071
##              flavor_descrFOSSIL FUEL      -0.047      0.017      -0.019      -2.717      0.007
##              flavor_descrHALF BAKED      -0.040      0.009      -0.045      -4.661      0.000
##              flavor_descrHEATH CANDY EVERYTHING BUT THE      -0.039      0.009      -0.039      -4.305      0.000
##              flavor_descrHEATH COFFEE CRUNCH      -0.024      0.008      -0.033      -3.030      0.002
##              flavor_descrHEATH CRUNCH      -0.002      0.009      -0.002      -0.267      0.789
##              flavor_descrIMAGINE WHIRLED PEACE      -0.045      0.009      -0.048      -5.152      0.000
##              flavor_descrKARAMEL SUTRA      -0.034      0.008      -0.040      -4.059      0.000
##              flavor_descrMAGIC BROWNIES      -0.044      0.012      -0.027      -3.572      0.000
##              flavor_descrMINT CHC CHUNK      0.012      0.014      0.006      0.850      0.395
##              flavor_descrNEAPOLITAN DYNAMITE      -0.024      0.013      -0.014      -1.896      0.058
##              flavor_descrNEW YORK SUPER FUDGE CHUNK      -0.036      0.008      -0.046      -4.438      0.000
##              flavor_descroATMEAL COOKIE CHUNK      -0.024      0.013      -0.014      -1.924      0.054
##              flavor_descrONE CSK BROWNIE      -0.062      0.009      -0.062      -6.884      0.000
##              flavor_descrOXFORD MINT CHC COOKIE      -0.028      0.010      -0.021      -2.643      0.008

```

```

##          flavor_descrPB CUP      -0.031      0.008      -0.038      -3.777      0.000
##          flavor_descrPB TRUFFLE  -0.092      0.148      -0.004      -0.620      0.535
##          flavor_descrPHISH FOOD  -0.024      0.008      -0.032      -3.002      0.003
##          flavor_descrPISTACHIO PISTACHIO -0.028      0.009      -0.032      -3.325      0.001
##          flavor_descrPUMPKIN CSK   -0.107      0.014      -0.055      -7.695      0.000
##          flavor_descrRSP CHC CHUNK -0.002      0.018      -0.001      -0.085      0.932
##          flavor_descrSMORES        0.009      0.012      0.005      0.735      0.462
##          flavor_descrSTR           0.048      0.045      0.007      1.064      0.287
##          flavor_descrSTR CSK       -0.049      0.009      -0.047      -5.318      0.000
##          flavor_descrSTRAWBERRIES & CREAM -0.022      0.041      -0.003      -0.519      0.603
##          flavor_descrSWEET CREAM & COOKIES 0.032      0.036      0.006      0.887      0.375
##          flavor_descrTRIPLE CARAMEL CHUNK -0.033      0.017      -0.013      -1.953      0.051
##          flavor_descrTURTLE SOUP  -0.055      0.012      -0.033      -4.475      0.000
##          flavor_descrVAN CARAMEL FUDGE -0.037      0.011      -0.027      -3.457      0.001
##          flavor_descrVERMONTY PYTHON -0.023      0.014      -0.011      -1.576      0.115
##          flavor_descrW-N-C-P-C     -0.038      0.009      -0.042      -4.411      0.000
##          flavor_descrWHITE RUSSIAN  0.164      0.148      0.007      1.112      0.266
## -----
##
##
##
##          Model Summary
## -----
## R          0.339      RMSE          0.147
## R-Squared   0.115      Coef. Var    10.170
## Adj. R-Squared 0.113      MSE          0.022
## Pred R-Squared  -Inf      MAE          0.111
## -----
## RMSE: Root Mean Square Error
## MSE: Mean Square Error
## MAE: Mean Absolute Error
##
##          ANOVA
## -----
##          Sum of
##          Squares      DF      Mean Square      F      Sig.
## -----
## Regression    61.841      55      1.124    51.704    0.0000
## Residual     476.641    21918      0.022
## Total        538.482    21973
## -----
##
##          Parameter Estimates
## -----
##          model      Beta      Std. Error      Std. Beta      t      Sig
## -----
##          (Intercept)    1.509      0.007      223.644    0.000
##          size1_descr32.0 MLOZ    0.302      0.008      37.323    0.000
##          couponper1      0.050      0.002      25.034    0.000
##          haspromoTRUE    -0.043      0.002    -19.786    0.000
##          regionCentral   -0.026      0.003    -8.496    0.000
##          regionSouth     -0.031      0.003   -10.747    0.000
##          regionWest      -0.018      0.003    -6.282    0.000
##          flavor_descrAMERICONE DREAM -0.029      0.008    -3.576    0.000

```

##	flavor_descrBANANA SPLIT	-0.047	0.009	-0.049	-5.314	0.000
##	flavor_descrBLACK & TAN	-0.095	0.030	-0.020	-3.135	0.002
##	flavor_descrBROWNIE BATTER	-0.007	0.014	-0.004	-0.495	0.620
##	flavor_descrBUTTER PECAN	-0.010	0.012	-0.007	-0.890	0.373
##	flavor_descrCAKE BATTER	-0.045	0.010	-0.038	-4.559	0.000
##	flavor_descrCHC	-0.002	0.016	-0.001	-0.093	0.926
##	flavor_descrCHC ALMOND NOUGAT	-0.019	0.015	-0.009	-1.258	0.208
##	flavor_descrCHC CHIP C-DH	-0.028	0.008	-0.039	-3.555	0.000
##	flavor_descrCHC FUDGE BROWNIE	-0.032	0.008	-0.048	-4.182	0.000
##	flavor_descrCHERRY GRCA	-0.034	0.007	-0.063	-4.618	0.000
##	flavor_descrCHUBBY HUBBY	-0.013	0.011	-0.010	-1.213	0.225
##	flavor_descrCHUNKY MONKEY	-0.039	0.008	-0.053	-4.869	0.000
##	flavor_descrcINNAMON BUNS	-0.051	0.009	-0.054	-5.794	0.000
##	flavor_descrCOFFEE	0.028	0.021	0.009	1.348	0.178
##	flavor_descrCREME BRULEE	-0.053	0.009	-0.048	-5.590	0.000
##	flavor_descrDOUBLE CHC FUDGE SWR	0.019	0.148	0.001	0.130	0.896
##	flavor_descrDUBLIN MUDSLIDE	-0.018	0.010	-0.015	-1.806	0.071
##	flavor_descrFOSSIL FUEL	-0.047	0.017	-0.019	-2.717	0.007
##	flavor_descrHALF BAKED	-0.040	0.009	-0.045	-4.661	0.000
##	flavor_descrHEATH CANDY EVERYTHING BUT THE	-0.039	0.009	-0.039	-4.305	0.000
##	flavor_descrHEATH COFFEE CRUNCH	-0.024	0.008	-0.033	-3.030	0.002
##	flavor_descrHEATH CRUNCH	-0.002	0.009	-0.002	-0.267	0.789
##	flavor_descrIMAGINE WHIRLED PEACE	-0.045	0.009	-0.048	-5.152	0.000
##	flavor_descrkKARAMEL SUTRA	-0.034	0.008	-0.040	-4.059	0.000
##	flavor_descrmMAGIC BROWNIES	-0.044	0.012	-0.027	-3.572	0.000
##	flavor_descrmMINT CHC CHUNK	0.012	0.014	0.006	0.850	0.395
##	flavor_descrneNEAPOLITAN DYNAMITE	-0.024	0.013	-0.014	-1.896	0.058
##	flavor_descrnNEW YORK SUPER FUDGE CHUNK	-0.036	0.008	-0.046	-4.438	0.000
##	flavor_descroOATMEAL COOKIE CHUNK	-0.024	0.013	-0.014	-1.924	0.054
##	flavor_descroONE CSK BROWNIE	-0.062	0.009	-0.062	-6.884	0.000
##	flavor_descroXFORD MINT CHC COOKIE	-0.028	0.010	-0.021	-2.643	0.008
##	flavor_descrpPB CUP	-0.031	0.008	-0.038	-3.777	0.000
##	flavor_descrpPB TRUFFLE	-0.092	0.148	-0.004	-0.620	0.535
##	flavor_descrpPHISH FOOD	-0.024	0.008	-0.032	-3.002	0.003
##	flavor_descrpPISTACHIO PISTACHIO	-0.028	0.009	-0.032	-3.325	0.001
##	flavor_descrpPUMPKIN CSK	-0.107	0.014	-0.055	-7.695	0.000
##	flavor_descrrRSP CHC CHUNK	-0.002	0.018	-0.001	-0.085	0.932
##	flavor_descrrSMORES	0.009	0.012	0.005	0.735	0.462
##	flavor_descrrSTR	0.048	0.045	0.007	1.064	0.287
##	flavor_descrrSTR CSK	-0.049	0.009	-0.047	-5.318	0.000
##	flavor_descrrSTRAWBERRIES & CREAM	-0.022	0.041	-0.003	-0.519	0.603
##	flavor_descrsSWEET CREAM & COOKIES	0.032	0.036	0.006	0.887	0.375
##	flavor_descrsTRIPLE CARAMEL CHUNK	-0.033	0.017	-0.013	-1.953	0.051
##	flavor_descrtTURTLE SOUP	-0.055	0.012	-0.033	-4.475	0.000
##	flavor_descrvVAN CARAMEL FUDGE	-0.037	0.011	-0.027	-3.457	0.001
##	flavor_descrvVERMONTY PYTHON	-0.023	0.014	-0.011	-1.576	0.115
##	flavor_descrw-N-C-P-C	-0.038	0.009	-0.042	-4.411	0.000
##	flavor_descrwWHITE RUSSIAN	0.164	0.148	0.007	1.112	0.266

##

Stepwise Selection: Step 6

##

- usecoup added

##

Model Summary

## R	0.345	RMSE	0.147
## R-Squared	0.119	Coef. Var	10.147
## Adj. R-Squared	0.117	MSE	0.022
## Pred R-Squared	-Inf	MAE	0.111

RMSE: Root Mean Square Error

MSE: Mean Square Error

MAE: Mean Absolute Error

##

ANOVA

##	Sum of	DF	Mean Square	F	Sig.
##	Squares				
## Regression	64.023	56	1.143	52.812	0.0000
## Residual	474.459	21917	0.022		
## Total	538.482	21973			

##

Parameter Estimates

##	model	Beta	Std. Error	Std. Beta	t	Sig
##						
##	(Intercept)	1.510	0.007		224.255	0.000
##	size1_descr32.0 MLOZ	0.304	0.008	0.249	37.622	0.000
##	couponper1	0.068	0.003	0.226	25.388	0.000
##	haspromoTRUE	-0.036	0.002	-0.112	-15.836	0.000
##	regionCentral	-0.027	0.003	-0.071	-8.707	0.000
##	regionSouth	-0.031	0.003	-0.092	-10.930	0.000
##	regionWest	-0.019	0.003	-0.052	-6.350	0.000
##	flavor_descrAMERICONE DREAM	-0.030	0.008	-0.038	-3.707	0.000
##	flavor_descrBANANA SPLIT	-0.047	0.009	-0.049	-5.285	0.000
##	flavor_descrBLACK & TAN	-0.096	0.030	-0.021	-3.170	0.002
##	flavor_descrBROWNIE BATTER	-0.008	0.014	-0.004	-0.597	0.551
##	flavor_descrBUTTER PECAN	-0.011	0.011	-0.007	-0.926	0.355
##	flavor_descrCAKE BATTER	-0.045	0.010	-0.039	-4.575	0.000
##	flavor_descrCHC	0.000	0.016	0.000	0.024	0.980
##	flavor_descrCHC ALMOND NOUGAT	-0.017	0.015	-0.008	-1.145	0.252
##	flavor_descrCHC CHIP C-DH	-0.029	0.008	-0.040	-3.649	0.000
##	flavor_descrCHC FUDGE BROWNIE	-0.032	0.008	-0.048	-4.186	0.000
##	flavor_descrCHERRY GRCA	-0.035	0.007	-0.065	-4.753	0.000
##	flavor_descrCHUBBY HUBBY	-0.014	0.011	-0.010	-1.301	0.193
##	flavor_descrCHUNKY MONKEY	-0.040	0.008	-0.054	-4.996	0.000
##	flavor_descrCINNAMON BUNS	-0.051	0.009	-0.054	-5.823	0.000
##	flavor_descrCOFFEE	0.027	0.021	0.009	1.317	0.188
##	flavor_descrCREME BRULEE	-0.053	0.009	-0.048	-5.602	0.000
##	flavor_descrDOUBLE CHC FUDGE SWR	0.019	0.147	0.001	0.129	0.897
##	flavor_descrDUBLIN MUDSLIDE	-0.018	0.010	-0.015	-1.821	0.069
##	flavor_descrFOSSIL FUEL	-0.049	0.017	-0.019	-2.813	0.005
##	flavor_descrHALF BAKED	-0.041	0.009	-0.046	-4.784	0.000

Parameter Estimates						
	model	Beta	Std. Error	Std. Beta	t	Sig
	(Intercept)	1.510	0.007		224.255	0.000
	size1_descr32.0 MLOZ	0.304	0.008	0.249	37.622	0.000
	couponper1	0.068	0.003	0.226	25.388	0.000
	haspromoTRUE	-0.036	0.002	-0.112	-15.836	0.000
	regionCentral	-0.027	0.003	-0.071	-8.707	0.000
	regionSouth	-0.031	0.003	-0.092	-10.930	0.000
	regionWest	-0.019	0.003	-0.052	-6.350	0.000
	flavor_descrAMERICONE DREAM	-0.030	0.008	-0.038	-3.707	0.000
	flavor_descrBANANA SPLIT	-0.047	0.009	-0.049	-5.285	0.000
	flavor_descrBLACK & TAN	-0.096	0.030	-0.021	-3.170	0.002
	flavor_descrBROWNIE BATTER	-0.008	0.014	-0.004	-0.597	0.551
	flavor_descrBUTTER PECAN	-0.011	0.011	-0.007	-0.926	0.355
	flavor_descrCAKE BATTER	-0.045	0.010	-0.039	-4.575	0.000
	flavor_descrCHC	0.000	0.016	0.000	0.024	0.980
	flavor_descrCHC ALMOND NOUGAT	-0.017	0.015	-0.008	-1.145	0.252
	flavor_descrCHC CHIP C-DH	-0.029	0.008	-0.040	-3.649	0.000
	flavor_descrCHC FUDGE BROWNIE	-0.032	0.008	-0.048	-4.186	0.000
	flavor_descrCHERRY GRCA	-0.035	0.007	-0.065	-4.753	0.000
	flavor_descrCHUBBY HUBBY	-0.014	0.011	-0.010	-1.301	0.193
	flavor_descrCHUNKY MONKEY	-0.040	0.008	-0.054	-4.996	0.000
	flavor_descrCINNAMON BUNS	-0.051	0.009	-0.054	-5.823	0.000
	flavor_descrCOFFEE	0.027	0.021	0.009	1.317	0.188
	flavor_descrCREME BRULEE	-0.053	0.009	-0.048	-5.602	0.000
	flavor_descrDOUBLE CHC FUDGE SWR	0.019	0.147	0.001	0.129	0.897
	flavor_descrDUBLIN MUDSLIDE	-0.018	0.010	-0.015	-1.821	0.069
	flavor_descrFOSSIL FUEL	-0.049	0.017	-0.019	-2.813	0.005
	flavor_descrHALF BAKED	-0.041	0.009	-0.046	-4.784	0.000
	flavor_descrHEATH CANDY EVERYTHING BUT THE	-0.039	0.009	-0.038	-4.292	0.000
	flavor_descrHEATH COFFEE CRUNCH	-0.024	0.008	-0.033	-3.014	0.003
	flavor_descrHEATH CRUNCH	-0.003	0.009	-0.003	-0.375	0.708
	flavor_descrIMAGINE WHIRLED PEACE	-0.045	0.009	-0.048	-5.164	0.000
	flavor_descrKARAMEL SUTRA	-0.036	0.008	-0.041	-4.234	0.000
	flavor_descrMAGIC BROWNIES	-0.045	0.012	-0.027	-3.683	0.000
	flavor_descrMINT CHC CHUNK	0.011	0.014	0.006	0.811	0.417
	flavor_descrNEAPOLITAN DYNAMITE	-0.025	0.012	-0.015	-2.037	0.042
	flavor_descrNEW YORK SUPER FUDGE CHUNK	-0.037	0.008	-0.048	-4.625	0.000
	flavor_descroATMEAL COOKIE CHUNK	-0.024	0.013	-0.014	-1.917	0.055
	flavor_descrONE CSK BROWNIE	-0.062	0.009	-0.063	-6.931	0.000
	flavor_descrOXFORD MINT CHC COOKIE	-0.029	0.010	-0.022	-2.738	0.006
	flavor_descrPB CUP	-0.032	0.008	-0.039	-3.841	0.000
	flavor_descrPB TRUFFLE	-0.092	0.147	-0.004	-0.623	0.533
	flavor_descrPHISH FOOD	-0.025	0.008	-0.032	-3.067	0.002
	flavor_descrPISTACHIO PISTACHIO	-0.028	0.008	-0.032	-3.344	0.001
	flavor_descrPUMPKIN CSK	-0.109	0.014	-0.056	-7.797	0.000
	flavor_descrRSP CHC CHUNK	0.000	0.018	0.000	-0.015	0.988
	flavor_descrSMORES	0.008	0.012	0.005	0.637	0.524
	flavor_descrSTR	0.051	0.045	0.007	1.136	0.256
	flavor_descrSTR CSK	-0.049	0.009	-0.047	-5.339	0.000
	flavor_descrSTRAWBERRIES & CREAM	-0.022	0.041	-0.003	-0.541	0.588

```

##          flavor_descrSWEET CREAM & COOKIES      0.033      0.036      0.006      0.910      0.363
##          flavor_descrTRIPLE CARAMEL CHUNK      -0.034      0.017      -0.014      -2.006      0.045
##          flavor_descrTURTLE SOUP      -0.055      0.012      -0.034      -4.514      0.000
##          flavor_descrVAN CARAMEL FUDGE      -0.038      0.011      -0.028      -3.545      0.000
##          flavor_descrVERMONTY PYTHON      -0.023      0.014      -0.011      -1.603      0.109
##          flavor_descrW-N-C-P-C      -0.038      0.009      -0.043      -4.457      0.000
##          flavor_descrWHITE RUSSIAN      0.164      0.147      0.007      1.113      0.266
##          usecoupTRUE      -0.048      0.005      -0.094      -10.040      0.000
## -----
##
##
##
## Stepwise Selection: Step 7
##
## - household_composition added
##
##          Model Summary
## -----
## R          0.349      RMSE          0.147
## R-Squared    0.122      Coef. Var    10.131
## Adj. R-Squared 0.119      MSE          0.022
## Pred R-Squared -Inf      MAE          0.111
## -----
## RMSE: Root Mean Square Error
## MSE: Mean Square Error
## MAE: Mean Absolute Error
##
##          ANOVA
## -----
##          Sum of
##          Squares      DF      Mean Square      F      Sig.
## -----
## Regression    65.665      62      1.059      49.08      0.0000
## Residual    472.817     21911      0.022
## Total      538.482     21973
## -----
##
##          Parameter Estimates
## -----
##          model      Beta      Std. Error      Std. Beta      t      Sig
## -----
##          (Intercept)      1.503      0.007      221.498      0.000
##          size1_descr32.0 MLOZ      0.304      0.008      0.250      37.746      0.000
##          couponper1      0.068      0.003      0.225      25.230      0.000
##          haspromoTRUE      -0.036      0.002      -0.113      -15.850      0.000
##          regionCentral      -0.027      0.003      -0.072      -8.826      0.000
##          regionSouth      -0.032      0.003      -0.094      -11.080      0.000
##          regionWest      -0.020      0.003      -0.057      -6.860      0.000
##          flavor_descrAMERICONE DREAM      -0.029      0.008      -0.035      -3.484      0.000
##          flavor_descrBANANA SPLIT      -0.047      0.009      -0.048      -5.259      0.000
##          flavor_descrBLACK & TAN      -0.092      0.030      -0.020      -3.059      0.002
##          flavor_descrBROWNIE BATTER      -0.005      0.014      -0.003      -0.386      0.700
##          flavor_descrBUTTER PECAN      -0.012      0.011      -0.008      -1.014      0.310
##          flavor_descrCAKE BATTER      -0.043      0.010      -0.037      -4.400      0.000

```

##	flavor_descrCHC	-0.002	0.016	-0.001	-0.120	0.905
##	flavor_descrCHC ALMOND NOUGAT	-0.016	0.015	-0.007	-1.062	0.288
##	flavor_descrCHC CHIP C-DH	-0.026	0.008	-0.035	-3.250	0.001
##	flavor_descrCHC FUDGE BROWNIE	-0.030	0.008	-0.045	-3.925	0.000
##	flavor_descrCHERRY GRCA	-0.033	0.007	-0.063	-4.597	0.000
##	flavor_descrCHUBBY HUBBY	-0.013	0.010	-0.010	-1.244	0.214
##	flavor_descrCHUNKY MONKEY	-0.037	0.008	-0.051	-4.711	0.000
##	flavor_descrcINNAMON BUNS	-0.050	0.009	-0.052	-5.637	0.000
##	flavor_descrcOFFEE	0.025	0.021	0.008	1.229	0.219
##	flavor_descrcREME BRULEE	-0.051	0.009	-0.046	-5.382	0.000
##	flavor_descrcDOUBLE CHC FUDGE SWR	0.014	0.147	0.001	0.093	0.926
##	flavor_descrcDUBLIN MUDSLIDE	-0.015	0.010	-0.013	-1.543	0.123
##	flavor_descrcFOSSIL FUEL	-0.047	0.017	-0.019	-2.720	0.007
##	flavor_descrcHALF BAKED	-0.038	0.009	-0.043	-4.482	0.000
##	flavor_descrcHEATH CANDY EVERYTHING BUT THE	-0.036	0.009	-0.035	-3.975	0.000
##	flavor_descrcHEATH COFFEE CRUNCH	-0.022	0.008	-0.030	-2.756	0.006
##	flavor_descrcHEATH CRUNCH	-0.002	0.009	-0.002	-0.198	0.843
##	flavor_descrcIMAGINE WHIRLED PEACE	-0.043	0.009	-0.046	-4.929	0.000
##	flavor_descrcKARAMEL SUTRA	-0.034	0.008	-0.040	-4.078	0.000
##	flavor_descrcMAGIC BROWNIES	-0.045	0.012	-0.027	-3.650	0.000
##	flavor_descrcMINT CHC CHUNK	0.014	0.014	0.007	0.997	0.319
##	flavor_descrcNEAPOLITAN DYNAMITE	-0.025	0.012	-0.015	-1.967	0.049
##	flavor_descrcNEW YORK SUPER FUDGE CHUNK	-0.036	0.008	-0.046	-4.408	0.000
##	flavor_descrcOATMEAL COOKIE CHUNK	-0.021	0.013	-0.012	-1.665	0.096
##	flavor_descrcONE CSK BROWNIE	-0.060	0.009	-0.060	-6.682	0.000
##	flavor_descrcOXFORD MINT CHC COOKIE	-0.025	0.010	-0.020	-2.443	0.015
##	flavor_descrcPB CUP	-0.030	0.008	-0.036	-3.574	0.000
##	flavor_descrcPB TRUFFLE	-0.082	0.147	-0.004	-0.559	0.576
##	flavor_descrcPHISH FOOD	-0.022	0.008	-0.028	-2.707	0.007
##	flavor_descrcPISTACHIO PISTACHIO	-0.026	0.008	-0.029	-3.036	0.002
##	flavor_descrcPUMPKIN CSK	-0.106	0.014	-0.055	-7.640	0.000
##	flavor_descrcRSP CHC CHUNK	-0.001	0.018	-0.001	-0.079	0.937
##	flavor_descrcSMORES	0.011	0.012	0.007	0.894	0.371
##	flavor_descrcSTR	0.053	0.045	0.008	1.185	0.236
##	flavor_descrcSTR CSK	-0.046	0.009	-0.045	-5.021	0.000
##	flavor_descrcSTRAWBERRIES & CREAM	-0.018	0.041	-0.003	-0.433	0.665
##	flavor_descrcSWEET CREAM & COOKIES	0.034	0.036	0.006	0.941	0.347
##	flavor_descrcTRIPLE CARAMEL CHUNK	-0.035	0.017	-0.014	-2.025	0.043
##	flavor_descrcTURTLE SOUP	-0.052	0.012	-0.032	-4.265	0.000
##	flavor_descrcVAN CARAMEL FUDGE	-0.037	0.011	-0.027	-3.414	0.001
##	flavor_descrcVERMONTY PYTHON	-0.021	0.014	-0.011	-1.499	0.134
##	flavor_descrcW-N-C-P-C	-0.038	0.009	-0.042	-4.414	0.000
##	flavor_descrcWHITE RUSSIAN	0.171	0.147	0.007	1.160	0.246
##	usecoupTRUE	-0.047	0.005	-0.094	-9.989	0.000
##	household_composition2	-0.003	0.004	-0.005	-0.770	0.441
##	household_composition3	0.018	0.005	0.022	3.431	0.001
##	household_composition5	0.012	0.003	0.028	4.256	0.000
##	household_composition6	-0.009	0.014	-0.004	-0.692	0.489
##	household_composition7	0.027	0.004	0.045	6.956	0.000
##	household_composition8	0.016	0.005	0.020	3.152	0.002
##	-----					
##						
##						
##						


```
##
## Model Summary
## -----
## R                0.349      RMSE                0.147
## R-Squared        0.122      Coef. Var           10.131
## Adj. R-Squared   0.119      MSE                0.022
## Pred R-Squared   -Inf       MAE                0.111
## -----
```

```
## RMSE: Root Mean Square Error
## MSE: Mean Square Error
## MAE: Mean Absolute Error
##
```

```
## ANOVA
## -----
## Sum of
## Squares      DF      Mean Square      F      Sig.
## -----
## Regression    65.665      62      1.059      49.08      0.0000
## Residual      472.817     21911      0.022
## Total         538.482     21973
## -----
```

```
## Parameter Estimates
## -----
## model      Beta      Std. Error      Std. Beta      t      Sig
## -----
## (Intercept)      1.503      0.007      221.498      0.000
## size1_desc32.0 MLOZ      0.304      0.008      0.250      37.746      0.000
## couponper1      0.068      0.003      0.225      25.230      0.000
## haspromoTRUE     -0.036      0.002     -0.113     -15.850      0.000
## regionCentral    -0.027      0.003     -0.072     -8.826      0.000
## regionSouth      -0.032      0.003     -0.094    -11.080      0.000
## regionWest       -0.020      0.003     -0.057     -6.860      0.000
## flavor_descrAMERICONE DREAM -0.029      0.008     -0.035     -3.484      0.000
## flavor_descrBANANA SPLIT  -0.047      0.009     -0.048     -5.259      0.000
## flavor_descrBLACK & TAN   -0.092      0.030     -0.020     -3.059      0.002
## flavor_descrBROWNIE BATTER -0.005      0.014     -0.003     -0.386      0.700
## flavor_descrBUTTER PECAN  -0.012      0.011     -0.008     -1.014      0.310
## flavor_descrCAKE BATTER   -0.043      0.010     -0.037     -4.400      0.000
## flavor_descrCHC          -0.002      0.016     -0.001     -0.120      0.905
## flavor_descrCHC ALMOND NOUGAT -0.016      0.015     -0.007     -1.062      0.288
## flavor_descrCHC CHIP C-DH  -0.026      0.008     -0.035     -3.250      0.001
## flavor_descrCHC FUDGE BROWNIE -0.030      0.008     -0.045     -3.925      0.000
## flavor_descrCHERRY GRCA   -0.033      0.007     -0.063     -4.597      0.000
## flavor_descrCHUBBY HUBBY   -0.013      0.010     -0.010     -1.244      0.214
## flavor_descrCHUNKY MONKEY  -0.037      0.008     -0.051     -4.711      0.000
## flavor_descrCINNAMON BUNS  -0.050      0.009     -0.052     -5.637      0.000
## flavor_descrCOFFEE        0.025      0.021      0.008      1.229      0.219
## flavor_descrCREME BRULEE   -0.051      0.009     -0.046     -5.382      0.000
## flavor_descrDOUBLE CHC FUDGE SWR 0.014      0.147      0.001      0.093      0.926
## flavor_descrDUBLIN MUDSLIDE -0.015      0.010     -0.013     -1.543      0.123
## flavor_descrFOSSIL FUEL    -0.047      0.017     -0.019     -2.720      0.007
## flavor_descrHALF BAKED     -0.038      0.009     -0.043     -4.482      0.000
## flavor_descrHEATH CANDY EVERYTHING BUT THE -0.036      0.009     -0.035     -3.975      0.000
## flavor_descrHEATH COFFEE CRUNCH -0.022      0.008     -0.030     -2.756      0.006
```

##	flavor_descrHEATH CRUNCH	-0.002	0.009	-0.002	-0.198	0.843
##	flavor_descrIMAGINE WHIRLED PEACE	-0.043	0.009	-0.046	-4.929	0.000
##	flavor_descrKARAMEL SUTRA	-0.034	0.008	-0.040	-4.078	0.000
##	flavor_descrMAGIC BROWNIES	-0.045	0.012	-0.027	-3.650	0.000
##	flavor_descrMINT CHC CHUNK	0.014	0.014	0.007	0.997	0.319
##	flavor_descrNEAPOLITAN DYNAMITE	-0.025	0.012	-0.015	-1.967	0.049
##	flavor_descrNEW YORK SUPER FUDGE CHUNK	-0.036	0.008	-0.046	-4.408	0.000
##	flavor_descroATMEAL COOKIE CHUNK	-0.021	0.013	-0.012	-1.665	0.096
##	flavor_descrONE CSK BROWNIE	-0.060	0.009	-0.060	-6.682	0.000
##	flavor_descroXFORD MINT CHC COOKIE	-0.025	0.010	-0.020	-2.443	0.015
##	flavor_descrPB CUP	-0.030	0.008	-0.036	-3.574	0.000
##	flavor_descrPB TRUFFLE	-0.082	0.147	-0.004	-0.559	0.576
##	flavor_descrPHISH FOOD	-0.022	0.008	-0.028	-2.707	0.007
##	flavor_descrPISTACHIO PISTACHIO	-0.026	0.008	-0.029	-3.036	0.002
##	flavor_descrPUMPKIN CSK	-0.106	0.014	-0.055	-7.640	0.000
##	flavor_descrRSP CHC CHUNK	-0.001	0.018	-0.001	-0.079	0.937
##	flavor_descrSMORES	0.011	0.012	0.007	0.894	0.371
##	flavor_descrSTR	0.053	0.045	0.008	1.185	0.236
##	flavor_descrSTR CSK	-0.046	0.009	-0.045	-5.021	0.000
##	flavor_descrSTRAWBERRIES & CREAM	-0.018	0.041	-0.003	-0.433	0.665
##	flavor_descrSWEET CREAM & COOKIES	0.034	0.036	0.006	0.941	0.347
##	flavor_descrTRIPLE CARAMEL CHUNK	-0.035	0.017	-0.014	-2.025	0.043
##	flavor_descrTURTLE SOUP	-0.052	0.012	-0.032	-4.265	0.000
##	flavor_descrVAN CARAMEL FUDGE	-0.037	0.011	-0.027	-3.414	0.001
##	flavor_descrVERMONTY PYTHON	-0.021	0.014	-0.011	-1.499	0.134
##	flavor_descrW-N-C-P-C	-0.038	0.009	-0.042	-4.414	0.000
##	flavor_descrWHITE RUSSIAN	0.171	0.147	0.007	1.160	0.246
##	usecoupTRUE	-0.047	0.005	-0.094	-9.989	0.000
##	household_composition2	-0.003	0.004	-0.005	-0.770	0.441
##	household_composition3	0.018	0.005	0.022	3.431	0.001
##	household_composition5	0.012	0.003	0.028	4.256	0.000
##	household_composition6	-0.009	0.014	-0.004	-0.692	0.489
##	household_composition7	0.027	0.004	0.045	6.956	0.000
##	household_composition8	0.016	0.005	0.020	3.152	0.002

##

##

##

##

Stepwise Selection: Step 8

##

- household_income added

##

Model Summary

##	-----			
##	R	0.355	RMSE	0.147
##	R-Squared	0.126	Coef. Var	10.108
##	Adj. R-Squared	0.123	MSE	0.021
##	Pred R-Squared	-Inf	MAE	0.110
##	-----			

RMSE: Root Mean Square Error

MSE: Mean Square Error

MAE: Mean Absolute Error

##

ANOVA

```

## -----
##              Sum of
##              Squares          DF      Mean Square      F      Sig.
## -----
## Regression      67.833           63          1.077    50.124    0.0000
## Residual       470.649        21910          0.021
## Total          538.482        21973
## -----
##
##              Parameter Estimates
## -----
##              model      Beta      Std. Error      Std. Beta      t      Sig
## -----
##              (Intercept)      1.457          0.008              177.400      0.000
##              size1_descr32.0 MLOZ      0.302          0.008              0.248      37.488      0.000
##              couponper1      0.068          0.003              0.225      25.343      0.000
##              haspromoTRUE     -0.036          0.002             -0.114     -16.121      0.000
##              regionCentral     -0.026          0.003             -0.070      -8.572      0.000
##              regionSouth     -0.032          0.003             -0.093     -11.006      0.000
##              regionWest     -0.021          0.003             -0.058      -7.012      0.000
##              flavor_descrAMERICONE DREAM     -0.028          0.008             -0.034      -3.393      0.001
##              flavor_descrBANANA SPLIT     -0.045          0.009             -0.047      -5.128      0.000
##              flavor_descrBLACK & TAN     -0.087          0.030             -0.019      -2.882      0.004
##              flavor_descrBROWNIE BATTER     -0.004          0.014             -0.002      -0.271      0.786
##              flavor_descrBUTTER PECAN     -0.011          0.011             -0.007      -0.945      0.344
##              flavor_descrCAKE BATTER     -0.042          0.010             -0.036      -4.288      0.000
##              flavor_descrCHC     -0.004          0.016             -0.002      -0.263      0.792
##              flavor_descrCHC ALMOND NOUGAT     -0.015          0.015             -0.007      -0.991      0.322
##              flavor_descrCHC CHIP C-DH     -0.025          0.008             -0.034      -3.170      0.002
##              flavor_descrCHC FUDGE BROWNIE     -0.027          0.008             -0.039      -3.442      0.001
##              flavor_descrCHERRY GRCA     -0.031          0.007             -0.059      -4.322      0.000
##              flavor_descrCHUBBY HUBBY     -0.011          0.010             -0.009      -1.095      0.273
##              flavor_descrCHUNKY MONKEY     -0.037          0.008             -0.050      -4.656      0.000
##              flavor_descrCINNAMON BUNS     -0.048          0.009             -0.050      -5.428      0.000
##              flavor_descrCOFFEE      0.027          0.021              0.009      1.318      0.188
##              flavor_descrCREME BRULEE     -0.048          0.009             -0.044      -5.071      0.000
##              flavor_descrDOUBLE CHC FUDGE SWR     -0.002          0.147              0.000      -0.012      0.991
##              flavor_descrDUBLIN MUDSLIDE     -0.012          0.010             -0.010      -1.186      0.236
##              flavor_descrFOSSIL FUEL     -0.048          0.017             -0.019      -2.769      0.006
##              flavor_descrHALF BAKED     -0.037          0.009             -0.041      -4.306      0.000
##              flavor_descrHEATH CANDY EVERYTHING BUT THE     -0.034          0.009             -0.034      -3.774      0.000
##              flavor_descrHEATH COFFEE CRUNCH     -0.021          0.008             -0.029      -2.640      0.008
##              flavor_descrHEATH CRUNCH     -0.002          0.009             -0.002      -0.212      0.832
##              flavor_descrIMAGINE WHIRLED PEACE     -0.042          0.009             -0.044      -4.728      0.000
##              flavor_descrKARAMEL SUTRA     -0.032          0.008             -0.037      -3.815      0.000
##              flavor_descrMAGIC BROWNIES     -0.043          0.012             -0.026      -3.483      0.000
##              flavor_descrMINT CHC CHUNK      0.013          0.014              0.007      0.964      0.335
##              flavor_descrNEAPOLITAN DYNAMITE     -0.023          0.012             -0.014      -1.866      0.062
##              flavor_descrNEW YORK SUPER FUDGE CHUNK     -0.033          0.008             -0.043      -4.145      0.000
##              flavor_descroATMEAL COOKIE CHUNK     -0.021          0.013             -0.012      -1.635      0.102
##              flavor_descrONE CSK BROWNIE     -0.057          0.009             -0.058      -6.381      0.000
##              flavor_descrOXFORD MINT CHC COOKIE     -0.025          0.010             -0.019      -2.406      0.016
##              flavor_descrPB CUP     -0.028          0.008             -0.034      -3.377      0.001
##              flavor_descrPB TRUFFLE     -0.079          0.147             -0.003      -0.537      0.591

```

##	flavor_descrPHISH FOOD	-0.021	0.008	-0.027	-2.586	0.010
##	flavor_descrPISTACHIO PISTACHIO	-0.026	0.008	-0.030	-3.096	0.002
##	flavor_descrPUMPKIN CSK	-0.101	0.014	-0.052	-7.282	0.000
##	flavor_descrsp CHC CHUNK	0.001	0.018	0.000	0.060	0.952
##	flavor_descrsMORES	0.012	0.012	0.007	0.952	0.341
##	flavor_descrsSTR	0.055	0.045	0.008	1.236	0.216
##	flavor_descrsSTR CSK	-0.043	0.009	-0.041	-4.642	0.000
##	flavor_descrsSTRAWBERRIES & CREAM	-0.019	0.041	-0.003	-0.463	0.643
##	flavor_descrsSWEET CREAM & COOKIES	0.033	0.036	0.006	0.914	0.361
##	flavor_descrsTRIPLE CARAMEL CHUNK	-0.033	0.017	-0.013	-1.924	0.054
##	flavor_descrsTURTLE SOUP	-0.051	0.012	-0.032	-4.234	0.000
##	flavor_descrsVAN CARAMEL FUDGE	-0.036	0.011	-0.026	-3.329	0.001
##	flavor_descrsVERMONTY PYTHON	-0.022	0.014	-0.011	-1.528	0.127
##	flavor_descrsW-N-C-P-C	-0.034	0.009	-0.038	-3.978	0.000
##	flavor_descrsWHITE RUSSIAN	0.183	0.147	0.008	1.250	0.211
##	usecoupTRUE	-0.047	0.005	-0.093	-9.983	0.000
##	household_composition2	0.007	0.004	0.012	1.787	0.074
##	household_composition3	0.021	0.005	0.027	4.148	0.000
##	household_composition5	0.023	0.003	0.054	7.630	0.000
##	household_composition6	-0.003	0.014	-0.001	-0.196	0.845
##	household_composition7	0.036	0.004	0.061	9.118	0.000
##	household_composition8	0.020	0.005	0.025	3.868	0.000
##	household_income	0.002	0.000	0.071	10.047	0.000

##

##

##

Model Summary			
##	R	0.355	RMSE 0.147
##	R-Squared	0.126	Coef. Var 10.108
##	Adj. R-Squared	0.123	MSE 0.021
##	Pred R-Squared	-Inf	MAE 0.110

RMSE: Root Mean Square Error

MSE: Mean Square Error

MAE: Mean Absolute Error

ANOVA						
##	##	Sum of	DF	Mean Square	F	Sig.
##	##	Squares				
##	Regression	67.833	63	1.077	50.124	0.0000
##	Residual	470.649	21910	0.021		
##	Total	538.482	21973			

Parameter Estimates							
##	##	model	Beta	Std. Error	Std. Beta	t	Sig.
##	##						
##		(Intercept)	1.457	0.008		177.400	0.000
##		size1_descr32.0 MLOZ	0.302	0.008	0.248	37.488	0.000

##	couponper1	0.068	0.003	0.225	25.343	0.000
##	haspromoTRUE	-0.036	0.002	-0.114	-16.121	0.000
##	regionCentral	-0.026	0.003	-0.070	-8.572	0.000
##	regionSouth	-0.032	0.003	-0.093	-11.006	0.000
##	regionWest	-0.021	0.003	-0.058	-7.012	0.000
##	flavor_descrAMERICONE DREAM	-0.028	0.008	-0.034	-3.393	0.001
##	flavor_descrBANANA SPLIT	-0.045	0.009	-0.047	-5.128	0.000
##	flavor_descrBLACK & TAN	-0.087	0.030	-0.019	-2.882	0.004
##	flavor_descrBROWNIE BATTER	-0.004	0.014	-0.002	-0.271	0.786
##	flavor_descrBUTTER PECAN	-0.011	0.011	-0.007	-0.945	0.344
##	flavor_descrCAKE BATTER	-0.042	0.010	-0.036	-4.288	0.000
##	flavor_descrCHC	-0.004	0.016	-0.002	-0.263	0.792
##	flavor_descrCHC ALMOND NOUGAT	-0.015	0.015	-0.007	-0.991	0.322
##	flavor_descrCHC CHIP C-DH	-0.025	0.008	-0.034	-3.170	0.002
##	flavor_descrCHC FUDGE BROWNIE	-0.027	0.008	-0.039	-3.442	0.001
##	flavor_descrCHERRY GRCA	-0.031	0.007	-0.059	-4.322	0.000
##	flavor_descrCHUBBY HUBBY	-0.011	0.010	-0.009	-1.095	0.273
##	flavor_descrCHUNKY MONKEY	-0.037	0.008	-0.050	-4.656	0.000
##	flavor_descrcINNAMON BUNS	-0.048	0.009	-0.050	-5.428	0.000
##	flavor_descrCOFFEE	0.027	0.021	0.009	1.318	0.188
##	flavor_descrCREME BRULEE	-0.048	0.009	-0.044	-5.071	0.000
##	flavor_descrDOUBLE CHC FUDGE SWR	-0.002	0.147	0.000	-0.012	0.991
##	flavor_descrDUBLIN MUDSLIDE	-0.012	0.010	-0.010	-1.186	0.236
##	flavor_descrFOSSIL FUEL	-0.048	0.017	-0.019	-2.769	0.006
##	flavor_descrHALF BAKED	-0.037	0.009	-0.041	-4.306	0.000
##	flavor_descrHEATH CANDY EVERYTHING BUT THE	-0.034	0.009	-0.034	-3.774	0.000
##	flavor_descrHEATH COFFEE CRUNCH	-0.021	0.008	-0.029	-2.640	0.008
##	flavor_descrHEATH CRUNCH	-0.002	0.009	-0.002	-0.212	0.832
##	flavor_descrIMAGINE WHIRLED PEACE	-0.042	0.009	-0.044	-4.728	0.000
##	flavor_descrKARAMEL SUTRA	-0.032	0.008	-0.037	-3.815	0.000
##	flavor_descrmAGIC BROWNIES	-0.043	0.012	-0.026	-3.483	0.000
##	flavor_descrmINT CHC CHUNK	0.013	0.014	0.007	0.964	0.335
##	flavor_descrNEAPOLITAN DYNAMITE	-0.023	0.012	-0.014	-1.866	0.062
##	flavor_descrNEW YORK SUPER FUDGE CHUNK	-0.033	0.008	-0.043	-4.145	0.000
##	flavor_descroATMEAL COOKIE CHUNK	-0.021	0.013	-0.012	-1.635	0.102
##	flavor_descroNE CSK BROWNIE	-0.057	0.009	-0.058	-6.381	0.000
##	flavor_descroXFORD MINT CHC COOKIE	-0.025	0.010	-0.019	-2.406	0.016
##	flavor_descrpB CUP	-0.028	0.008	-0.034	-3.377	0.001
##	flavor_descrpB TRUFFLE	-0.079	0.147	-0.003	-0.537	0.591
##	flavor_descrpHISH FOOD	-0.021	0.008	-0.027	-2.586	0.010
##	flavor_descrpISTACHIO PISTACHIO	-0.026	0.008	-0.030	-3.096	0.002
##	flavor_descrpUMPKIN CSK	-0.101	0.014	-0.052	-7.282	0.000
##	flavor_descrpSP CHC CHUNK	0.001	0.018	0.000	0.060	0.952
##	flavor_descrpSMORES	0.012	0.012	0.007	0.952	0.341
##	flavor_descrpSTR	0.055	0.045	0.008	1.236	0.216
##	flavor_descrpSTR CSK	-0.043	0.009	-0.041	-4.642	0.000
##	flavor_descrpSTRAWBERRIES & CREAM	-0.019	0.041	-0.003	-0.463	0.643
##	flavor_descrpSWEET CREAM & COOKIES	0.033	0.036	0.006	0.914	0.361
##	flavor_descrpTRIPLE CARAMEL CHUNK	-0.033	0.017	-0.013	-1.924	0.054
##	flavor_descrpTURTLE SOUP	-0.051	0.012	-0.032	-4.234	0.000
##	flavor_descrpVAN CARAMEL FUDGE	-0.036	0.011	-0.026	-3.329	0.001
##	flavor_descrpVERMONTY PYTHON	-0.022	0.014	-0.011	-1.528	0.127
##	flavor_descrpW-N-C-P-C	-0.034	0.009	-0.038	-3.978	0.000
##	flavor_descrpWHITE RUSSIAN	0.183	0.147	0.008	1.250	0.211

```

##          usecoupTRUE      -0.047      0.005      -0.093      -9.983      0.000
##      household_composition2      0.007      0.004      0.012      1.787      0.074
##      household_composition3      0.021      0.005      0.027      4.148      0.000
##      household_composition5      0.023      0.003      0.054      7.630      0.000
##      household_composition6     -0.003      0.014     -0.001     -0.196      0.845
##      household_composition7      0.036      0.004      0.061      9.118      0.000
##      household_composition8      0.020      0.005      0.025      3.868      0.000
##      household_income      0.002      0.000      0.071     10.047      0.000
## -----
##
##
##
## Stepwise Selection: Step 9
##
## - microwave added
##
##          Model Summary
## -----
## R          0.356      RMSE          0.146
## R-Squared    0.127      Coef. Var    10.102
## Adj. R-Squared 0.124      MSE          0.021
## Pred R-Squared  -Inf      MAE          0.110
## -----
## RMSE: Root Mean Square Error
## MSE: Mean Square Error
## MAE: Mean Absolute Error
##
##          ANOVA
## -----
##          Sum of
##          Squares      DF      Mean Square      F      Sig.
## -----
## Regression      68.355      64      1.068      49.774      0.0000
## Residual      470.126     21909      0.021
## Total      538.482     21973
## -----
##
##          Parameter Estimates
## -----
##          model      Beta      Std. Error      Std. Beta      t      Sig
## -----
##          (Intercept)      1.490      0.011      139.528      0.000
##          size1_descr32.0 MLOZ      0.301      0.008      0.247      37.476      0.000
##          couponper1      0.068      0.003      0.225      25.281      0.000
##          haspromoTRUE     -0.037      0.002     -0.115     -16.286      0.000
##          regionCentral     -0.026      0.003     -0.068     -8.419      0.000
##          regionSouth     -0.031      0.003     -0.091    -10.839      0.000
##          regionWest     -0.020      0.003     -0.057     -6.938      0.000
##          flavor_descrAMERICONE DREAM     -0.026      0.008     -0.033     -3.230      0.001
##          flavor_descrBANANA SPLIT     -0.043      0.009     -0.045     -4.914      0.000
##          flavor_descrBLACK & TAN     -0.084      0.030     -0.018     -2.812      0.005
##          flavor_descrBROWNIE BATTER     -0.002      0.014     -0.001     -0.169      0.865
##          flavor_descrBUTTER PECAN     -0.009      0.011     -0.006     -0.772      0.440
##          flavor_descrCAKE BATTER     -0.040      0.010     -0.035     -4.126      0.000

```

##	flavor_descrCHC	-0.004	0.016	-0.002	-0.241	0.810
##	flavor_descrCHC ALMOND NOUGAT	-0.014	0.015	-0.007	-0.956	0.339
##	flavor_descrCHC CHIP C-DH	-0.024	0.008	-0.033	-2.992	0.003
##	flavor_descrCHC FUDGE BROWNIE	-0.025	0.008	-0.037	-3.291	0.001
##	flavor_descrCHERRY GRCA	-0.030	0.007	-0.056	-4.096	0.000
##	flavor_descrCHUBBY HUBBY	-0.010	0.010	-0.008	-0.960	0.337
##	flavor_descrCHUNKY MONKEY	-0.035	0.008	-0.048	-4.464	0.000
##	flavor_descrCINNAMON BUNS	-0.046	0.009	-0.049	-5.266	0.000
##	flavor_descrCOFFEE	0.030	0.021	0.010	1.438	0.150
##	flavor_descrCREME BRULEE	-0.047	0.009	-0.043	-5.016	0.000
##	flavor_descrDOUBLE CHC FUDGE SWR	0.001	0.147	0.000	0.004	0.997
##	flavor_descrDUBLIN MUDSLIDE	-0.010	0.010	-0.008	-1.031	0.303
##	flavor_descrFOSSIL FUEL	-0.047	0.017	-0.019	-2.723	0.006
##	flavor_descrHALF BAKED	-0.036	0.009	-0.040	-4.183	0.000
##	flavor_descrHEATH CANDY EVERYTHING BUT THE	-0.033	0.009	-0.033	-3.667	0.000
##	flavor_descrHEATH COFFEE CRUNCH	-0.020	0.008	-0.027	-2.482	0.013
##	flavor_descrHEATH CRUNCH	-0.001	0.009	-0.001	-0.071	0.943
##	flavor_descrIMAGINE WHIRLED PEACE	-0.040	0.009	-0.042	-4.604	0.000
##	flavor_descrKARAMEL SUTRA	-0.031	0.008	-0.036	-3.660	0.000
##	flavor_descrMAGIC BROWNIES	-0.041	0.012	-0.025	-3.354	0.001
##	flavor_descrMINT CHC CHUNK	0.015	0.014	0.008	1.066	0.287
##	flavor_descrNEAPOLITAN DYNAMITE	-0.022	0.012	-0.013	-1.793	0.073
##	flavor_descrNEW YORK SUPER FUDGE CHUNK	-0.032	0.008	-0.041	-3.951	0.000
##	flavor_descroATMEAL COOKIE CHUNK	-0.020	0.013	-0.012	-1.578	0.115
##	flavor_descroNE CSK BROWNIE	-0.056	0.009	-0.056	-6.218	0.000
##	flavor_descroXFORD MINT CHC COOKIE	-0.024	0.010	-0.019	-2.322	0.020
##	flavor_descrpB CUP	-0.027	0.008	-0.033	-3.275	0.001
##	flavor_descrpB TRUFFLE	-0.077	0.147	-0.003	-0.528	0.598
##	flavor_descrpHISH FOOD	-0.020	0.008	-0.026	-2.464	0.014
##	flavor_descrpISTACHIO PISTACHIO	-0.025	0.008	-0.028	-2.900	0.004
##	flavor_descrpPUMPKIN CSK	-0.100	0.014	-0.052	-7.222	0.000
##	flavor_descrpSP CHC CHUNK	0.002	0.018	0.001	0.129	0.898
##	flavor_descrpSMORES	0.013	0.012	0.008	1.037	0.300
##	flavor_descrpSTR	0.054	0.045	0.008	1.208	0.227
##	flavor_descrpSTR CSK	-0.041	0.009	-0.040	-4.519	0.000
##	flavor_descrpSTRAWBERRIES & CREAM	-0.017	0.041	-0.003	-0.415	0.678
##	flavor_descrpSWEET CREAM & COOKIES	0.026	0.036	0.005	0.732	0.464
##	flavor_descrpTRIPLE CARAMEL CHUNK	-0.031	0.017	-0.013	-1.844	0.065
##	flavor_descrpTURTLE SOUP	-0.050	0.012	-0.031	-4.125	0.000
##	flavor_descrpVAN CARAMEL FUDGE	-0.034	0.011	-0.025	-3.167	0.002
##	flavor_descrpVERMONTY PYTHON	-0.020	0.014	-0.010	-1.410	0.159
##	flavor_descrpW-N-C-P-C	-0.033	0.009	-0.036	-3.812	0.000
##	flavor_descrpWHITE RUSSIAN	0.185	0.147	0.008	1.262	0.207
##	usecoupTRUE	-0.046	0.005	-0.092	-9.801	0.000
##	household_composition2	0.007	0.004	0.012	1.840	0.066
##	household_composition3	0.021	0.005	0.027	4.126	0.000
##	household_composition5	0.022	0.003	0.052	7.288	0.000
##	household_composition6	-0.003	0.014	-0.001	-0.201	0.841
##	household_composition7	0.034	0.004	0.059	8.750	0.000
##	household_composition8	0.020	0.005	0.025	3.834	0.000
##	household_income	0.002	0.000	0.072	10.285	0.000
##	microwaveTRUE	-0.037	0.007	-0.032	-4.934	0.000
##	-----					
##						

```

##
##
##           Model Summary
## -----
## R                0.356      RMSE                0.146
## R-Squared        0.127      Coef. Var            10.102
## Adj. R-Squared   0.124      MSE                 0.021
## Pred R-Squared   -Inf      MAE                 0.110
## -----
## RMSE: Root Mean Square Error
## MSE: Mean Square Error
## MAE: Mean Absolute Error
##
##           ANOVA
## -----
##           Sum of
##           Squares      DF      Mean Square      F      Sig.
## -----
## Regression      68.355        64        1.068    49.774    0.0000
## Residual       470.126     21909        0.021
## Total          538.482     21973
## -----
##
##           Parameter Estimates
## -----
##           model      Beta      Std. Error      Std. Beta      t      Sig
## -----
##           (Intercept)      1.490      0.011      139.528    0.000
##           size1_desc32.0 MLOZ      0.301      0.008      0.247     37.476    0.000
##           couponper1      0.068      0.003      0.225     25.281    0.000
##           haspromoTRUE     -0.037      0.002     -0.115    -16.286    0.000
##           regionCentral     -0.026      0.003     -0.068     -8.419    0.000
##           regionSouth     -0.031      0.003     -0.091    -10.839    0.000
##           regionWest      -0.020      0.003     -0.057     -6.938    0.000
##           flavor_descrAMERICONE DREAM     -0.026      0.008     -0.033     -3.230    0.001
##           flavor_descrBANANA SPLIT     -0.043      0.009     -0.045     -4.914    0.000
##           flavor_descrBLACK & TAN     -0.084      0.030     -0.018     -2.812    0.005
##           flavor_descrBROWNIE BATTER     -0.002      0.014     -0.001     -0.169    0.865
##           flavor_descrBUTTER PECAN     -0.009      0.011     -0.006     -0.772    0.440
##           flavor_descrCAKE BATTER     -0.040      0.010     -0.035     -4.126    0.000
##           flavor_descrCHC      -0.004      0.016     -0.002     -0.241    0.810
##           flavor_descrCHC ALMOND NOUGAT     -0.014      0.015     -0.007     -0.956    0.339
##           flavor_descrCHC CHIP C-DH     -0.024      0.008     -0.033     -2.992    0.003
##           flavor_descrCHC FUDGE BROWNIE     -0.025      0.008     -0.037     -3.291    0.001
##           flavor_descrCHERRY GRCA     -0.030      0.007     -0.056     -4.096    0.000
##           flavor_descrHUBBY HUBBY     -0.010      0.010     -0.008     -0.960    0.337
##           flavor_descrCHUNKY MONKEY     -0.035      0.008     -0.048     -4.464    0.000
##           flavor_descrCINNAMON BUNS     -0.046      0.009     -0.049     -5.266    0.000
##           flavor_descrCOFFEE      0.030      0.021      0.010      1.438    0.150
##           flavor_descrCREME BRULEE     -0.047      0.009     -0.043     -5.016    0.000
##           flavor_descrDOUBLE CHC FUDGE SWR      0.001      0.147      0.000      0.004    0.997
##           flavor_descrDUBLIN MUDSLIDE     -0.010      0.010     -0.008     -1.031    0.303
##           flavor_descrFOSSIL FUEL     -0.047      0.017     -0.019     -2.723    0.006
##           flavor_descrHALF BAKED     -0.036      0.009     -0.040     -4.183    0.000

```


##	flavor_descrHEATH CANDY EVERYTHING BUT THE	-0.033	0.009	-0.033	-3.667	0.000
##	flavor_descrHEATH COFFEE CRUNCH	-0.020	0.008	-0.027	-2.482	0.013
##	flavor_descrHEATH CRUNCH	-0.001	0.009	-0.001	-0.071	0.943
##	flavor_descrIMAGINE WHIRLED PEACE	-0.040	0.009	-0.042	-4.604	0.000
##	flavor_descrKARAMEL SUTRA	-0.031	0.008	-0.036	-3.660	0.000
##	flavor_descrMAGIC BROWNIES	-0.041	0.012	-0.025	-3.354	0.001
##	flavor_descrMINT CHC CHUNK	0.015	0.014	0.008	1.066	0.287
##	flavor_descrNEAPOLITAN DYNAMITE	-0.022	0.012	-0.013	-1.793	0.073
##	flavor_descrNEW YORK SUPER FUDGE CHUNK	-0.032	0.008	-0.041	-3.951	0.000
##	flavor_descroATMEAL COOKIE CHUNK	-0.020	0.013	-0.012	-1.578	0.115
##	flavor_descrONE CSK BROWNIE	-0.056	0.009	-0.056	-6.218	0.000
##	flavor_descroXFORD MINT CHC COOKIE	-0.024	0.010	-0.019	-2.322	0.020
##	flavor_descrPB CUP	-0.027	0.008	-0.033	-3.275	0.001
##	flavor_descrPB TRUFFLE	-0.077	0.147	-0.003	-0.528	0.598
##	flavor_descrPHISH FOOD	-0.020	0.008	-0.026	-2.464	0.014
##	flavor_descrPISTACHIO PISTACHIO	-0.025	0.008	-0.028	-2.900	0.004
##	flavor_descrPUMPKIN CSK	-0.100	0.014	-0.052	-7.222	0.000
##	flavor_descrRSP CHC CHUNK	0.002	0.018	0.001	0.129	0.898
##	flavor_descrSMORES	0.013	0.012	0.008	1.037	0.300
##	flavor_descrSTR	0.054	0.045	0.008	1.208	0.227
##	flavor_descrSTR CSK	-0.041	0.009	-0.040	-4.519	0.000
##	flavor_descrSTRAWBERRIES & CREAM	-0.017	0.041	-0.003	-0.415	0.678
##	flavor_descrSWEET CREAM & COOKIES	0.026	0.036	0.005	0.732	0.464
##	flavor_descrTRIPLE CARAMEL CHUNK	-0.031	0.017	-0.013	-1.844	0.065
##	flavor_descrTURTLE SOUP	-0.050	0.012	-0.031	-4.125	0.000
##	flavor_descrVAN CARAMEL FUDGE	-0.034	0.011	-0.025	-3.167	0.002
##	flavor_descrVERMONTY PYTHON	-0.020	0.014	-0.010	-1.410	0.159
##	flavor_descrW-N-C-P-C	-0.033	0.009	-0.036	-3.812	0.000
##	flavor_descrWHITE RUSSIAN	0.185	0.147	0.008	1.262	0.207
##	usecoupTRUE	-0.046	0.005	-0.092	-9.801	0.000
##	household_composition2	0.007	0.004	0.012	1.840	0.066
##	household_composition3	0.021	0.005	0.027	4.126	0.000
##	household_composition5	0.022	0.003	0.052	7.288	0.000
##	household_composition6	-0.003	0.014	-0.001	-0.201	0.841
##	household_composition7	0.034	0.004	0.059	8.750	0.000
##	household_composition8	0.020	0.005	0.025	3.834	0.000
##	household_income	0.002	0.000	0.072	10.285	0.000
##	microwaveTRUE	-0.037	0.007	-0.032	-4.934	0.000

```

## -----
##
##
##
## Stepwise Selection: Step 10
##
## - sfh added
##
##
##           Model Summary
## -----
## R           0.358      RMSE           0.146
## R-Squared    0.128      Coef. Var     10.098
## Adj. R-Squared 0.125      MSE           0.021
## Pred R-Squared -Inf      MAE           0.110
## -----
## RMSE: Root Mean Square Error

```

MSE: Mean Square Error
MAE: Mean Absolute Error

##

ANOVA

	Sum of	DF	Mean Square	F	Sig.
	Squares				
## Regression	68.828	65	1.059	49.394	0.0000
## Residual	469.654	21908	0.021		
## Total	538.482	21973			

##

Parameter Estimates

	model	Beta	Std. Error	Std. Beta	t	Sig
##	(Intercept)	1.495	0.011		139.495	0.000
##	size1_descr32.0 MLOZ	0.302	0.008	0.248	37.531	0.000
##	couponper1	0.068	0.003	0.226	25.393	0.000
##	haspromoTRUE	-0.037	0.002	-0.115	-16.256	0.000
##	regionCentral	-0.024	0.003	-0.064	-7.865	0.000
##	regionSouth	-0.029	0.003	-0.086	-10.047	0.000
##	regionWest	-0.019	0.003	-0.054	-6.507	0.000
##	flavor_descrAMERICONE DREAM	-0.027	0.008	-0.034	-3.312	0.001
##	flavor_descrBANANA SPLIT	-0.043	0.009	-0.045	-4.850	0.000
##	flavor_descrBLACK & TAN	-0.087	0.030	-0.019	-2.881	0.004
##	flavor_descrBROWNIE BATTER	-0.002	0.014	-0.001	-0.133	0.894
##	flavor_descrBUTTER PECAN	-0.009	0.011	-0.006	-0.757	0.449
##	flavor_descrCAKE BATTER	-0.040	0.010	-0.035	-4.165	0.000
##	flavor_descrCHC	-0.009	0.016	-0.004	-0.527	0.598
##	flavor_descrCHC ALMOND NOUGAT	-0.015	0.015	-0.007	-1.032	0.302
##	flavor_descrCHC CHIP C-DH	-0.024	0.008	-0.033	-3.010	0.003
##	flavor_descrCHC FUDGE BROWNIE	-0.025	0.008	-0.037	-3.275	0.001
##	flavor_descrCHERRY GRCA	-0.030	0.007	-0.056	-4.106	0.000
##	flavor_descrCHUBBY HUBBY	-0.010	0.010	-0.008	-1.002	0.317
##	flavor_descrCHUNKY MONKEY	-0.035	0.008	-0.048	-4.467	0.000
##	flavor_descrCINNAMON BUNS	-0.046	0.009	-0.049	-5.257	0.000
##	flavor_descrCOFFEE	0.029	0.021	0.009	1.385	0.166
##	flavor_descrCREME BRULEE	-0.048	0.009	-0.043	-5.045	0.000
##	flavor_descrDOUBLE CHC FUDGE SWR	-0.007	0.147	0.000	-0.045	0.964
##	flavor_descrDUBLIN MUDSLIDE	-0.011	0.010	-0.009	-1.118	0.264
##	flavor_descrFOSSIL FUEL	-0.046	0.017	-0.018	-2.680	0.007
##	flavor_descrHALF BAKED	-0.036	0.009	-0.040	-4.224	0.000
##	flavor_descrHEATH CANDY EVERYTHING BUT THE	-0.033	0.009	-0.033	-3.675	0.000
##	flavor_descrHEATH COFFEE CRUNCH	-0.020	0.008	-0.027	-2.529	0.011
##	flavor_descrHEATH CRUNCH	-0.001	0.009	0.000	-0.055	0.956
##	flavor_descrIMAGINE WHIRLED PEACE	-0.041	0.009	-0.043	-4.632	0.000
##	flavor_descrKARAMEL SUTRA	-0.031	0.008	-0.036	-3.699	0.000
##	flavor_descrMAGIC BROWNIES	-0.040	0.012	-0.024	-3.295	0.001
##	flavor_descrMINT CHC CHUNK	0.015	0.014	0.008	1.077	0.282
##	flavor_descrNEAPOLITAN DYNAMITE	-0.023	0.012	-0.014	-1.836	0.066
##	flavor_descrNEW YORK SUPER FUDGE CHUNK	-0.032	0.008	-0.041	-3.955	0.000
##	flavor_descroATMEAL COOKIE CHUNK	-0.020	0.013	-0.011	-1.557	0.119

##	flavor_descrONE CSK BROWNIE	-0.056	0.009	-0.056	-6.263	0.000
##	flavor_descrOXFORD MINT CHC COOKIE	-0.024	0.010	-0.019	-2.323	0.020
##	flavor_descrPB CUP	-0.027	0.008	-0.033	-3.271	0.001
##	flavor_descrPB TRUFFLE	-0.074	0.147	-0.003	-0.503	0.615
##	flavor_descrPHISH FOOD	-0.020	0.008	-0.026	-2.464	0.014
##	flavor_descrPISTACHIO PISTACHIO	-0.024	0.008	-0.028	-2.868	0.004
##	flavor_descrPUMPKIN CSK	-0.100	0.014	-0.051	-7.208	0.000
##	flavor_descrRSP CHC CHUNK	0.002	0.018	0.001	0.123	0.902
##	flavor_descrSMORES	0.013	0.012	0.008	1.024	0.306
##	flavor_descrSTR	0.053	0.045	0.008	1.179	0.238
##	flavor_descrSTR CSK	-0.042	0.009	-0.041	-4.598	0.000
##	flavor_descrSTRAWBERRIES & CREAM	-0.019	0.041	-0.003	-0.453	0.651
##	flavor_descrsWEET CREAM & COOKIES	0.024	0.036	0.004	0.673	0.501
##	flavor_descrTRIPLE CARAMEL CHUNK	-0.031	0.017	-0.012	-1.821	0.069
##	flavor_descrTURTLE SOUP	-0.050	0.012	-0.030	-4.086	0.000
##	flavor_descrvAN CARAMEL FUDGE	-0.036	0.011	-0.027	-3.381	0.001
##	flavor_descrvERMONTy PYTHON	-0.021	0.014	-0.010	-1.459	0.144
##	flavor_descrw-N-C-P-C	-0.032	0.009	-0.036	-3.751	0.000
##	flavor_descrwHITE RUSSIAN	0.187	0.147	0.008	1.278	0.201
##	usecoupTRUE	-0.047	0.005	-0.092	-9.881	0.000
##	household_composition2	0.006	0.004	0.009	1.380	0.168
##	household_composition3	0.020	0.005	0.025	3.887	0.000
##	household_composition5	0.019	0.003	0.044	6.019	0.000
##	household_composition6	-0.003	0.014	-0.001	-0.196	0.845
##	household_composition7	0.032	0.004	0.054	7.926	0.000
##	household_composition8	0.018	0.005	0.022	3.423	0.001
##	household_income	0.002	0.000	0.078	10.894	0.000
##	microwaveTRUE	-0.036	0.007	-0.031	-4.802	0.000
##	sfhTRUE	-0.011	0.002	-0.032	-4.696	0.000

Model Summary

## R	0.358	RMSE	0.146
## R-Squared	0.128	Coef. Var	10.098
## Adj. R-Squared	0.125	MSE	0.021
## Pred R-Squared	-Inf	MAE	0.110

```
## RMSE: Root Mean Square Error
## MSE: Mean Square Error
## MAE: Mean Absolute Error
```

ANOVA

##	Sum of				
##	Squares	DF	Mean Square	F	Sig.
##	-----	-----	-----	-----	-----
## Regression	68.828	65	1.059	49.394	0.0000
## Residual	469.654	21908	0.021		
## Total	538.482	21973			

Parameter Estimates						
##	model	Beta	Std. Error	Std. Beta	t	Sig
##	(Intercept)	1.495	0.011		139.495	0.000
##	size1_descr32.0 MLOZ	0.302	0.008	0.248	37.531	0.000
##	couponper1	0.068	0.003	0.226	25.393	0.000
##	haspromoTRUE	-0.037	0.002	-0.115	-16.256	0.000
##	regionCentral	-0.024	0.003	-0.064	-7.865	0.000
##	regionSouth	-0.029	0.003	-0.086	-10.047	0.000
##	regionWest	-0.019	0.003	-0.054	-6.507	0.000
##	flavor_descrAMERICONE DREAM	-0.027	0.008	-0.034	-3.312	0.001
##	flavor_descrBANANA SPLIT	-0.043	0.009	-0.045	-4.850	0.000
##	flavor_descrBLACK & TAN	-0.087	0.030	-0.019	-2.881	0.004
##	flavor_descrBROWNIE BATTER	-0.002	0.014	-0.001	-0.133	0.894
##	flavor_descrBUTTER PECAN	-0.009	0.011	-0.006	-0.757	0.449
##	flavor_descrCAKE BATTER	-0.040	0.010	-0.035	-4.165	0.000
##	flavor_descrCHC	-0.009	0.016	-0.004	-0.527	0.598
##	flavor_descrCHC ALMOND NOUGAT	-0.015	0.015	-0.007	-1.032	0.302
##	flavor_descrCHC CHIP C-DH	-0.024	0.008	-0.033	-3.010	0.003
##	flavor_descrCHC FUDGE BROWNIE	-0.025	0.008	-0.037	-3.275	0.001
##	flavor_descrCHERRY GRCA	-0.030	0.007	-0.056	-4.106	0.000
##	flavor_descrCHUBBY HUBBY	-0.010	0.010	-0.008	-1.002	0.317
##	flavor_descrCHUNKY MONKEY	-0.035	0.008	-0.048	-4.467	0.000
##	flavor_descrCINNAMON BUNS	-0.046	0.009	-0.049	-5.257	0.000
##	flavor_descrCOFFEE	0.029	0.021	0.009	1.385	0.166
##	flavor_descrCREME BRULEE	-0.048	0.009	-0.043	-5.045	0.000
##	flavor_descrDOUBLE CHC FUDGE SWR	-0.007	0.147	0.000	-0.045	0.964
##	flavor_descrDUBLIN MUDSLIDE	-0.011	0.010	-0.009	-1.118	0.264
##	flavor_descrFOSSIL FUEL	-0.046	0.017	-0.018	-2.680	0.007
##	flavor_descrHALF BAKED	-0.036	0.009	-0.040	-4.224	0.000
##	flavor_descrHEATH CANDY EVERYTHING BUT THE	-0.033	0.009	-0.033	-3.675	0.000
##	flavor_descrHEATH COFFEE CRUNCH	-0.020	0.008	-0.027	-2.529	0.011
##	flavor_descrHEATH CRUNCH	-0.001	0.009	0.000	-0.055	0.956
##	flavor_descrIMAGINE WHIRLED PEACE	-0.041	0.009	-0.043	-4.632	0.000
##	flavor_descrKARAMEL SUTRA	-0.031	0.008	-0.036	-3.699	0.000
##	flavor_descrMAGIC BROWNIES	-0.040	0.012	-0.024	-3.295	0.001
##	flavor_descrMINT CHC CHUNK	0.015	0.014	0.008	1.077	0.282
##	flavor_descrNEAPOLITAN DYNAMITE	-0.023	0.012	-0.014	-1.836	0.066
##	flavor_descrNEW YORK SUPER FUDGE CHUNK	-0.032	0.008	-0.041	-3.955	0.000
##	flavor_descroATMEAL COOKIE CHUNK	-0.020	0.013	-0.011	-1.557	0.119
##	flavor_descrONE CSK BROWNIE	-0.056	0.009	-0.056	-6.263	0.000
##	flavor_descrOXFORD MINT CHC COOKIE	-0.024	0.010	-0.019	-2.323	0.020
##	flavor_descrPB CUP	-0.027	0.008	-0.033	-3.271	0.001
##	flavor_descrPB TRUFFLE	-0.074	0.147	-0.003	-0.503	0.615
##	flavor_descrPHISH FOOD	-0.020	0.008	-0.026	-2.464	0.014
##	flavor_descrPISTACHIO PISTACHIO	-0.024	0.008	-0.028	-2.868	0.004
##	flavor_descrPUMPKIN CSK	-0.100	0.014	-0.051	-7.208	0.000
##	flavor_descrRSP CHC CHUNK	0.002	0.018	0.001	0.123	0.902
##	flavor_descrSMORES	0.013	0.012	0.008	1.024	0.306
##	flavor_descrSTR	0.053	0.045	0.008	1.179	0.238
##	flavor_descrSTR CSK	-0.042	0.009	-0.041	-4.598	0.000
##	flavor_descrSTRAWBERRIES & CREAM	-0.019	0.041	-0.003	-0.453	0.651
##	flavor_descrSWEET CREAM & COOKIES	0.024	0.036	0.004	0.673	0.501

```

##          flavor_descrTRIPLE CARAMEL CHUNK    -0.031      0.017      -0.012      -1.821      0.069
##              flavor_descrTURTLE SOUP        -0.050      0.012      -0.030      -4.086      0.000
##          flavor_descrVAN CARAMEL FUDGE       -0.036      0.011      -0.027      -3.381      0.001
##              flavor_descrVERMONTY PYTHON    -0.021      0.014      -0.010      -1.459      0.144
##              flavor_descrW-N-C-P-C          -0.032      0.009      -0.036      -3.751      0.000
##          flavor_descrWHITE RUSSIAN           0.187      0.147      0.008      1.278      0.201
##              usecoupTRUE                    -0.047      0.005      -0.092      -9.881      0.000
##          household_composition2              0.006      0.004      0.009      1.380      0.168
##          household_composition3              0.020      0.005      0.025      3.887      0.000
##          household_composition5              0.019      0.003      0.044      6.019      0.000
##          household_composition6             -0.003      0.014      -0.001      -0.196      0.845
##          household_composition7              0.032      0.004      0.054      7.926      0.000
##          household_composition8              0.018      0.005      0.022      3.423      0.001
##          household_income                    0.002      0.000      0.078     10.894      0.000
##              microwaveTRUE                  -0.036      0.007      -0.031      -4.802      0.000
##              sfhTRUE                        -0.011      0.002      -0.032      -4.696      0.000
## -----
##
##
##
## Stepwise Selection: Step 11
##
## - race added
##
##          Model Summary
## -----
## R              0.359      RMSE              0.146
## R-Squared      0.129      Coef. Var        10.094
## Adj. R-Squared 0.126      MSE              0.021
## Pred R-Squared -Inf      MAE              0.110
## -----
## RMSE: Root Mean Square Error
## MSE: Mean Square Error
## MAE: Mean Absolute Error
##
##          ANOVA
## -----
##          Sum of
##          Squares      DF      Mean Square      F      Sig.
## -----
## Regression      69.211      68      1.018      47.51      0.0000
## Residual        469.271     21905      0.021
## Total           538.482     21973
## -----
##
##          Parameter Estimates
## -----
##          model      Beta      Std. Error      Std. Beta      t      Sig.
## -----
##          (Intercept)      1.493      0.011      139.228      0.000
##          size1_descr32.0 MLOZ      0.302      0.008      0.248      37.546      0.000
##          couponper1      0.068      0.003      0.225      25.386      0.000
##          haspromoTRUE     -0.037      0.002     -0.115     -16.229      0.000
##          regionCentral    -0.024      0.003     -0.064      -7.851      0.000

```

##	regionSouth	-0.030	0.003	-0.088	-10.286	0.000
##	regionWest	-0.020	0.003	-0.055	-6.619	0.000
##	flavor_descrAMERICONE DREAM	-0.026	0.008	-0.032	-3.197	0.001
##	flavor_descrBANANA SPLIT	-0.043	0.009	-0.045	-4.882	0.000
##	flavor_descrBLACK & TAN	-0.086	0.030	-0.018	-2.846	0.004
##	flavor_descrBROWNIE BATTER	-0.001	0.014	-0.001	-0.093	0.926
##	flavor_descrBUTTER PECAN	-0.009	0.011	-0.006	-0.800	0.423
##	flavor_descrCAKE BATTER	-0.040	0.010	-0.034	-4.093	0.000
##	flavor_descrCHC	-0.009	0.016	-0.004	-0.538	0.591
##	flavor_descrCHC ALMOND NOUGAT	-0.017	0.015	-0.008	-1.141	0.254
##	flavor_descrCHC CHIP C-DH	-0.024	0.008	-0.033	-3.008	0.003
##	flavor_descrCHC FUDGE BROWNIE	-0.025	0.008	-0.037	-3.291	0.001
##	flavor_descrCHERRY GRCA	-0.030	0.007	-0.056	-4.127	0.000
##	flavor_descrCHUBBY HUBBY	-0.009	0.010	-0.007	-0.872	0.383
##	flavor_descrCHUNKY MONKEY	-0.036	0.008	-0.049	-4.555	0.000
##	flavor_descrCINNAMON BUNS	-0.046	0.009	-0.048	-5.246	0.000
##	flavor_descrCOFFEE	0.030	0.021	0.010	1.434	0.152
##	flavor_descrCREME BRULEE	-0.047	0.009	-0.043	-4.958	0.000
##	flavor_descrDOUBLE CHC FUDGE SWR	-0.005	0.147	0.000	-0.032	0.975
##	flavor_descrDUBLIN MUDSLIDE	-0.010	0.010	-0.009	-1.036	0.300
##	flavor_descrFOSSIL FUEL	-0.046	0.017	-0.018	-2.646	0.008
##	flavor_descrHALF BAKED	-0.035	0.009	-0.040	-4.164	0.000
##	flavor_descrHEATH CANDY EVERYTHING BUT THE	-0.033	0.009	-0.032	-3.636	0.000
##	flavor_descrHEATH COFFEE CRUNCH	-0.019	0.008	-0.026	-2.445	0.014
##	flavor_descrHEATH CRUNCH	0.000	0.009	0.000	0.016	0.987
##	flavor_descrIMAGINE WHIRLED PEACE	-0.040	0.009	-0.042	-4.528	0.000
##	flavor_descrKARAMEL SUTRA	-0.031	0.008	-0.035	-3.645	0.000
##	flavor_descrMAGIC BROWNIES	-0.039	0.012	-0.024	-3.220	0.001
##	flavor_descrMINT CHC CHUNK	0.015	0.014	0.008	1.087	0.277
##	flavor_descrNEAPOLITAN DYNAMITE	-0.023	0.012	-0.014	-1.841	0.066
##	flavor_descrNEW YORK SUPER FUDGE CHUNK	-0.032	0.008	-0.041	-3.946	0.000
##	flavor_descroATMEAL COOKIE CHUNK	-0.019	0.013	-0.011	-1.518	0.129
##	flavor_descrONE CSK BROWNIE	-0.056	0.009	-0.056	-6.266	0.000
##	flavor_descroXFORD MINT CHC COOKIE	-0.024	0.010	-0.018	-2.296	0.022
##	flavor_descrPB CUP	-0.026	0.008	-0.032	-3.178	0.001
##	flavor_descrPB TRUFFLE	-0.071	0.147	-0.003	-0.484	0.629
##	flavor_descrPHISH FOOD	-0.019	0.008	-0.025	-2.340	0.019
##	flavor_descrPISTACHIO PISTACHIO	-0.024	0.008	-0.027	-2.814	0.005
##	flavor_descrPUMPKIN CSK	-0.099	0.014	-0.051	-7.165	0.000
##	flavor_descrRSP CHC CHUNK	0.003	0.018	0.001	0.177	0.859
##	flavor_descrSMORES	0.011	0.012	0.007	0.930	0.352
##	flavor_descrSTR	0.048	0.045	0.007	1.079	0.281
##	flavor_descrSTR CSK	-0.042	0.009	-0.041	-4.599	0.000
##	flavor_descrSTRAWBERRIES & CREAM	-0.017	0.041	-0.003	-0.410	0.682
##	flavor_descrSWEET CREAM & COOKIES	0.023	0.036	0.004	0.634	0.526
##	flavor_descrTRIPLE CARAMEL CHUNK	-0.031	0.017	-0.013	-1.846	0.065
##	flavor_descrTURTLE SOUP	-0.049	0.012	-0.030	-4.055	0.000
##	flavor_descrVAN CARAMEL FUDGE	-0.037	0.011	-0.027	-3.446	0.001
##	flavor_descrVERMONTY PYTHON	-0.020	0.014	-0.010	-1.391	0.164
##	flavor_descrW-N-C-P-C	-0.032	0.009	-0.036	-3.762	0.000
##	flavor_descrWHITE RUSSIAN	0.189	0.147	0.008	1.286	0.198
##	usecoupTRUE	-0.047	0.005	-0.093	-9.954	0.000
##	household_composition2	0.005	0.004	0.008	1.154	0.249
##	household_composition3	0.019	0.005	0.024	3.732	0.000

```

##          household_composition5      0.018      0.003      0.043      5.943      0.000
##          household_composition6     -0.002      0.014     -0.001     -0.159      0.874
##          household_composition7      0.032      0.004      0.055      8.097      0.000
##          household_composition8      0.018      0.005      0.022      3.452      0.001
##          household_income            0.002      0.000      0.077     10.803      0.000
##          microwaveTRUE             -0.035      0.007     -0.030     -4.758      0.000
##          sfhTRUE                   -0.011      0.002     -0.031     -4.441      0.000
##          raceblack                   0.014      0.004      0.023      3.620      0.000
##          raceasian                   0.001      0.006      0.001      0.146      0.884
##          raceother                   0.012      0.005      0.015      2.383      0.017
## -----
##
##
##
##          Model Summary
## -----
## R          0.359      RMSE          0.146
## R-Squared   0.129      Coef. Var    10.094
## Adj. R-Squared 0.126      MSE          0.021
## Pred R-Squared -Inf      MAE          0.110
## -----
## RMSE: Root Mean Square Error
## MSE: Mean Square Error
## MAE: Mean Absolute Error
##
##          ANOVA
## -----
##          Sum of
##          Squares      DF      Mean Square      F      Sig.
## -----
## Regression      69.211      68      1.018      47.51      0.0000
## Residual       469.271     21905      0.021
## Total          538.482     21973
## -----
##
##          Parameter Estimates
## -----
##          model      Beta      Std. Error      Std. Beta      t      Sig
## -----
##          (Intercept)      1.493      0.011      139.228      0.000
##          size1_descr32.0 MLOZ      0.302      0.008      0.248      37.546      0.000
##          couponper1      0.068      0.003      0.225      25.386      0.000
##          haspromoTRUE     -0.037      0.002     -0.115     -16.229      0.000
##          regionCentral    -0.024      0.003     -0.064     -7.851      0.000
##          regionSouth     -0.030      0.003     -0.088    -10.286      0.000
##          regionWest      -0.020      0.003     -0.055     -6.619      0.000
##          flavor_descrAMERICONE DREAM -0.026      0.008     -0.032     -3.197      0.001
##          flavor_descrBANANA SPLIT  -0.043      0.009     -0.045     -4.882      0.000
##          flavor_descrBLACK & TAN  -0.086      0.030     -0.018     -2.846      0.004
##          flavor_descrBROWNIE BATTER -0.001      0.014     -0.001     -0.093      0.926
##          flavor_descrBUTTER PECAN  -0.009      0.011     -0.006     -0.800      0.423
##          flavor_descrCAKE BATTER  -0.040      0.010     -0.034     -4.093      0.000
##          flavor_descrCHC          -0.009      0.016     -0.004     -0.538      0.591
##          flavor_descrCHC ALMOND NOUGAT -0.017      0.015     -0.008     -1.141      0.254

```

##	flavor_descrCHC CHIP C-DH	-0.024	0.008	-0.033	-3.008	0.003
##	flavor_descrCHC FUDGE BROWNIE	-0.025	0.008	-0.037	-3.291	0.001
##	flavor_descrCHERRY GRCA	-0.030	0.007	-0.056	-4.127	0.000
##	flavor_descrCHUBBY HUBBY	-0.009	0.010	-0.007	-0.872	0.383
##	flavor_descrCHUNKY MONKEY	-0.036	0.008	-0.049	-4.555	0.000
##	flavor_descrcINNAMON BUNS	-0.046	0.009	-0.048	-5.246	0.000
##	flavor_descrCOFFEE	0.030	0.021	0.010	1.434	0.152
##	flavor_descrCREME BRULEE	-0.047	0.009	-0.043	-4.958	0.000
##	flavor_descrDOUBLE CHC FUDGE SWR	-0.005	0.147	0.000	-0.032	0.975
##	flavor_descrDUBLIN MUDSLIDE	-0.010	0.010	-0.009	-1.036	0.300
##	flavor_descrfOSSIL FUEL	-0.046	0.017	-0.018	-2.646	0.008
##	flavor_descrfHALF BAKED	-0.035	0.009	-0.040	-4.164	0.000
##	flavor_descrHEATH CANDY EVERYTHING BUT THE	-0.033	0.009	-0.032	-3.636	0.000
##	flavor_descrHEATH COFFEE CRUNCH	-0.019	0.008	-0.026	-2.445	0.014
##	flavor_descrHEATH CRUNCH	0.000	0.009	0.000	0.016	0.987
##	flavor_descrIMAGINE WHIRLED PEACE	-0.040	0.009	-0.042	-4.528	0.000
##	flavor_descrkARAMEL SUTRA	-0.031	0.008	-0.035	-3.645	0.000
##	flavor_descrmAGIC BROWNIES	-0.039	0.012	-0.024	-3.220	0.001
##	flavor_descrmINT CHC CHUNK	0.015	0.014	0.008	1.087	0.277
##	flavor_descrneAPOLITAN DYNAMITE	-0.023	0.012	-0.014	-1.841	0.066
##	flavor_descrnEW YORK SUPER FUDGE CHUNK	-0.032	0.008	-0.041	-3.946	0.000
##	flavor_descroATMEAL COOKIE CHUNK	-0.019	0.013	-0.011	-1.518	0.129
##	flavor_descroNE CSK BROWNIE	-0.056	0.009	-0.056	-6.266	0.000
##	flavor_descroXFORD MINT CHC COOKIE	-0.024	0.010	-0.018	-2.296	0.022
##	flavor_descrpB CUP	-0.026	0.008	-0.032	-3.178	0.001
##	flavor_descrpB TRUFFLE	-0.071	0.147	-0.003	-0.484	0.629
##	flavor_descrpHISH FOOD	-0.019	0.008	-0.025	-2.340	0.019
##	flavor_descrpISTACHIO PISTACHIO	-0.024	0.008	-0.027	-2.814	0.005
##	flavor_descrpUMPKIN CSK	-0.099	0.014	-0.051	-7.165	0.000
##	flavor_descrrSP CHC CHUNK	0.003	0.018	0.001	0.177	0.859
##	flavor_descrrSMORES	0.011	0.012	0.007	0.930	0.352
##	flavor_descrrSTR	0.048	0.045	0.007	1.079	0.281
##	flavor_descrrSTR CSK	-0.042	0.009	-0.041	-4.599	0.000
##	flavor_descrrSTRAWBERRIES & CREAM	-0.017	0.041	-0.003	-0.410	0.682
##	flavor_descrrSWEET CREAM & COOKIES	0.023	0.036	0.004	0.634	0.526
##	flavor_descrrTRIPLE CARAMEL CHUNK	-0.031	0.017	-0.013	-1.846	0.065
##	flavor_descrrTURTLE SOUP	-0.049	0.012	-0.030	-4.055	0.000
##	flavor_descrvAN CARAMEL FUDGE	-0.037	0.011	-0.027	-3.446	0.001
##	flavor_descrvERMONTY PYTHON	-0.020	0.014	-0.010	-1.391	0.164
##	flavor_descrw-N-C-P-C	-0.032	0.009	-0.036	-3.762	0.000
##	flavor_descrwHITE RUSSIAN	0.189	0.147	0.008	1.286	0.198
##	usecoupTRUE	-0.047	0.005	-0.093	-9.954	0.000
##	household_composition2	0.005	0.004	0.008	1.154	0.249
##	household_composition3	0.019	0.005	0.024	3.732	0.000
##	household_composition5	0.018	0.003	0.043	5.943	0.000
##	household_composition6	-0.002	0.014	-0.001	-0.159	0.874
##	household_composition7	0.032	0.004	0.055	8.097	0.000
##	household_composition8	0.018	0.005	0.022	3.452	0.001
##	household_income	0.002	0.000	0.077	10.803	0.000
##	microwaveTRUE	-0.035	0.007	-0.030	-4.758	0.000
##	sfhTRUE	-0.011	0.002	-0.031	-4.441	0.000
##	raceblack	0.014	0.004	0.023	3.620	0.000
##	raceasian	0.001	0.006	0.001	0.146	0.884
##	raceother	0.012	0.005	0.015	2.383	0.017


```

## -----
##
##
## Stepwise Selection: Step 12
##
## - household_size added
##
##
## Model Summary
## -----
## R                0.359      RMSE                0.146
## R-Squared        0.129      Coef. Var          10.091
## Adj. R-Squared   0.126      MSE                0.021
## Pred R-Squared   -Inf      MAE                0.110
## -----
## RMSE: Root Mean Square Error
## MSE: Mean Square Error
## MAE: Mean Absolute Error
##
## ANOVA
## -----
## Sum of
## Squares      DF      Mean Square      F      Sig.
## -----
## Regression    69.489      69      1.007    47.036    0.0000
## Residual     468.992    21904      0.021
## Total        538.482    21973
## -----
##
## Parameter Estimates
## -----
## model      Beta      Std. Error      Std. Beta      t      Sig
## -----
## (Intercept)  1.502      0.011      136.322    0.000
## size1_descr32.0 MLOZ  0.302      0.008      0.248    37.609    0.000
## couponper1    0.068      0.003      0.225    25.369    0.000
## haspromoTRUE -0.037      0.002     -0.115   -16.288    0.000
## regionCentral -0.024      0.003     -0.064    -7.865    0.000
## regionSouth  -0.030      0.003     -0.088   -10.363    0.000
## regionWest   -0.019      0.003     -0.054    -6.536    0.000
## flavor_descrAMERICONE DREAM -0.026      0.008     -0.032    -3.121    0.002
## flavor_descrBANANA SPLIT -0.042      0.009     -0.044    -4.759    0.000
## flavor_descrBLACK & TAN -0.084      0.030     -0.018    -2.806    0.005
## flavor_descrBROWNIE BATTER  0.000      0.014      0.000    -0.019    0.984
## flavor_descrBUTTER PECAN -0.009      0.011     -0.006    -0.784    0.433
## flavor_descrCAKE BATTER -0.038      0.010     -0.033    -3.956    0.000
## flavor_descrCHC -0.008      0.016     -0.003    -0.504    0.614
## flavor_descrCHC ALMOND NOUGAT -0.017      0.015     -0.008    -1.135    0.256
## flavor_descrCHC CHIP C-DH -0.022      0.008     -0.031    -2.820    0.005
## flavor_descrCHC FUDGE BROWNIE -0.024      0.008     -0.035    -3.120    0.002
## flavor_descrCHERRY GRCA -0.030      0.007     -0.056    -4.121    0.000
## flavor_descrHUBBY HUBBY -0.008      0.010     -0.006    -0.776    0.438
## flavor_descrCHUNKY MONKEY -0.035      0.008     -0.048    -4.457    0.000
## flavor_descrCINNAMON BUNS -0.045      0.009     -0.047    -5.126    0.000

```

##	flavor_descrCOFFEE	0.030	0.021	0.010	1.448	0.148
##	flavor_descrCREME BRULEE	-0.047	0.009	-0.042	-4.945	0.000
##	flavor_descrDOUBLE CHC FUDGE SWR	-0.003	0.147	0.000	-0.024	0.981
##	flavor_descrDUBLIN MUDSLIDE	-0.010	0.010	-0.008	-1.006	0.315
##	flavor_descrFOSSIL FUEL	-0.045	0.017	-0.018	-2.617	0.009
##	flavor_descrHALF BAKED	-0.034	0.009	-0.038	-3.972	0.000
##	flavor_descrHEATH CANDY EVERYTHING BUT THE	-0.032	0.009	-0.032	-3.560	0.000
##	flavor_descrHEATH COFFEE CRUNCH	-0.019	0.008	-0.025	-2.354	0.019
##	flavor_descrHEATH CRUNCH	0.001	0.009	0.001	0.131	0.896
##	flavor_descrIMAGINE WHIRLED PEACE	-0.039	0.009	-0.041	-4.415	0.000
##	flavor_descrKARAMEL SUTRA	-0.030	0.008	-0.035	-3.576	0.000
##	flavor_descrMAGIC BROWNIES	-0.039	0.012	-0.023	-3.148	0.002
##	flavor_descrMINT CHC CHUNK	0.016	0.014	0.008	1.162	0.245
##	flavor_descrNEAPOLITAN DYNAMITE	-0.022	0.012	-0.013	-1.771	0.077
##	flavor_descrNEW YORK SUPER FUDGE CHUNK	-0.031	0.008	-0.040	-3.832	0.000
##	flavor_descroATMEAL COOKIE CHUNK	-0.018	0.013	-0.011	-1.467	0.142
##	flavor_descrONE CSK BROWNIE	-0.055	0.009	-0.055	-6.073	0.000
##	flavor_descroXFORD MINT CHC COOKIE	-0.023	0.010	-0.018	-2.200	0.028
##	flavor_descrPB CUP	-0.025	0.008	-0.031	-3.055	0.002
##	flavor_descrPB TRUFFLE	-0.062	0.147	-0.003	-0.425	0.671
##	flavor_descrPHISH FOOD	-0.018	0.008	-0.023	-2.187	0.029
##	flavor_descrPISTACHIO PISTACHIO	-0.023	0.008	-0.027	-2.766	0.006
##	flavor_descrPUMPKIN CSK	-0.098	0.014	-0.050	-7.040	0.000
##	flavor_descrRSP CHC CHUNK	0.004	0.018	0.001	0.199	0.843
##	flavor_descrSMORES	0.013	0.012	0.008	1.058	0.290
##	flavor_descrSTR	0.047	0.045	0.007	1.056	0.291
##	flavor_descrSTR CSK	-0.041	0.009	-0.039	-4.435	0.000
##	flavor_descrSTRAWBERRIES & CREAM	-0.016	0.041	-0.002	-0.383	0.702
##	flavor_descrSWEET CREAM & COOKIES	0.023	0.036	0.004	0.626	0.532
##	flavor_descrTRIPLE CARAMEL CHUNK	-0.030	0.017	-0.012	-1.785	0.074
##	flavor_descrTURTLE SOUP	-0.048	0.012	-0.030	-3.977	0.000
##	flavor_descrVAN CARAMEL FUDGE	-0.037	0.011	-0.027	-3.392	0.001
##	flavor_descrVERMONTY PYTHON	-0.017	0.014	-0.009	-1.230	0.219
##	flavor_descrW-N-C-P-C	-0.032	0.009	-0.036	-3.714	0.000
##	flavor_descrWHITE RUSSIAN	0.186	0.146	0.008	1.269	0.205
##	usecoupTRUE	-0.047	0.005	-0.093	-9.954	0.000
##	household_composition2	0.004	0.004	0.007	0.971	0.331
##	household_composition3	0.019	0.005	0.023	3.628	0.000
##	household_composition5	0.012	0.004	0.028	3.279	0.001
##	household_composition6	-0.005	0.014	-0.002	-0.363	0.717
##	household_composition7	0.026	0.004	0.044	5.830	0.000
##	household_composition8	0.015	0.005	0.019	2.859	0.004
##	household_income	0.002	0.000	0.077	10.822	0.000
##	microwaveTRUE	-0.036	0.007	-0.031	-4.807	0.000
##	sfhTRUE	-0.010	0.002	-0.029	-4.106	0.000
##	raceblack	0.015	0.004	0.024	3.746	0.000
##	raceasian	0.001	0.006	0.001	0.156	0.876
##	raceother	0.013	0.005	0.016	2.573	0.010
##	household_size	-0.003	0.001	-0.030	-3.605	0.000

##

Model Summary

```
## -----
## R                0.359      RMSE                0.146
## R-Squared        0.129      Coef. Var            10.091
## Adj. R-Squared   0.126      MSE                 0.021
## Pred R-Squared   -Inf       MAE                 0.110
## -----
```

```
## RMSE: Root Mean Square Error
## MSE: Mean Square Error
## MAE: Mean Absolute Error
##
```

ANOVA

```
## -----
##              Sum of
##              Squares      DF      Mean Square      F      Sig.
## -----
## Regression    69.489        69        1.007    47.036    0.0000
## Residual     468.992     21904        0.021
## Total        538.482     21973
## -----
```

Parameter Estimates

```
## -----
##              model      Beta      Std. Error      Std. Beta      t      Sig
## -----
##              (Intercept)    1.502        0.011              136.322    0.000
##              size1_descr32.0 MLOZ    0.302        0.008              37.609    0.000
##              couponper1    0.068        0.003              25.369    0.000
##              haspromoTRUE   -0.037        0.002             -0.115    0.000
##              regionCentral  -0.024        0.003             -0.064    0.000
##              regionSouth   -0.030        0.003             -0.088    0.000
##              regionWest    -0.019        0.003             -0.054    0.000
##              flavor_descrAMERICONE DREAM -0.026        0.008             -0.032    0.002
##              flavor_descrBANANA SPLIT  -0.042        0.009             -0.044    0.000
##              flavor_descrBLACK & TAN  -0.084        0.030             -0.018    0.005
##              flavor_descrBROWNIE BATTER  0.000        0.014              0.000    0.984
##              flavor_descrBUTTER PECAN -0.009        0.011             -0.006    0.433
##              flavor_descrCAKE BATTER  -0.038        0.010             -0.033    0.000
##              flavor_descrCHC          -0.008        0.016             -0.003    0.614
##              flavor_descrCHC ALMOND NOUGAT -0.017        0.015             -0.008    0.256
##              flavor_descrCHC CHIP C-DH  -0.022        0.008             -0.031    0.005
##              flavor_descrCHC FUDGE BROWNIE -0.024        0.008             -0.035    0.002
##              flavor_descrCHERRY GRCA   -0.030        0.007             -0.056    0.000
##              flavor_descrCHUBBY HUBBY  -0.008        0.010             -0.006    0.438
##              flavor_descrCHUNKY MONKEY  -0.035        0.008             -0.048    0.000
##              flavor_descrCINNAMON BUNS  -0.045        0.009             -0.047    0.000
##              flavor_descrCOFFEE        0.030        0.021              0.010    0.148
##              flavor_descrCREME BRULEE  -0.047        0.009             -0.042    0.000
##              flavor_descrDOUBLE CHC FUDGE SWR -0.003        0.147              0.000    0.981
##              flavor_descrDUBLIN MUDSLIDE -0.010        0.010             -0.008    0.315
##              flavor_descrFOSSIL FUEL   -0.045        0.017             -0.018    0.009
##              flavor_descrHALF BAKED    -0.034        0.009             -0.038    0.000
##              flavor_descrHEATH CANDY EVERYTHING BUT THE -0.032        0.009             -0.032    0.000
##              flavor_descrHEATH COFFEE CRUNCH -0.019        0.008             -0.025    0.019
##              flavor_descrHEATH CRUNCH   0.001        0.009              0.001    0.896
## -----
```

##	flavor_descrIMAGINE WHIRLED PEACE	-0.039	0.009	-0.041	-4.415	0.000
##	flavor_descrKARAMEL SUTRA	-0.030	0.008	-0.035	-3.576	0.000
##	flavor_descrMAGIC BROWNIES	-0.039	0.012	-0.023	-3.148	0.002
##	flavor_descrMINT CHC CHUNK	0.016	0.014	0.008	1.162	0.245
##	flavor_descrNEAPOLITAN DYNAMITE	-0.022	0.012	-0.013	-1.771	0.077
##	flavor_descrNEW YORK SUPER FUDGE CHUNK	-0.031	0.008	-0.040	-3.832	0.000
##	flavor_descroATMEAL COOKIE CHUNK	-0.018	0.013	-0.011	-1.467	0.142
##	flavor_descroNE CSK BROWNIE	-0.055	0.009	-0.055	-6.073	0.000
##	flavor_descroXFORD MINT CHC COOKIE	-0.023	0.010	-0.018	-2.200	0.028
##	flavor_descrpB CUP	-0.025	0.008	-0.031	-3.055	0.002
##	flavor_descrpB TRUFFLE	-0.062	0.147	-0.003	-0.425	0.671
##	flavor_descrpHISH FOOD	-0.018	0.008	-0.023	-2.187	0.029
##	flavor_descrpISTACHIO PISTACHIO	-0.023	0.008	-0.027	-2.766	0.006
##	flavor_descrpPUMPKIN CSK	-0.098	0.014	-0.050	-7.040	0.000
##	flavor_descrpSP CHC CHUNK	0.004	0.018	0.001	0.199	0.843
##	flavor_descrpSMORES	0.013	0.012	0.008	1.058	0.290
##	flavor_descrpSTR	0.047	0.045	0.007	1.056	0.291
##	flavor_descrpSTR CSK	-0.041	0.009	-0.039	-4.435	0.000
##	flavor_descrpSTRAWBERRIES & CREAM	-0.016	0.041	-0.002	-0.383	0.702
##	flavor_descrpSWEET CREAM & COOKIES	0.023	0.036	0.004	0.626	0.532
##	flavor_descrpTRIPLE CARAMEL CHUNK	-0.030	0.017	-0.012	-1.785	0.074
##	flavor_descrpTURTLE SOUP	-0.048	0.012	-0.030	-3.977	0.000
##	flavor_descrpVAN CARAMEL FUDGE	-0.037	0.011	-0.027	-3.392	0.001
##	flavor_descrpVERMONTY PYTHON	-0.017	0.014	-0.009	-1.230	0.219
##	flavor_descrpW-N-C-P-C	-0.032	0.009	-0.036	-3.714	0.000
##	flavor_descrpWHITE RUSSIAN	0.186	0.146	0.008	1.269	0.205
##	usecoupTRUE	-0.047	0.005	-0.093	-9.954	0.000
##	household_composition2	0.004	0.004	0.007	0.971	0.331
##	household_composition3	0.019	0.005	0.023	3.628	0.000
##	household_composition5	0.012	0.004	0.028	3.279	0.001
##	household_composition6	-0.005	0.014	-0.002	-0.363	0.717
##	household_composition7	0.026	0.004	0.044	5.830	0.000
##	household_composition8	0.015	0.005	0.019	2.859	0.004
##	household_income	0.002	0.000	0.077	10.822	0.000
##	microwaveTRUE	-0.036	0.007	-0.031	-4.807	0.000
##	sfhTRUE	-0.010	0.002	-0.029	-4.106	0.000
##	raceblack	0.015	0.004	0.024	3.746	0.000
##	raceasian	0.001	0.006	0.001	0.156	0.876
##	raceother	0.013	0.005	0.016	2.573	0.010
##	household_size	-0.003	0.001	-0.030	-3.605	0.000

##

##

##

Stepwise Selection: Step 13

##

- tvcable added

##

Model Summary

##	-----			
##	R	0.359	RMSE	0.146
##	R-Squared	0.129	Coef. Var	10.092
##	Adj. R-Squared	0.126	MSE	0.021
##	Pred R-Squared	-Inf	MAE	0.110

```

## -----
## RMSE: Root Mean Square Error
## MSE: Mean Square Error
## MAE: Mean Absolute Error
##
## ANOVA
## -----
## Sum of
## Squares      DF      Mean Square      F      Sig.
## -----
## Regression    69.212      70      0.989    46.178    0.0000
## Residual     468.252    21869      0.021
## Total        537.464    21939
## -----
##
## Parameter Estimates
## -----
## model      Beta      Std. Error      Std. Beta      t      Sig
## -----
## (Intercept)    1.501      0.011      135.774    0.000
## size1_descr32.0 MLOZ    0.302      0.008      0.247    37.484    0.000
## couponper1      0.068      0.003      0.225    25.325    0.000
## haspromoTRUE   -0.036      0.002     -0.115   -16.147    0.000
## regionCentral  -0.023      0.003     -0.062    -7.581    0.000
## regionSouth   -0.029      0.003     -0.086    -9.955    0.000
## regionWest    -0.018      0.003     -0.052    -6.200    0.000
## flavor_descrAMERICONE DREAM -0.026      0.008     -0.032    -3.154    0.002
## flavor_descrBANANA SPLIT  -0.042      0.009     -0.044    -4.772    0.000
## flavor_descrBLACK & TAN   -0.083      0.030     -0.018    -2.776    0.006
## flavor_descrBROWNIE BATTER -0.001      0.014      0.000    -0.037    0.970
## flavor_descrBUTTER PECAN  -0.010      0.011     -0.006    -0.837    0.402
## flavor_descrCAKE BATTER   -0.039      0.010     -0.033    -3.977    0.000
## flavor_descrCHC          -0.011      0.016     -0.005    -0.658    0.511
## flavor_descrCHC ALMOND NOUGAT -0.016      0.015     -0.007    -1.047    0.295
## flavor_descrCHC CHIP C-DH  -0.022      0.008     -0.031    -2.819    0.005
## flavor_descrCHC FUDGE BROWNIE -0.025      0.008     -0.036    -3.201    0.001
## flavor_descrCHERRY GRCA   -0.030      0.007     -0.057    -4.165    0.000
## flavor_descrCHUBBY HUBBY   -0.008      0.010     -0.006    -0.761    0.447
## flavor_descrCHUNKY MONKEY  -0.035      0.008     -0.049    -4.494    0.000
## flavor_descrCINNAMON BUNS  -0.045      0.009     -0.047    -5.113    0.000
## flavor_descrCOFFEE        0.029      0.021      0.009     1.422    0.155
## flavor_descrCREME BRULEE   -0.047      0.009     -0.043    -4.962    0.000
## flavor_descrDOUBLE CHC FUDGE SWR -0.004      0.147      0.000    -0.030    0.976
## flavor_descrDUBLIN MUDSLIDE -0.010      0.010     -0.008    -1.013    0.311
## flavor_descrFOSSIL FUEL    -0.045      0.017     -0.018    -2.613    0.009
## flavor_descrHALF BAKED     -0.034      0.009     -0.038    -3.972    0.000
## flavor_descrHEATH CANDY EVERYTHING BUT THE -0.033      0.009     -0.032    -3.574    0.000
## flavor_descrHEATH COFFEE CRUNCH -0.019      0.008     -0.026    -2.405    0.016
## flavor_descrHEATH CRUNCH    0.001      0.009      0.001     0.106    0.916
## flavor_descrIMAGINE WHIRLED PEACE -0.039      0.009     -0.041    -4.424    0.000
## flavor_descrKARAMEL SUTRA  -0.030      0.008     -0.035    -3.600    0.000
## flavor_descrMAGIC BROWNIES -0.039      0.012     -0.023    -3.151    0.002
## flavor_descrMINT CHC CHUNK  0.016      0.014      0.008     1.132    0.258
## flavor_descrNEAPOLITAN DYNAMITE -0.022      0.012     -0.013    -1.749    0.080

```

##	flavor_descrNEW YORK SUPER FUDGE CHUNK	-0.031	0.008	-0.040	-3.815	0.000
##	flavor_descroATMEAL COOKIE CHUNK	-0.018	0.013	-0.011	-1.438	0.150
##	flavor_descrONE CSK BROWNIE	-0.055	0.009	-0.055	-6.084	0.000
##	flavor_descrOXFORD MINT CHC COOKIE	-0.023	0.010	-0.018	-2.219	0.026
##	flavor_descrPB CUP	-0.026	0.008	-0.031	-3.115	0.002
##	flavor_descrPB TRUFFLE	-0.060	0.147	-0.003	-0.406	0.685
##	flavor_descrPHISH FOOD	-0.018	0.008	-0.023	-2.199	0.028
##	flavor_descrPISTACHIO PISTACHIO	-0.024	0.008	-0.027	-2.810	0.005
##	flavor_descrPUMPKIN CSK	-0.098	0.014	-0.050	-7.044	0.000
##	flavor_descrRSP CHC CHUNK	0.004	0.018	0.001	0.213	0.831
##	flavor_descrSMORES	0.012	0.012	0.007	1.003	0.316
##	flavor_descrSTR	0.047	0.045	0.007	1.059	0.290
##	flavor_descrSTR CSK	-0.041	0.009	-0.040	-4.477	0.000
##	flavor_descrSTRAWBERRIES & CREAM	-0.016	0.041	-0.002	-0.390	0.696
##	flavor_descrSWEET CREAM & COOKIES	0.023	0.036	0.004	0.641	0.521
##	flavor_descrTRIPLE CARAMEL CHUNK	-0.031	0.017	-0.012	-1.809	0.070
##	flavor_descrTURTLE SOUP	-0.048	0.012	-0.029	-3.954	0.000
##	flavor_descrVAN CARAMEL FUDGE	-0.037	0.011	-0.027	-3.462	0.001
##	flavor_descrVERMONTY PYTHON	-0.018	0.014	-0.009	-1.232	0.218
##	flavor_descrW-N-C-P-C	-0.032	0.009	-0.036	-3.743	0.000
##	flavor_descrWHITE RUSSIAN	0.183	0.147	0.008	1.250	0.211
##	usecoupTRUE	-0.047	0.005	-0.094	-10.015	0.000
##	household_composition2	0.003	0.004	0.006	0.836	0.403
##	household_composition3	0.018	0.005	0.023	3.561	0.000
##	household_composition5	0.011	0.004	0.027	3.154	0.002
##	household_composition6	-0.005	0.014	-0.002	-0.358	0.720
##	household_composition7	0.025	0.004	0.042	5.586	0.000
##	household_composition8	0.014	0.005	0.018	2.732	0.006
##	household_income	0.002	0.000	0.075	10.446	0.000
##	microwaveTRUE	-0.038	0.007	-0.032	-5.017	0.000
##	sfhTRUE	-0.009	0.002	-0.026	-3.733	0.000
##	raceblack	0.015	0.004	0.024	3.679	0.000
##	raceasian	0.001	0.006	0.001	0.145	0.885
##	raceother	0.013	0.005	0.017	2.604	0.009
##	household_size	-0.004	0.001	-0.030	-3.627	0.000
##	tvccableTRUE	0.005	0.002	0.015	2.337	0.019

##

##

##

##

Model Summary

##	-----			
##	R	0.359	RMSE	0.146
##	R-Squared	0.129	Coef. Var	10.092
##	Adj. R-Squared	0.126	MSE	0.021
##	Pred R-Squared	-Inf	MAE	0.110
##	-----			

RMSE: Root Mean Square Error

MSE: Mean Square Error

MAE: Mean Absolute Error

##

##

ANOVA

##

##

Sum of

##	Squares	DF	Mean Square	F	Sig.
##	-----	-----	-----	-----	-----
## Regression	69.212	70	0.989	46.178	0.0000
## Residual	468.252	21869	0.021		
## Total	537.464	21939			
##	-----	-----	-----	-----	-----

##	Parameter Estimates					
##	model	Beta	Std. Error	Std. Beta	t	Sig
##	-----	-----	-----	-----	-----	-----
##	(Intercept)	1.501	0.011		135.774	0.000
##	size1_descr32.0 MLOZ	0.302	0.008	0.247	37.484	0.000
##	couponper1	0.068	0.003	0.225	25.325	0.000
##	haspromoTRUE	-0.036	0.002	-0.115	-16.147	0.000
##	regionCentral	-0.023	0.003	-0.062	-7.581	0.000
##	regionSouth	-0.029	0.003	-0.086	-9.955	0.000
##	regionWest	-0.018	0.003	-0.052	-6.200	0.000
##	flavor_descrAMERICONE DREAM	-0.026	0.008	-0.032	-3.154	0.002
##	flavor_descrBANANA SPLIT	-0.042	0.009	-0.044	-4.772	0.000
##	flavor_descrBLACK & TAN	-0.083	0.030	-0.018	-2.776	0.006
##	flavor_descrBROWNIE BATTER	-0.001	0.014	0.000	-0.037	0.970
##	flavor_descrBUTTER PECAN	-0.010	0.011	-0.006	-0.837	0.402
##	flavor_descrCAKE BATTER	-0.039	0.010	-0.033	-3.977	0.000
##	flavor_descrCHC	-0.011	0.016	-0.005	-0.658	0.511
##	flavor_descrCHC ALMOND NOUGAT	-0.016	0.015	-0.007	-1.047	0.295
##	flavor_descrCHC CHIP C-DH	-0.022	0.008	-0.031	-2.819	0.005
##	flavor_descrCHC FUDGE BROWNIE	-0.025	0.008	-0.036	-3.201	0.001
##	flavor_descrCHERRY GRCA	-0.030	0.007	-0.057	-4.165	0.000
##	flavor_descrCHUBBY HUBBY	-0.008	0.010	-0.006	-0.761	0.447
##	flavor_descrCHUNKY MONKEY	-0.035	0.008	-0.049	-4.494	0.000
##	flavor_descrCINNAMON BUNS	-0.045	0.009	-0.047	-5.113	0.000
##	flavor_descrCOFFEE	0.029	0.021	0.009	1.422	0.155
##	flavor_descrCREME BRULEE	-0.047	0.009	-0.043	-4.962	0.000
##	flavor_descrDOUBLE CHC FUDGE SWR	-0.004	0.147	0.000	-0.030	0.976
##	flavor_descrDUBLIN MUDSLIDE	-0.010	0.010	-0.008	-1.013	0.311
##	flavor_descrFOSSIL FUEL	-0.045	0.017	-0.018	-2.613	0.009
##	flavor_descrHALF BAKED	-0.034	0.009	-0.038	-3.972	0.000
##	flavor_descrHEATH CANDY EVERYTHING BUT THE	-0.033	0.009	-0.032	-3.574	0.000
##	flavor_descrHEATH COFFEE CRUNCH	-0.019	0.008	-0.026	-2.405	0.016
##	flavor_descrHEATH CRUNCH	0.001	0.009	0.001	0.106	0.916
##	flavor_descrIMAGINE WHIRLED PEACE	-0.039	0.009	-0.041	-4.424	0.000
##	flavor_descrKARAMEL SUTRA	-0.030	0.008	-0.035	-3.600	0.000
##	flavor_descrMAGIC BROWNIES	-0.039	0.012	-0.023	-3.151	0.002
##	flavor_descrMINT CHC CHUNK	0.016	0.014	0.008	1.132	0.258
##	flavor_descrNEAPOLITAN DYNAMITE	-0.022	0.012	-0.013	-1.749	0.080
##	flavor_descrNEW YORK SUPER FUDGE CHUNK	-0.031	0.008	-0.040	-3.815	0.000
##	flavor_descroATMEAL COOKIE CHUNK	-0.018	0.013	-0.011	-1.438	0.150
##	flavor_descrONE CSK BROWNIE	-0.055	0.009	-0.055	-6.084	0.000
##	flavor_descrOXFORD MINT CHC COOKIE	-0.023	0.010	-0.018	-2.219	0.026
##	flavor_descrPB CUP	-0.026	0.008	-0.031	-3.115	0.002
##	flavor_descrPB TRUFFLE	-0.060	0.147	-0.003	-0.406	0.685
##	flavor_descrPHISH FOOD	-0.018	0.008	-0.023	-2.199	0.028
##	flavor_descrPISTACHIO PISTACHIO	-0.024	0.008	-0.027	-2.810	0.005

##	flavor_descrPUMPKIN CSK	-0.098	0.014	-0.050	-7.044	0.000
##	flavor_descrRSP CHC CHUNK	0.004	0.018	0.001	0.213	0.831
##	flavor_descrSMORES	0.012	0.012	0.007	1.003	0.316
##	flavor_descrSTR	0.047	0.045	0.007	1.059	0.290
##	flavor_descrSTR CSK	-0.041	0.009	-0.040	-4.477	0.000
##	flavor_descrSTRAWBERRIES & CREAM	-0.016	0.041	-0.002	-0.390	0.696
##	flavor_descrSWEET CREAM & COOKIES	0.023	0.036	0.004	0.641	0.521
##	flavor_descrTRIPLE CARAMEL CHUNK	-0.031	0.017	-0.012	-1.809	0.070
##	flavor_descrTURTLE SOUP	-0.048	0.012	-0.029	-3.954	0.000
##	flavor_descrVAN CARAMEL FUDGE	-0.037	0.011	-0.027	-3.462	0.001
##	flavor_descrVERMONTY PYTHON	-0.018	0.014	-0.009	-1.232	0.218
##	flavor_descrW-N-C-P-C	-0.032	0.009	-0.036	-3.743	0.000
##	flavor_descrWHITE RUSSIAN	0.183	0.147	0.008	1.250	0.211
##	usecoupTRUE	-0.047	0.005	-0.094	-10.015	0.000
##	household_composition2	0.003	0.004	0.006	0.836	0.403
##	household_composition3	0.018	0.005	0.023	3.561	0.000
##	household_composition5	0.011	0.004	0.027	3.154	0.002
##	household_composition6	-0.005	0.014	-0.002	-0.358	0.720
##	household_composition7	0.025	0.004	0.042	5.586	0.000
##	household_composition8	0.014	0.005	0.018	2.732	0.006
##	household_income	0.002	0.000	0.075	10.446	0.000
##	microwaveTRUE	-0.038	0.007	-0.032	-5.017	0.000
##	sfhTRUE	-0.009	0.002	-0.026	-3.733	0.000
##	raceblack	0.015	0.004	0.024	3.679	0.000
##	raceasian	0.001	0.006	0.001	0.145	0.885
##	raceother	0.013	0.005	0.017	2.604	0.009
##	household_size	-0.004	0.001	-0.030	-3.627	0.000
##	tvccableTRUE	0.005	0.002	0.015	2.337	0.019

No more variables to be added/removed.

##

Final Model Output

Model Summary

##	R	0.359	RMSE	0.146
##	R-Squared	0.129	Coef. Var	10.092
##	Adj. R-Squared	0.126	MSE	0.021
##	Pred R-Squared	-Inf	MAE	0.110

RMSE: Root Mean Square Error

MSE: Mean Square Error

MAE: Mean Absolute Error

##

ANOVA

##	Sum of	DF	Mean Square	F	Sig.
##	Squares				
##					

```
## Regression      69.212      70      0.989    46.178    0.0000
## Residual       468.252    21869    0.021
## Total         537.464    21939
```

```
## -----
```

```
##
```

```
##
```

Parameter Estimates

```
## -----
```

	model	Beta	Std. Error	Std. Beta	t	Sig
	(Intercept)	1.501	0.011		135.774	0.000
	size1_descr32.0 MLOZ	0.302	0.008	0.247	37.484	0.000
	couponper1	0.068	0.003	0.225	25.325	0.000
	haspromoTRUE	-0.036	0.002	-0.115	-16.147	0.000
	regionCentral	-0.023	0.003	-0.062	-7.581	0.000
	regionSouth	-0.029	0.003	-0.086	-9.955	0.000
	regionWest	-0.018	0.003	-0.052	-6.200	0.000
	flavor_descrAMERICONE DREAM	-0.026	0.008	-0.032	-3.154	0.002
	flavor_descrBANANA SPLIT	-0.042	0.009	-0.044	-4.772	0.000
	flavor_descrBLACK & TAN	-0.083	0.030	-0.018	-2.776	0.006
	flavor_descrBROWNIE BATTER	-0.001	0.014	0.000	-0.037	0.970
	flavor_descrBUTTER PECAN	-0.010	0.011	-0.006	-0.837	0.402
	flavor_descrCAKE BATTER	-0.039	0.010	-0.033	-3.977	0.000
	flavor_descrCHC	-0.011	0.016	-0.005	-0.658	0.511
	flavor_descrCHC ALMOND NOUGAT	-0.016	0.015	-0.007	-1.047	0.295
	flavor_descrCHC CHIP C-DH	-0.022	0.008	-0.031	-2.819	0.005
	flavor_descrCHC FUDGE BROWNIE	-0.025	0.008	-0.036	-3.201	0.001
	flavor_descrCHERRY GRCA	-0.030	0.007	-0.057	-4.165	0.000
	flavor_descrCHUBBY HUBBY	-0.008	0.010	-0.006	-0.761	0.447
	flavor_descrCHUNKY MONKEY	-0.035	0.008	-0.049	-4.494	0.000
	flavor_descrCINNAMON BUNS	-0.045	0.009	-0.047	-5.113	0.000
	flavor_descrCOFFEE	0.029	0.021	0.009	1.422	0.155
	flavor_descrCREME BRULEE	-0.047	0.009	-0.043	-4.962	0.000
	flavor_descrDOUBLE CHC FUDGE SWR	-0.004	0.147	0.000	-0.030	0.976
	flavor_descrDUBLIN MUDSLIDE	-0.010	0.010	-0.008	-1.013	0.311
	flavor_descrFOSSIL FUEL	-0.045	0.017	-0.018	-2.613	0.009
	flavor_descrHALF BAKED	-0.034	0.009	-0.038	-3.972	0.000
	flavor_descrHEATH CANDY EVERYTHING BUT THE	-0.033	0.009	-0.032	-3.574	0.000
	flavor_descrHEATH COFFEE CRUNCH	-0.019	0.008	-0.026	-2.405	0.016
	flavor_descrHEATH CRUNCH	0.001	0.009	0.001	0.106	0.916
	flavor_descrIMAGINE WHIRLED PEACE	-0.039	0.009	-0.041	-4.424	0.000
	flavor_descrKARAMEL SUTRA	-0.030	0.008	-0.035	-3.600	0.000
	flavor_descrMAGIC BROWNIES	-0.039	0.012	-0.023	-3.151	0.002
	flavor_descrMINT CHC CHUNK	0.016	0.014	0.008	1.132	0.258
	flavor_descrNEAPOLITAN DYNAMITE	-0.022	0.012	-0.013	-1.749	0.080
	flavor_descrNEW YORK SUPER FUDGE CHUNK	-0.031	0.008	-0.040	-3.815	0.000
	flavor_descroATMEAL COOKIE CHUNK	-0.018	0.013	-0.011	-1.438	0.150
	flavor_descrONE CSK BROWNIE	-0.055	0.009	-0.055	-6.084	0.000
	flavor_descrOXFORD MINT CHC COOKIE	-0.023	0.010	-0.018	-2.219	0.026
	flavor_descrPB CUP	-0.026	0.008	-0.031	-3.115	0.002
	flavor_descrPB TRUFFLE	-0.060	0.147	-0.003	-0.406	0.685
	flavor_descrPHISH FOOD	-0.018	0.008	-0.023	-2.199	0.028
	flavor_descrPISTACHIO PISTACHIO	-0.024	0.008	-0.027	-2.810	0.005
	flavor_descrPUMPKIN CSK	-0.098	0.014	-0.050	-7.044	0.000
	flavor_descrRSP CHC CHUNK	0.004	0.018	0.001	0.213	0.831

```
##          flavor_descrSMORES      0.012      0.012      0.007      1.003      0.316
##          flavor_descrSTR        0.047      0.045      0.007      1.059      0.290
##          flavor_descrSTR CSK     -0.041      0.009     -0.040     -4.477      0.000
##          flavor_descrSTRAWBERRIES & CREAM -0.016      0.041     -0.002     -0.390      0.696
##          flavor_descrSWEET CREAM & COOKIES 0.023      0.036      0.004      0.641      0.521
##          flavor_descrTRIPLE CARAMEL CHUNK -0.031      0.017     -0.012     -1.809      0.070
##          flavor_descrTURTLE SOUP  -0.048      0.012     -0.029     -3.954      0.000
##          flavor_descrVAN CARAMEL FUDGE  -0.037      0.011     -0.027     -3.462      0.001
##          flavor_descrVERMONTY PYTHON -0.018      0.014     -0.009     -1.232      0.218
##          flavor_descrW-N-C-P-C    -0.032      0.009     -0.036     -3.743      0.000
##          flavor_descrWHITE RUSSIAN  0.183      0.147      0.008      1.250      0.211
##          usecoupTRUE             -0.047      0.005     -0.094    -10.015      0.000
##          household_composition2      0.003      0.004      0.006      0.836      0.403
##          household_composition3      0.018      0.005      0.023      3.561      0.000
##          household_composition5      0.011      0.004      0.027      3.154      0.002
##          household_composition6     -0.005      0.014     -0.002     -0.358      0.720
##          household_composition7      0.025      0.004      0.042      5.586      0.000
##          household_composition8      0.014      0.005      0.018      2.732      0.006
##          household_income           0.002      0.000      0.075     10.446      0.000
##          microwaveTRUE             -0.038      0.007     -0.032     -5.017      0.000
##          sfhTRUE                   -0.009      0.002     -0.026     -3.733      0.000
##          raceblack                 0.015      0.004      0.024      3.679      0.000
##          raceasian                 0.001      0.006      0.001      0.145      0.885
##          raceother                 0.013      0.005      0.017      2.604      0.009
##          household_size            -0.004      0.001     -0.030     -3.627      0.000
##          tvcableTRUE               0.005      0.002      0.015      2.337      0.019
## -----
```

```
##                                     #
### Consider selected variables only and create a separate data frame      #
df_sel_var <- data.frame(df$y, df$size1_descr, df$couponper1,df$haspromo,    #
                        df$region, df$flavor_descr,df$usecoup,              #
                        df$household_composition, df$household_income,      #
                        df$microwave, df$sfh, df$race, df$household_size,   #
                        df$tv cable)                                         #
                                                                              #
model_improved <- glm(y ~ df$size1_descr+ df$couponper1+df$haspromo+        #
                     df$region+df$flavor_descr+df$usecoup+                #
                     df$household_composition+df$household_income+        #
                     df$microwave+ df$sfh+ df$race+ df$household_size+    #
                     df$tv cable +df$couponper1:df$region +               #
                     df$couponper1:df$race)                                #
summary(model_improved)                                                    #
```

```
##
## Call:
## glm(formula = y ~ df$size1_descr + df$couponper1 + df$haspromo +
##      df$region + df$flavor_descr + df$usecoup + df$household_composition +
##      df$household_income + df$microwave + df$sfh + df$race + df$household_size +
##      df$tv cable + df$couponper1:df$region + df$couponper1:df$race)
##
## Deviance Residuals:
##      Min       1Q   Median       3Q      Max
## -1.46594  -0.06882   0.00887   0.08818   0.64145
##
```

```

## Coefficients:
##
## (Intercept)
## df$size1_descr32.0 MLOZ
## df$couponper1
## df$haspromoTRUE
## df$regionCentral
## df$regionSouth
## df$regionWest
## df$flavor_descrAMERICONE DREAM
## df$flavor_descrBANANA SPLIT
## df$flavor_descrBLACK & TAN
## df$flavor_descrBROWNIE BATTER
## df$flavor_descrBUTTER PECAN
## df$flavor_descrCAKE BATTER
## df$flavor_descrCHC
## df$flavor_descrCHC ALMOND NOUGAT
## df$flavor_descrCHC CHIP C-DH
## df$flavor_descrCHC FUDGE BROWNIE
## df$flavor_descrCHERRY GRCA
## df$flavor_descrCHUBBY HUBBY
## df$flavor_descrCHUNKY MONKEY
## df$flavor_descrcINNAMON BUNS
## df$flavor_descrcOFFEE
## df$flavor_descrcREME BRULEE
## df$flavor_descrcDOUBLE CHC FUDGE SWR
## df$flavor_descrcDUBLIN MUDSLIDE
## df$flavor_descrcFOSSIL FUEL
## df$flavor_descrcHALF BAKED
## df$flavor_descrcHEATH CANDY EVERYTHING BUT THE
## df$flavor_descrcHEATH COFFEE CRUNCH
## df$flavor_descrcHEATH CRUNCH
## df$flavor_descrcIMAGINE WHIRLED PEACE
## df$flavor_descrcKARAMEL SUTRA
## df$flavor_descrcMAGIC BROWNIES
## df$flavor_descrcMINT CHC CHUNK
## df$flavor_descrcNEAPOLITAN DYNAMITE
## df$flavor_descrcNEW YORK SUPER FUDGE CHUNK
## df$flavor_descrcOATMEAL COOKIE CHUNK
## df$flavor_descrcONE CSK BROWNIE
## df$flavor_descrcOXFORD MINT CHC COOKIE
## df$flavor_descrcPB CUP
## df$flavor_descrcPB TRUFFLE
## df$flavor_descrcPHISH FOOD
## df$flavor_descrcPISTACHIO PISTACHIO
## df$flavor_descrcPUMPKIN CSK
## df$flavor_descrcRSP CHC CHUNK
## df$flavor_descrcSMORES
## df$flavor_descrcSTR
## df$flavor_descrcSTR CSK
## df$flavor_descrcSTRAWBERRIES & CREAM
## df$flavor_descrcSWEET CREAM & COOKIES
## df$flavor_descrcTRIPLE CARAMEL CHUNK
## df$flavor_descrcTURTLE SOUP

```

	Estimate	Std. Error
(Intercept)	1.5013796	0.0110605
df\$size1_descr32.0 MLOZ	0.3018985	0.0080435
df\$couponper1	0.0581430	0.0049269
df\$haspromoTRUE	-0.0364471	0.0022599
df\$regionCentral	-0.0260421	0.0031870
df\$regionSouth	-0.0291771	0.0030090
df\$regionWest	-0.0186929	0.0030768
df\$flavor_descrAMERICONE DREAM	-0.0253094	0.0081810
df\$flavor_descrBANANA SPLIT	-0.0413752	0.0088281
df\$flavor_descrBLACK & TAN	-0.0821192	0.0300296
df\$flavor_descrBROWNIE BATTER	0.0012591	0.0137503
df\$flavor_descrBUTTER PECAN	-0.0091748	0.0114414
df\$flavor_descrCAKE BATTER	-0.0377682	0.0097194
df\$flavor_descrCHC	-0.0099550	0.0163807
df\$flavor_descrCHC ALMOND NOUGAT	-0.0165259	0.0149528
df\$flavor_descrCHC CHIP C-DH	-0.0215843	0.0079080
df\$flavor_descrCHC FUDGE BROWNIE	-0.0240585	0.0077286
df\$flavor_descrCHERRY GRCA	-0.0295611	0.0072415
df\$flavor_descrCHUBBY HUBBY	-0.0070860	0.0104715
df\$flavor_descrCHUNKY MONKEY	-0.0346901	0.0078888
df\$flavor_descrcINNAMON BUNS	-0.0440753	0.0087787
df\$flavor_descrcOFFEE	0.0329934	0.0206283
df\$flavor_descrcREME BRULEE	-0.0463964	0.0094508
df\$flavor_descrcDOUBLE CHC FUDGE SWR	-0.0019933	0.1464400
df\$flavor_descrcDUBLIN MUDSLIDE	-0.0096791	0.0100008
df\$flavor_descrcFOSSIL FUEL	-0.0444052	0.0172219
df\$flavor_descrcHALF BAKED	-0.0331071	0.0085186
df\$flavor_descrcHEATH CANDY EVERYTHING BUT THE	-0.0321705	0.0090983
df\$flavor_descrcHEATH COFFEE CRUNCH	-0.0180328	0.0078682
df\$flavor_descrcHEATH CRUNCH	0.0019163	0.0092399
df\$flavor_descrcIMAGINE WHIRLED PEACE	-0.0384130	0.0087794
df\$flavor_descrcKARAMEL SUTRA	-0.0299031	0.0084280
df\$flavor_descrcMAGIC BROWNIES	-0.0377870	0.0122285
df\$flavor_descrcMINT CHC CHUNK	0.0143387	0.0137753
df\$flavor_descrcNEAPOLITAN DYNAMITE	-0.0209003	0.0124746
df\$flavor_descrcNEW YORK SUPER FUDGE CHUNK	-0.0303131	0.0080667
df\$flavor_descrcOATMEAL COOKIE CHUNK	-0.0171967	0.0125887
df\$flavor_descrcONE CSK BROWNIE	-0.0536542	0.0089962
df\$flavor_descrcOXFORD MINT CHC COOKIE	-0.0219443	0.0103730
df\$flavor_descrcPB CUP	-0.0250801	0.0082367
df\$flavor_descrcPB TRUFFLE	-0.0592422	0.1464715
df\$flavor_descrcPHISH FOOD	-0.0167184	0.0080076
df\$flavor_descrcPISTACHIO PISTACHIO	-0.0231394	0.0084636
df\$flavor_descrcPUMPKIN CSK	-0.0968576	0.0138814
df\$flavor_descrcRSP CHC CHUNK	0.0038521	0.0176994
df\$flavor_descrcSMORES	0.0125424	0.0122296
df\$flavor_descrcSTR	0.0467395	0.0445880
df\$flavor_descrcSTR CSK	-0.0400392	0.0091651
df\$flavor_descrcSTRAWBERRIES & CREAM	-0.0159223	0.0411035
df\$flavor_descrcSWEET CREAM & COOKIES	0.0245899	0.0361161
df\$flavor_descrcTRIPLE CARAMEL CHUNK	-0.0306980	0.0169952
df\$flavor_descrcTURTLE SOUP	-0.0474605	0.0121735

## df\$flavor_descrVAN CARAMEL FUDGE	-0.0366666	0.0107791
## df\$flavor_descrVERMONT PYTHON	-0.0165085	0.0142164
## df\$flavor_descrW-N-C-P-C	-0.0311996	0.0085329
## df\$flavor_descrWHITE RUSSIAN	0.1854566	0.1464198
## df\$usecoupTRUE	-0.0424861	0.0048388
## df\$household_composition2	0.0033760	0.0040415
## df\$household_composition3	0.0182581	0.0051752
## df\$household_composition5	0.0111256	0.0035981
## df\$household_composition6	-0.0058366	0.0136663
## df\$household_composition7	0.0245232	0.0044055
## df\$household_composition8	0.0134900	0.0052645
## df\$household_income	0.0020595	0.0001976
## df\$microwaveTRUE	-0.0376274	0.0074918
## df\$sfhTRUE	-0.0092787	0.0024808
## df\$raceblack	0.0129380	0.0041439
## df\$raceasian	-0.0023031	0.0063807
## df\$raceother	0.0157437	0.0052293
## df\$household_size	-0.0036294	0.0009670
## df\$tvacableTRUE	0.0050934	0.0021384
## df\$couponper1:df\$regionCentral	0.0185065	0.0054423
## df\$couponper1:df\$regionSouth	-0.0015877	0.0060142
## df\$couponper1:df\$regionWest	0.0005589	0.0060718
## df\$couponper1:df\$raceblack	0.0108166	0.0069323
## df\$couponper1:df\$raceasian	0.0239380	0.0098276
## df\$couponper1:df\$raceother	-0.0279818	0.0132650
##	t value Pr(> t)	
## (Intercept)	135.742	< 2e-16 ***
## df\$size1_descr32.0 MLOZ	37.533	< 2e-16 ***
## df\$couponper1	11.801	< 2e-16 ***
## df\$haspromoTRUE	-16.127	< 2e-16 ***
## df\$regionCentral	-8.171	3.21e-16 ***
## df\$regionSouth	-9.697	< 2e-16 ***
## df\$regionWest	-6.075	1.26e-09 ***
## df\$flavor_descrAMERICONE DREAM	-3.094	0.001979 **
## df\$flavor_descrBANANA SPLIT	-4.687	2.79e-06 ***
## df\$flavor_descrBLACK & TAN	-2.735	0.006250 **
## df\$flavor_descrBROWNIE BATTER	0.092	0.927039
## df\$flavor_descrBUTTER PECAN	-0.802	0.422619
## df\$flavor_descrCAKE BATTER	-3.886	0.000102 ***
## df\$flavor_descrCHC	-0.608	0.543374
## df\$flavor_descrCHC ALMOND NOUGAT	-1.105	0.269083
## df\$flavor_descrCHC CHIP C-DH	-2.729	0.006350 **
## df\$flavor_descrCHC FUDGE BROWNIE	-3.113	0.001855 **
## df\$flavor_descrCHERRY GRCA	-4.082	4.48e-05 ***
## df\$flavor_descrCHUBBY HUBBY	-0.677	0.498612
## df\$flavor_descrCHUNKY MONKEY	-4.397	1.10e-05 ***
## df\$flavor_descrcINNAMON BUNS	-5.021	5.19e-07 ***
## df\$flavor_descrcOFFEE	1.599	0.109741
## df\$flavor_descrcREME BRULEE	-4.909	9.21e-07 ***
## df\$flavor_descrcDOUBLE CHC FUDGE SWR	-0.014	0.989140
## df\$flavor_descrcDUBLIN MUDSLIDE	-0.968	0.333142
## df\$flavor_descrcFOSSIL FUEL	-2.578	0.009932 **
## df\$flavor_descrcHALF BAKED	-3.886	0.000102 ***
## df\$flavor_descrcHEATH CANDY EVERYTHING BUT THE	-3.536	0.000407 ***

```

## df$flavor_descrHEATH COFFEE CRUNCH          -2.292 0.021923 *
## df$flavor_descrHEATH CRUNCH                  0.207 0.835702
## df$flavor_descrIMAGINE WHIRLED PEACE         -4.375 1.22e-05 ***
## df$flavor_descrKARAMEL SUTRA                 -3.548 0.000389 ***
## df$flavor_descrMAGIC BROWNIES                -3.090 0.002004 **
## df$flavor_descrMINT CHC CHUNK                1.041 0.297934
## df$flavor_descrNEAPOLITAN DYNAMITE          -1.675 0.093864 .
## df$flavor_descrNEW YORK SUPER FUDGE CHUNK   -3.758 0.000172 ***
## df$flavor_descroATMEAL COOKIE CHUNK         -1.366 0.171941
## df$flavor_descrONE CSK BROWNIE              -5.964 2.50e-09 ***
## df$flavor_descrOXFORD MINT CHC COOKIE        -2.116 0.034397 *
## df$flavor_descrPB CUP                       -3.045 0.002330 **
## df$flavor_descrPB TRUFFLE                   -0.404 0.685877
## df$flavor_descrPHISH FOOD                   -2.088 0.036827 *
## df$flavor_descrPISTACHIO PISTACHIO          -2.734 0.006262 **
## df$flavor_descrPUMPKIN CSK                  -6.977 3.09e-12 ***
## df$flavor_descrRSP CHC CHUNK                0.218 0.827712
## df$flavor_descrSMORES                       1.026 0.305101
## df$flavor_descrSTR                          1.048 0.294533
## df$flavor_descrSTR CSK                     -4.369 1.26e-05 ***
## df$flavor_descrSTRAWBERRIES & CREAM         -0.387 0.698486
## df$flavor_descrSWEET CREAM & COOKIES        0.681 0.495970
## df$flavor_descrTRIPLE CARAMEL CHUNK         -1.806 0.070889 .
## df$flavor_descrTURTLE SOUP                 -3.899 9.70e-05 ***
## df$flavor_descrVAN CARAMEL FUDGE            -3.402 0.000671 ***
## df$flavor_descrVERMONTY PYTHON              -1.161 0.245563
## df$flavor_descrW-N-C-P-C                   -3.656 0.000256 ***
## df$flavor_descrWHITE RUSSIAN                1.267 0.205309
## df$usecoupTRUE                             -8.780 < 2e-16 ***
## df$household_composition2                   0.835 0.403532
## df$household_composition3                   3.528 0.000420 ***
## df$household_composition5                   3.092 0.001990 **
## df$household_composition6                  -0.427 0.669324
## df$household_composition7                   5.567 2.63e-08 ***
## df$household_composition8                   2.562 0.010401 *
## df$household_income                        10.422 < 2e-16 ***
## df$microwaveTRUE                           -5.022 5.14e-07 ***
## df$sfhTRUE                                 -3.740 0.000184 ***
## df$raceblack                               3.122 0.001798 **
## df$raceasian                              -0.361 0.718140
## df$raceother                               3.011 0.002610 **
## df$household_size                          -3.753 0.000175 ***
## df$tvccableTRUE                           2.382 0.017235 *
## df$couponper1:df$regionCentral            3.400 0.000674 ***
## df$couponper1:df$regionSouth              -0.264 0.791792
## df$couponper1:df$regionWest               0.092 0.926659
## df$couponper1:df$raceblack                1.560 0.118701
## df$couponper1:df$raceasian                2.436 0.014867 *
## df$couponper1:df$raceother                -2.109 0.034918 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for gaussian family taken to be 0.02138715)
##

```

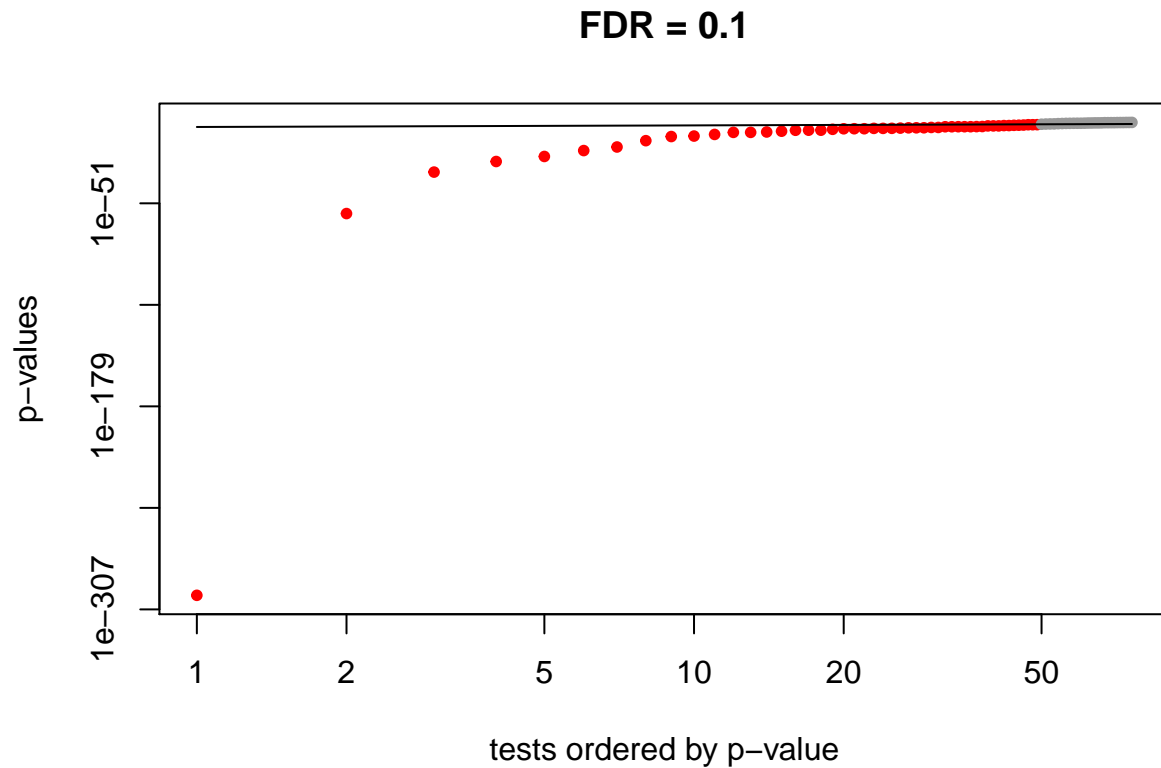
```
## Null deviance: 537.46 on 21939 degrees of freedom
## Residual deviance: 467.59 on 21863 degrees of freedom
## (34 observations deleted due to missingness)
## AIC: -22017
##
## Number of Fisher Scoring iterations: 2
```

```
#####

## grab the non-intercept p-values from a glm
## -1 to drop the intercept, 4 is 4th column
pvals <- summary(model_improved)$coef[-1,4]

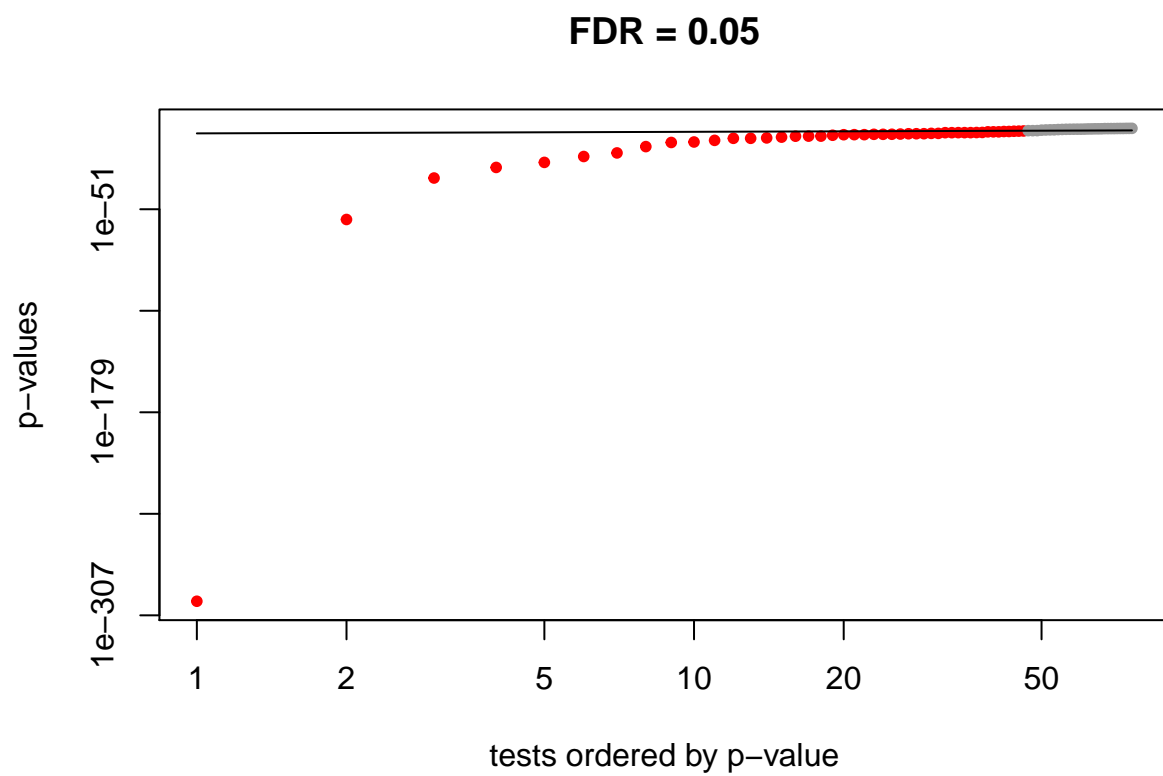
## source the fdr_cut function
source("fdr.R")

fdr(pvals, 0.1, plotit=TRUE)
```



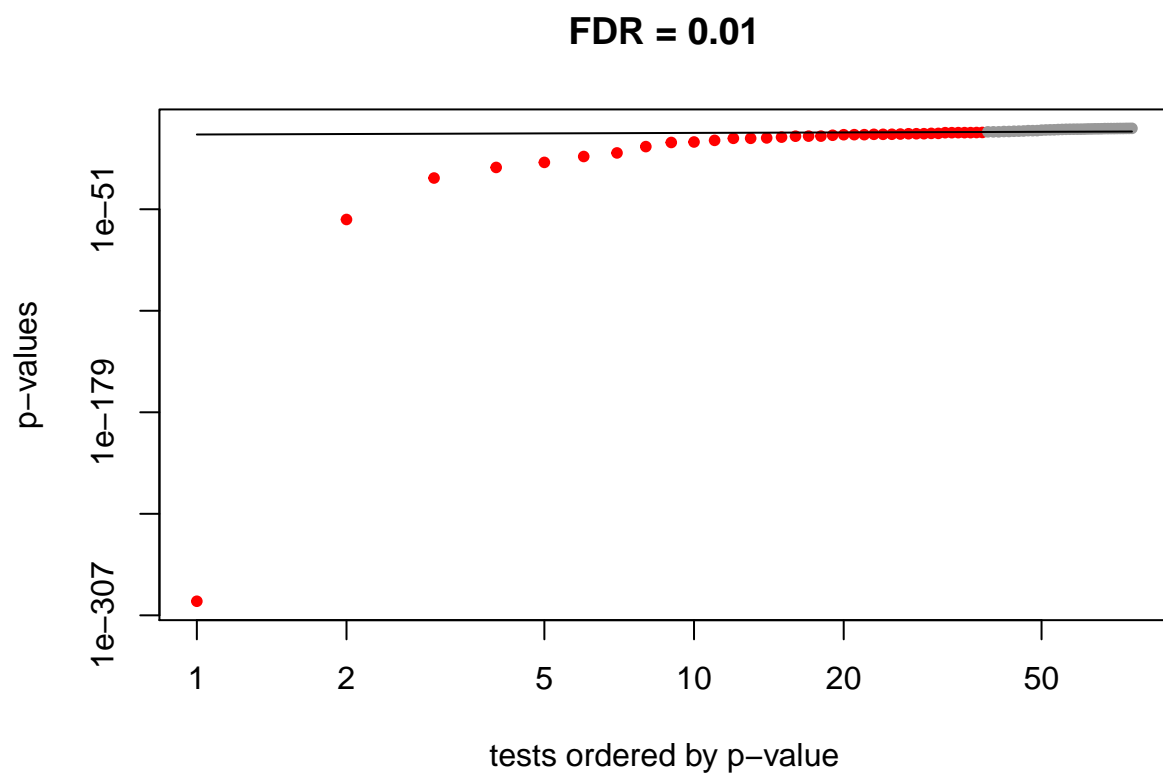
```
## [1] 0.03682681
```

```
fdr(pvals, 0.05, plotit=TRUE)
```



```
## [1] 0.021923
```

```
fdr(pvals, 0.01, plotit=TRUE)
```



[1] 0.00260965