

Project Title

A STAT 139 Final Project

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Due December 13, 2017

Abstract

Introduction

- Obesity is an exerbating problem in the US.
- Explore the association of 21 different factors with bmi, 13 of which are behavior-related factors such as the typical number of hours sleep per night

Methods

- Data description
- data source is NHANES 2013-2014
- Variables of interest
- Only consider adults of age 20 or above
- Data preprocessing & assumptions
- Merge data by participant sequence number
- Exclude don't know/refused/missing values — discuss implications in limitations
- Perform EDA
- Fit regression models
- Check assumptions

Results

Exploratory Data Analysis

Limitations

Conclusions

Appendix

Appendix I: Data preprocessing

```
## Warning: package 'dplyr' was built under R version 3.4.2
##
## Attaching package: 'dplyr'
```

```

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

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

##      gender          age          race          edu          marriage
##            0              0              0              0                  0
##      famsize        famincome    alcohol12yr    alcoholfrq      grocery
##            0              0              0              0                  0
##      eatout        delivery       milk  meals_nothome meals_fastfood
##            0              0              0              0                  0
##      depressed   sleep_trouble    activity      tv_hrs      sleep_hr
##            0              0              0              0                  0
##      smoke           bmi      bmi_class
##            0              0              0

##      gender          age          race          edu          marriage
##      "factor"      "integer"    "factor"    "factor"    "factor"
##      famsize        famincome    alcohol12yr    alcoholfrq      grocery
##      "integer"      "factor"    "factor"    "integer"    "integer"
##      eatout        delivery       milk  meals_nothome meals_fastfood
##      "integer"      "integer"    "factor"    "integer"    "integer"
##      depressed   sleep_trouble    activity      tv_hrs      sleep_hr
##      "factor"      "factor"    "factor"    "factor"    "integer"
##      smoke           bmi      bmi_class
##      "factor"      "numeric"    "character"

```

Appendix II: Exploratory Data Analysis

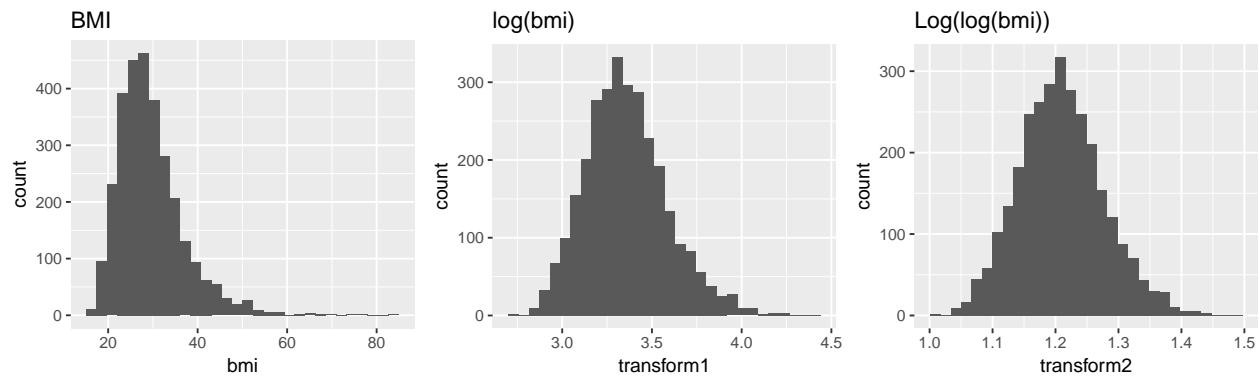
Response Variable (bmi)

```

## Loading required package: gridExtra
##
## Attaching package: 'gridExtra'
## The following object is masked from 'package:dplyr':
##
##     combine

## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.

```

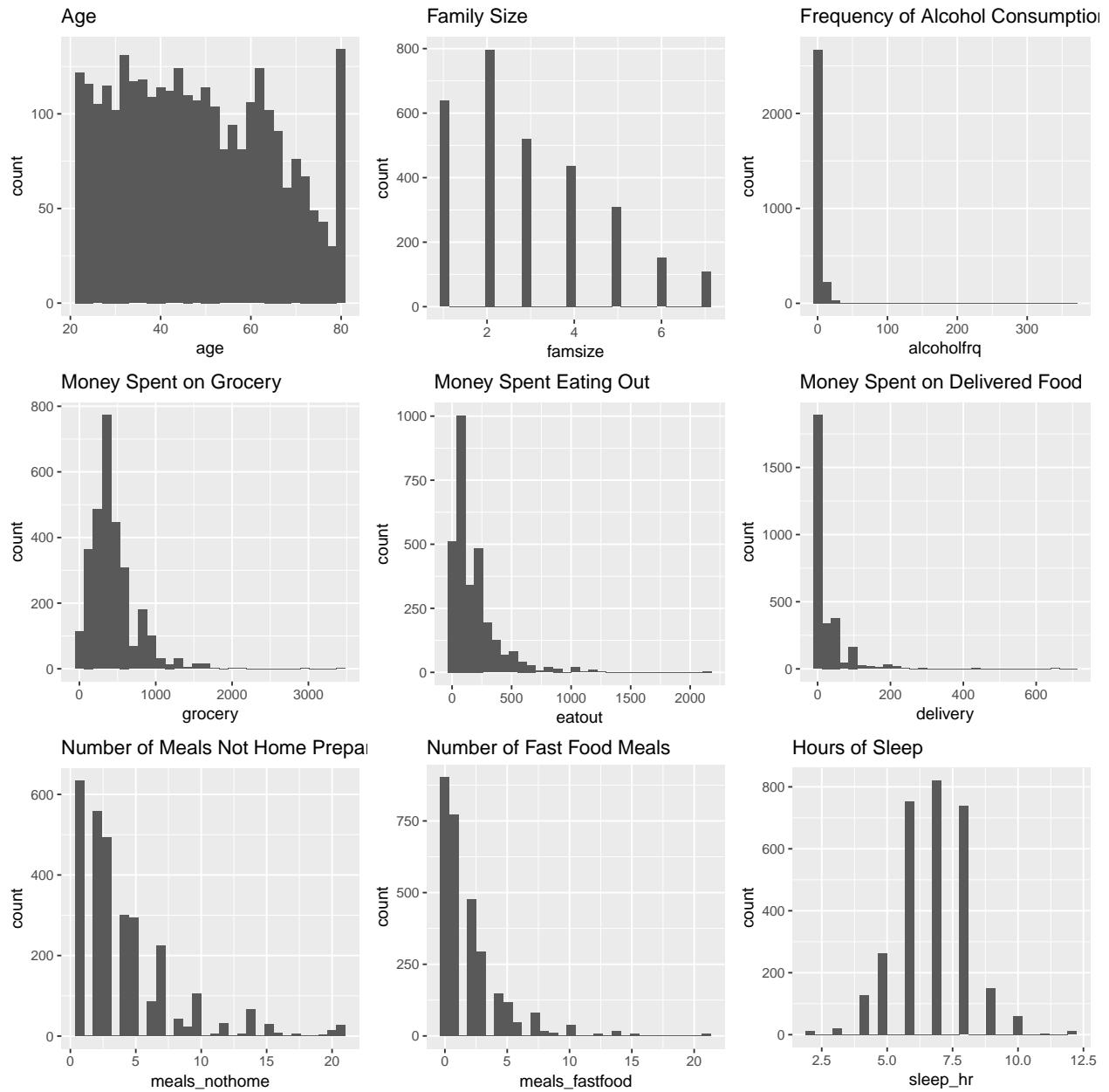


Predictor Variables

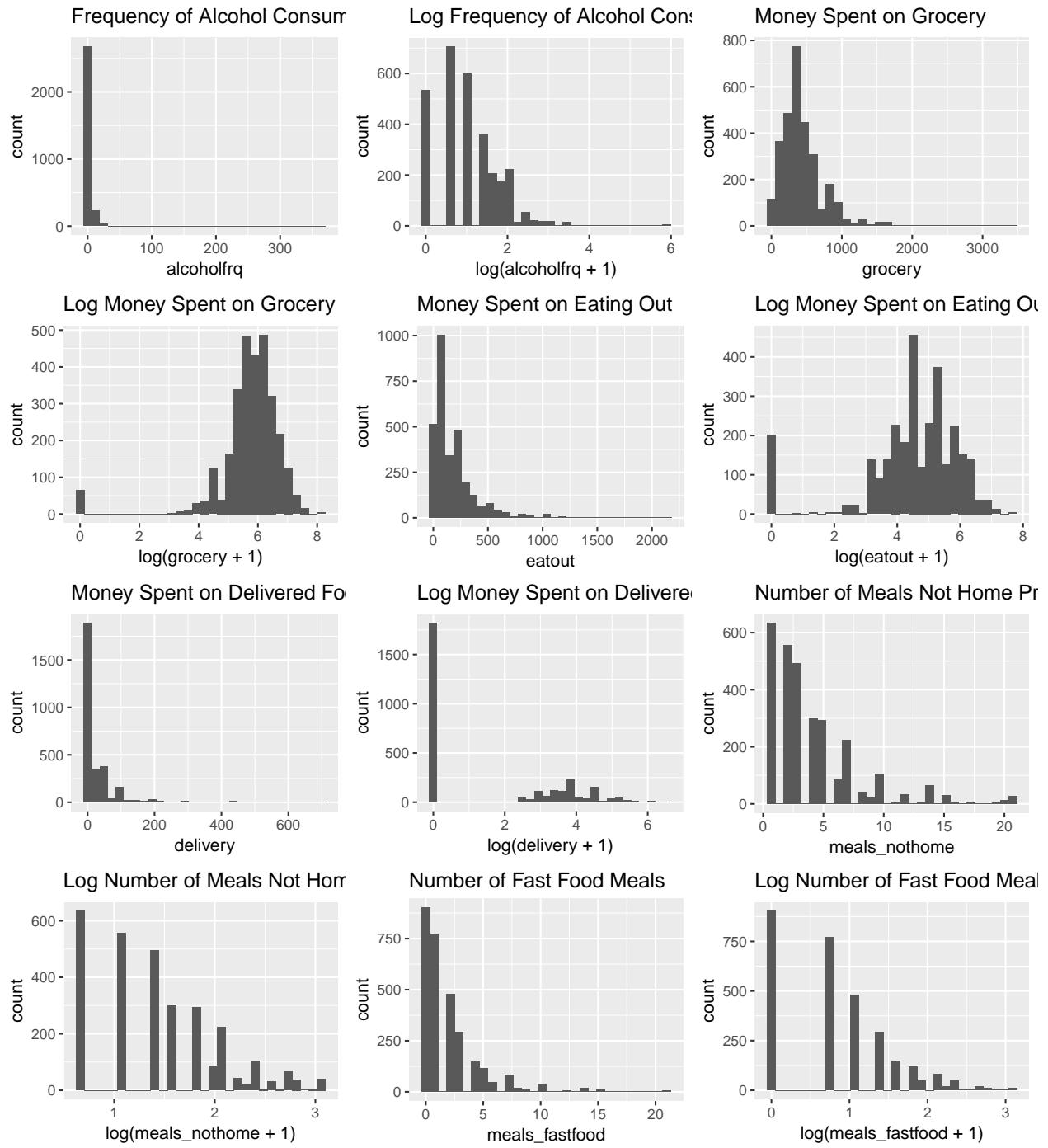
Numeric Variables

Distribtuion of numeric variables

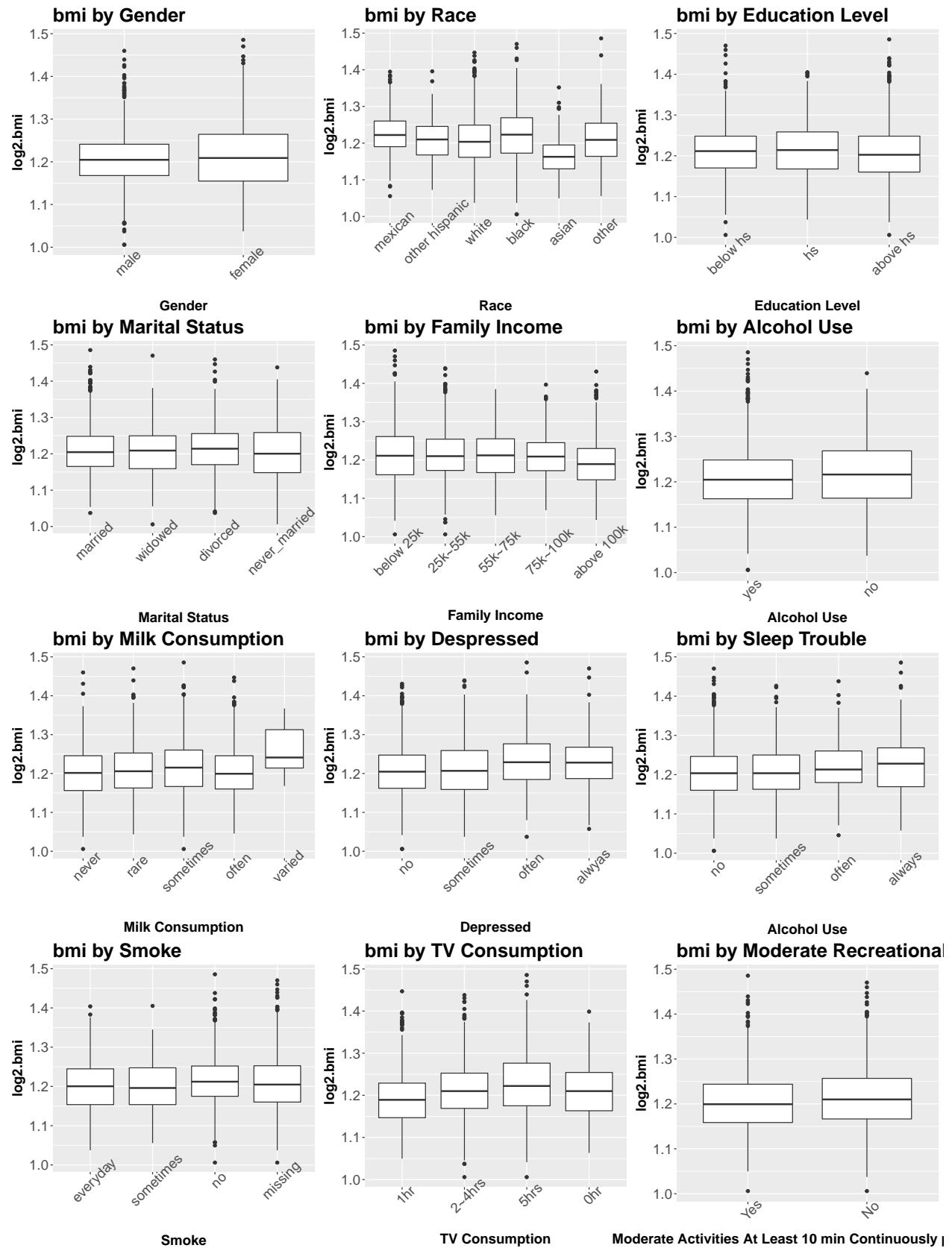
```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
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## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```



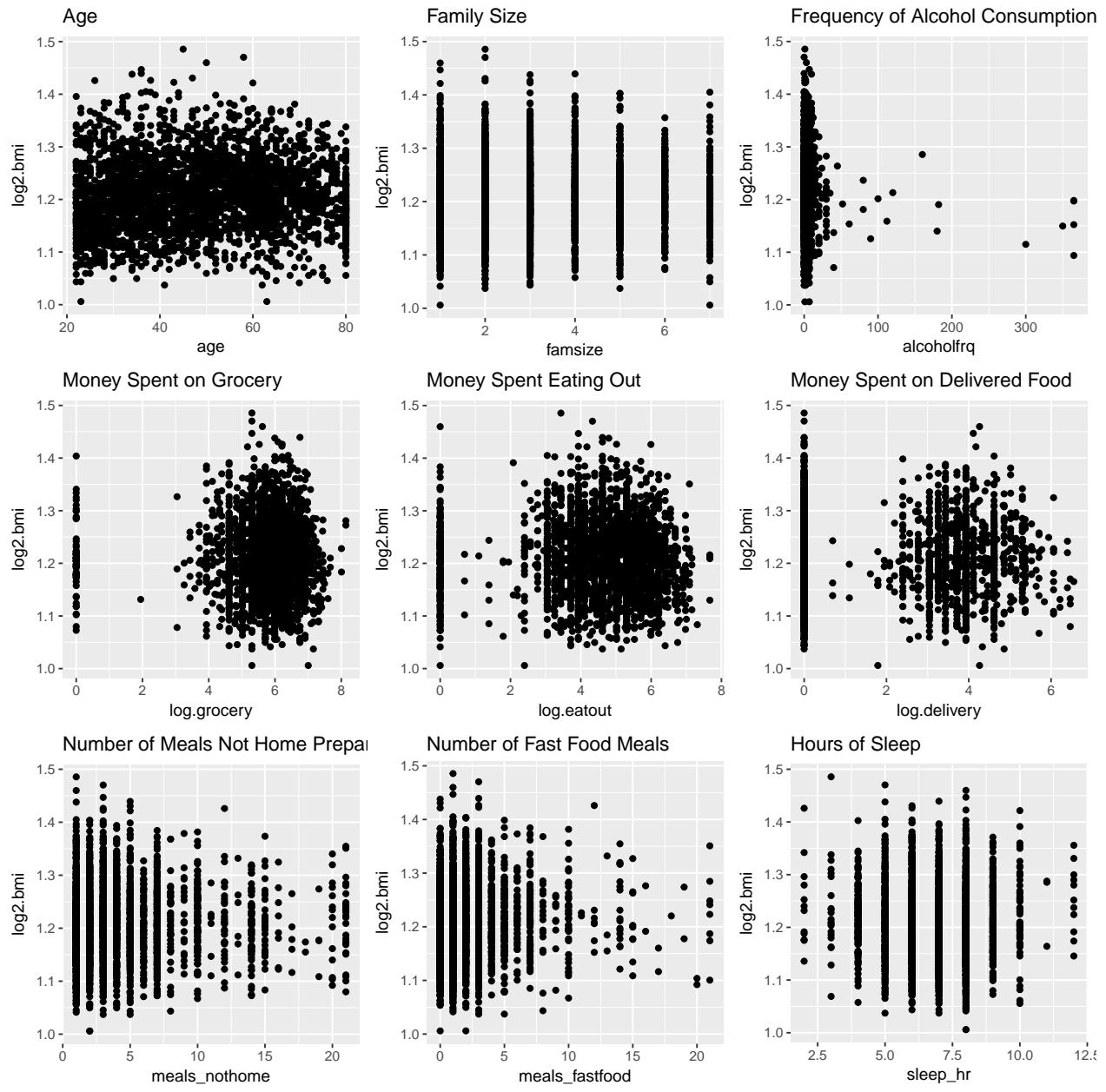
```
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
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## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
## `stat_bin()` using `bins = 30`. Pick better value with `binwidth`.
```



Categorical Variables



Response vs. numeric distribution



Models

```
#df_adult
check_assumptions <- function(model){
  hist(resid(model), col="grey", breaks=15)
  plot(resid(model)~fitted(model), cex=1.5)
  abline(h=0, lwd=2)
}
```

```

library(Matrix)
library(glmnet)

## Warning: package 'glmnet' was built under R version 3.4.2
## Loading required package: foreach
## Loaded glmnet 2.0-13
library(plotmo)

## Loading required package: plotrix
## Warning: package 'plotrix' was built under R version 3.4.3
## Loading required package: TeachingDemos
library(caret)

## Loading required package: lattice
library(lattice)

# define training control
train_control <- trainControl(method="cv", number=5)

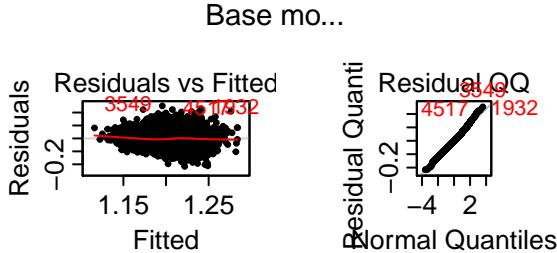
#baseline model
model1 = lm(log2.bmi~gender+age+race+edu+marriage+famsize+famincome+alcohol12yr+alcoholfrq+log.grocery+log.eatout+log.delivery+milk+meals_nothome+meals_fastfood+depressed+sleep_trouble+activity+tv_hours+sleep_hr+smoke, data = df_adult)
summary(model1)

##
## Call:
## lm(formula = log2.bmi ~ gender + age + race + edu + marriage +
##     famsize + famincome + alcohol12yr + alcoholfrq + log.grocery +
##     log.eatout + log.delivery + milk + meals_nothome + meals_fastfood +
##     depressed + sleep_trouble + activity + tv_hours + sleep_hr +
##     smoke, data = df_adult)
##
## Residuals:
##      Min        1Q    Median        3Q       Max
## -0.216033 -0.042926 -0.001571  0.037661  0.251263
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)    
## (Intercept) 1.174e+00  1.244e-02 94.348 < 2e-16 ***
## genderfemale 6.522e-03  2.542e-03  2.566  0.010334 *  
## age          1.238e-05  9.107e-05  0.136  0.891867    
## raceother hispanic -1.977e-02  5.433e-03 -3.639  0.000279 *** 
## racewhite    -1.745e-02  4.121e-03 -4.235  2.36e-05 *** 
## 
```

```

## raceblack      -6.450e-03  4.615e-03 -1.398 0.162343
## raceasian     -5.589e-02  5.625e-03 -9.936 < 2e-16 ***
## raceother     -1.310e-02  7.660e-03 -1.710 0.087362 .
## eduhs         6.452e-03  4.083e-03  1.580 0.114175
## eduabove hs   8.396e-03  3.834e-03  2.190 0.028624 *
## marriagewidowed -7.843e-03  5.771e-03 -1.359 0.174211
## marrieddivorced 1.411e-03  3.712e-03  0.380 0.703971
## marriagenever_married -6.582e-03  3.657e-03 -1.800 0.072007 .
## famsize        1.048e-03  8.544e-04  1.227 0.220056
## famincome25k~55k 3.582e-03  3.293e-03  1.088 0.276744
## famincome55k~75k -1.775e-03  4.446e-03 -0.399 0.689739
## famincome75k~100k -2.414e-03  4.813e-03 -0.502 0.615958
## famincomeabove 100k -1.285e-02  4.264e-03 -3.015 0.002594 **
## alcohol12yrno   4.590e-03  3.573e-03  1.285 0.199038
## alcoholfrq      -1.576e-04  6.709e-05 -2.349 0.018895 *
## log.grocery     4.339e-04  1.163e-03  0.373 0.709206
## log.eatout       2.039e-03  8.723e-04  2.338 0.019463 *
## log.delivery    -5.234e-04  6.241e-04 -0.839 0.401684
## milkrare        8.184e-03  3.974e-03  2.060 0.039526 *
## milksometimes   9.926e-03  3.578e-03  2.774 0.005573 **
## milkoften        3.152e-03  3.527e-03  0.894 0.371559
## milkvaried      5.545e-02  2.158e-02  2.570 0.010224 *
## meals_nothome   -4.889e-05  4.116e-04 -0.119 0.905466
## meals_fastfood   7.922e-04  5.683e-04  1.394 0.163401
## depressedsometimes -3.224e-04  3.304e-03 -0.098 0.922286
## depressedoftent  2.130e-02  6.621e-03  3.217 0.001310 **
## depresseddalwyas 8.558e-03  6.972e-03  1.227 0.219775
## sleep_troublesometimes -2.588e-04  2.984e-03 -0.087 0.930885
## sleep_troubleoften 6.435e-03  5.100e-03  1.262 0.207134
## sleep_troublealways 1.046e-02  4.610e-03  2.268 0.023388 *
## activityNo       5.992e-03  2.445e-03  2.451 0.014309 *
## tv_hrs2~4hrs    1.630e-02  2.857e-03  5.704 1.29e-08 ***
## tv_hrs5hrs      2.746e-02  4.107e-03  6.685 2.76e-11 ***
## tv_hrs0hr        1.430e-02  8.722e-03  1.639 0.101294
## sleep_hr         -1.509e-03  8.878e-04 -1.699 0.089383 .
## smokesometimes   6.294e-03  6.565e-03  0.959 0.337729
## smokeno          2.323e-02  3.941e-03  5.894 4.20e-09 ***
## smokemissing     1.631e-02  3.667e-03  4.447 9.01e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.06387 on 2916 degrees of freedom
## Multiple R-squared:  0.1153, Adjusted R-squared:  0.1025
## F-statistic: 9.047 on 42 and 2916 DF,  p-value: < 2.2e-16
plotres(model1, which=3:4, caption = "Base model assumption check")

```



```
#baseline model cv
model1_cv = train(base_form, data=df_adult, method="lm", preProcess="scale", trControl=train_control)

print("Base model cv results:")

## [1] "Base model cv results:"
print(paste("RMSE:", model1_cv$results$RMSE, "Rsquared:", model1_cv$results$Rsquared))

## [1] "RMSE: 0.0645052005209794 Rsquared: 0.088067250588867"
# add sleep^2 to basemodel

base_sleep_form = update.formula(base_form, . ~. + I(sleep_hr^2))

model_sleep = lm(base_sleep_form, data = df_adult)
summary(model_sleep)

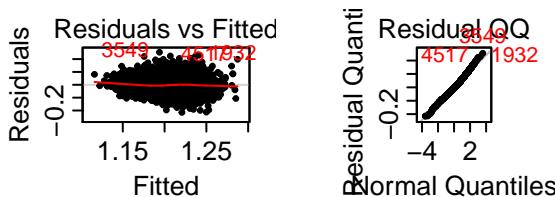
##
## Call:
## lm(formula = base_sleep_form, data = df_adult)
##
## Residuals:
##      Min       1Q   Median       3Q      Max 
## -0.214891 -0.042735 -0.001989  0.038703  0.252994 
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)    
## (Intercept) 1.226e+00  2.068e-02  59.258 < 2e-16 ***
## genderfemale 6.313e-03  2.539e-03   2.487 0.012952 *  
## age          1.057e-07  9.102e-05   0.001 0.999074    
## raceother hispanic -2.017e-02  5.426e-03  -3.717 0.000205 *** 
## racewhite     -1.774e-02  4.115e-03  -4.311 1.68e-05 *** 
## raceblack     -7.084e-03  4.613e-03  -1.536 0.124703    
## raceasian     -5.606e-02  5.617e-03  -9.980 < 2e-16 *** 
## raceother     -1.376e-02  7.652e-03  -1.798 0.072249 .  
## eduhs         6.566e-03  4.077e-03   1.610 0.107421    
## eduabove hs   8.670e-03  3.830e-03   2.264 0.023654 *  
## mariagewidowed -7.529e-03  5.763e-03  -1.306 0.191529    
## marriagedivorced  1.333e-03  3.707e-03   0.360 0.719192    
## mariagenever_married -6.877e-03  3.653e-03  -1.883 0.059855 . 
## famsize        1.004e-03  8.533e-04   1.177 0.239228
```

```

## famincome25k~55k      4.011e-03  3.291e-03  1.219  0.222967
## famincome55k~75k     -1.084e-03 4.445e-03 -0.244  0.807404
## famincome75k~100k    -1.844e-03 4.809e-03 -0.383  0.701497
## famincomeabove 100k   -1.202e-02 4.266e-03 -2.818  0.004867 **
## alcohol12yrno        4.487e-03  3.568e-03  1.258  0.208649
## alcoholfrq           -1.551e-04 6.699e-05 -2.316  0.020638 *
## log.grocery          5.069e-04  1.162e-03  0.436  0.662648
## log.eatout            2.054e-03  8.710e-04  2.358  0.018423 *
## log.delivery          -5.134e-04 6.232e-04 -0.824  0.410086
## milkrare              8.199e-03  3.968e-03  2.067  0.038866 *
## milksometimes         9.809e-03  3.573e-03  2.745  0.006085 **
## milkoften              3.030e-03  3.521e-03  0.860  0.389674
## milkvaried             5.552e-02  2.154e-02  2.577  0.010020 *
## meals_nothome          -4.445e-05 4.110e-04 -0.108  0.913889
## meals_fastfood         7.112e-04  5.680e-04  1.252  0.210666
## depressedsometimes    -3.848e-04 3.299e-03 -0.117  0.907156
## depressedoften          2.010e-02  6.623e-03  3.035  0.002428 **
## depresseddalwyas       7.497e-03  6.970e-03  1.076  0.282216
## sleep_troublesometimes -1.836e-04 2.980e-03 -0.062  0.950859
## sleep_troubleoften      6.144e-03  5.093e-03  1.206  0.227773
## sleep_troublealways     9.340e-03  4.617e-03  2.023  0.043164 *
## activityNo              5.901e-03  2.441e-03  2.417  0.015705 *
## tv_hrs2~4hrs            1.641e-02  2.853e-03  5.751  9.77e-09 ***
## tv_hrs5hrs              2.704e-02  4.103e-03  6.589  5.23e-11 ***
## tv_hrs0hr                1.396e-02  8.710e-03  1.602  0.109211
## sleep_hr                 -1.736e-02 5.155e-03 -3.367  0.000769 ***
## smokesometimes           6.572e-03  6.556e-03  1.002  0.316187
## smokeno                  2.355e-02  3.936e-03  5.983  2.46e-09 ***
## smokemissing              1.683e-02  3.665e-03  4.592  4.58e-06 ***
## I(sleep_hr^2)            1.169e-03  3.747e-04  3.121  0.001819 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.06377 on 2915 degrees of freedom
## Multiple R-squared:  0.1182, Adjusted R-squared:  0.1052
## F-statistic:  9.09 on 43 and 2915 DF,  p-value: < 2.2e-16
plotres(model_sleep, which=3:4, caption = "Base model plus sleephour^2 assumption check")

```

Base mod...



```

#sleep model cv
model_sleep_cv = train(base_sleep_form, data=df_adult, method="lm", preProcess="scale", trControl=t

```

```

print("Base model plus sleephour^2 cv results:")

## [1] "Base model plus sleephour^2 cv results:"
print(paste("RMSE:", model_sleep_cv$results$RMSE, "Rsquared:", model_sleep_cv$results$Rsquared))

## [1] "RMSE: 0.0643364611392913 Rsquared: 0.0929862036390957"
#backward selection from model_sleep
model1a = step(model_sleep, trace = 0, direction = "backward")

summary(model1a)

##
## Call:
## lm(formula = log2.bmi ~ gender + race + marriage + famincome +
##     alcoholfrq + log.eatout + milk + meals_fastfood + depressed +
##     activity + tv_hrs + sleep_hr + smoke + I(sleep_hr^2), data = df_adult)
##
## Residuals:
##      Min        1Q    Median        3Q       Max
## -0.217862 -0.043316 -0.001999  0.038609  0.237685
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)    
## (Intercept) 1.2405495  0.0187413 66.193 < 2e-16 ***
## genderfemale 0.0076997  0.0024626  3.127 0.001785 ** 
## raceother hispanic -0.0189712  0.0053672 -3.535 0.000415 *** 
## racewhite      -0.0162956  0.0038976 -4.181 2.99e-05 *** 
## raceblack      -0.0061984  0.0044883 -1.381 0.167381  
## raceasian      -0.0537885  0.0054678 -9.837 < 2e-16 *** 
## raceother      -0.0114359  0.0075375 -1.517 0.129325  
## marriagewidowed -0.0086698  0.0054977 -1.577 0.114908  
## marriagedivorced  0.0009124  0.0035927  0.254 0.799550  
## marriagenever_married -0.0071847  0.0033962 -2.116 0.034471 *  
## famincome25k~55k   0.0048268  0.0032492  1.486 0.137506  
## famincome55k~75k   0.0003760  0.0043429  0.087 0.931022  
## famincome75k~100k  -0.0006102  0.0046790 -0.130 0.896252  
## famincomeabove 100k -0.0102279  0.0040343 -2.535 0.011290 *  
## alcoholfrq      -0.0001607  0.0000669 -2.402 0.016351 *  
## log.eatout       0.0021729  0.0008540  2.544 0.010997 *  
## milkrare        0.0084880  0.0039608  2.143 0.032194 *  
## milksometimes   0.0102518  0.0035659  2.875 0.004070 ** 
## milkoften        0.0034353  0.0035174  0.977 0.328829  
## milkvaried       0.0554002  0.0215398  2.572 0.010161 *  
## meals_fastfood   0.0006560  0.0004501  1.457 0.145098  
## depressedsometimes 0.0008391  0.0032268  0.260 0.794859  
## depressedoften    0.0220355  0.0065168  3.381 0.000731 *** 
## depresseddalwyas 0.0110872  0.0066641  1.664 0.096274 .

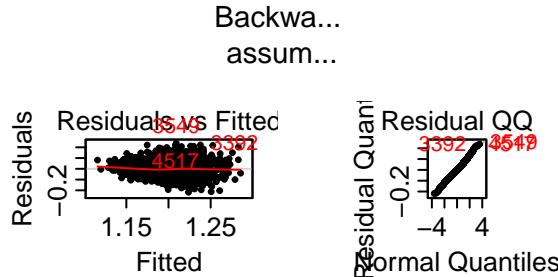
```

```

## activityNo          0.0058802  0.0024239   2.426  0.015332 *
## tv_hrs2~4hrs       0.0159697  0.0028093   5.685 1.44e-08 ***
## tv_hrs5hrs         0.0266123  0.0040045   6.646 3.59e-11 ***
## tv_hrs0hr          0.0142426  0.0087007   1.637  0.101749
## sleep_hr           -0.0185287  0.0051173  -3.621  0.000299 ***
## smokesometimes     0.0065101  0.0065346   0.996  0.319211
## smokeno            0.0238127  0.0038491   6.187 7.00e-10 ***
## smokemissing        0.0177815  0.0035966   4.944 8.09e-07 ***
## I(sleep_hr^2)      0.0012238  0.0003729   3.282  0.001043 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.0638 on 2926 degrees of freedom
## Multiple R-squared:  0.1142, Adjusted R-squared:  0.1045
## F-statistic: 11.79 on 32 and 2926 DF,  p-value: < 2.2e-16
extractAIC(model1a)

## [1] 33.00 -16253.63
plotres(model1a, which=3:4, caption = "Backward selected sleep model\n assumption check")

```



```

#model1a cv
model1a_cv = train(formula(model1a), data=df_adult, method="lm", preProcess="scale", trControl=trainControl(method="cv", number=10))

print("Model1a cv results:")

## [1] "Model1a cv results:"
print(paste("RMSE:", model1a_cv$results$RMSE, "Rsquared:", model1a_cv$results$Rsquared))

## [1] "RMSE: 0.0644538034636567 Rsquared: 0.0906605719600155"

##
## Call:
## lm(formula = full_intr_form, data = df_adult)
##
## Residuals:
##       Min        1Q    Median        3Q       Max
## -0.201156 -0.034804 -0.001737  0.032754  0.201127
##
## Coefficients: (32 not defined because of singularities)
##              Estimate Std. Error t value

```

## (Intercept)	1.312e+00	2.510e-01	5.228
## genderfemale	1.377e-01	6.176e-02	2.229
## age	-3.336e-03	2.250e-03	-1.483
## raceother hispanic	-2.780e-01	1.447e-01	-1.921
## racewhite	-1.209e-01	1.112e-01	-1.087
## raceblack	-3.227e-03	1.105e-01	-0.029
## raceasian	5.403e-02	1.708e-01	0.316
## raceother	5.226e-02	1.748e-01	0.299
## eduhs	1.173e-01	8.398e-02	1.397
## eduabove hs	9.342e-02	8.161e-02	1.145
## marriagewidowed	-1.132e-01	1.628e-01	-0.696
## marriagedivorced	-1.128e-02	8.089e-02	-0.139
## marriagenever_married	-1.249e-01	8.380e-02	-1.490
## famsize	-1.887e-02	1.832e-02	-1.030
## famincome25k~55k	-1.349e-01	7.195e-02	-1.874
## famincome55k~75k	-1.220e-01	1.160e-01	-1.052
## famincome75k~100k	-2.414e-02	1.314e-01	-0.184
## famincomeabove 100k	-7.246e-02	1.123e-01	-0.645
## alcohol12yrno	-2.291e-02	8.361e-02	-0.274
## alcoholfrq	9.798e-03	7.220e-03	1.357
## log.grocery	2.830e-02	2.525e-02	1.121
## log.eatout	2.719e-02	1.832e-02	1.484
## log.delivery	-1.781e-02	1.524e-02	-1.169
## milkrare	-1.672e-01	9.812e-02	-1.704
## milksometimes	-5.895e-02	8.636e-02	-0.683
## milkoften	1.566e-02	8.736e-02	0.179
## milkvaried	2.521e+00	1.057e+00	2.386
## meals_nothome	5.974e-03	1.107e-02	0.539
## meals_fastfood	-1.679e-02	1.377e-02	-1.219
## depressedsometimes	-7.727e-02	7.444e-02	-1.038
## depressedoften	1.928e-01	1.381e-01	1.396
## depresseddalwyas	1.035e-01	1.596e-01	0.648
## sleep_troublesometimes	3.423e-03	7.103e-02	0.048
## sleep_troubleoften	-4.037e-02	1.153e-01	-0.350
## sleep_troublealways	-8.362e-02	9.511e-02	-0.879
## activityNo	5.565e-02	5.923e-02	0.940
## tv_hrs2~4hrs	-7.781e-04	6.920e-02	-0.011
## tv_hrs5hrs	-6.985e-02	8.733e-02	-0.800
## tv_hrs0hr	-2.725e-01	2.434e-01	-1.119
## sleep_hr	-3.950e-02	7.114e-02	-0.555
## smokesometimes	-2.892e-01	1.578e-01	-1.832
## smokeno	-4.271e-03	8.533e-02	-0.050
## smokemissing	-3.127e-03	7.789e-02	-0.040
## I(sleep_hr^2)	1.609e-03	6.289e-03	0.256
## genderfemale:age	4.604e-04	2.248e-04	2.048
## genderfemale:raceother hispanic	-1.028e-02	1.378e-02	-0.747
## genderfemale:racewhite	-1.429e-02	1.046e-02	-1.367
## genderfemale:raceblack	8.298e-03	1.200e-02	0.691

## genderfemale:raceasian	-2.321e-02	1.419e-02	-1.635
## genderfemale:raceother	-1.774e-02	2.505e-02	-0.708
## genderfemale:eduhs	-3.962e-03	1.091e-02	-0.363
## genderfemale:eduabove hs	-2.441e-03	1.038e-02	-0.235
## genderfemale:marriagewidowed	1.029e-02	1.640e-02	0.627
## genderfemale:marriagedivorced	-5.347e-03	9.809e-03	-0.545
## genderfemale:marriagenever_married	-9.905e-05	9.217e-03	-0.011
## genderfemale:famsize	1.103e-03	2.140e-03	0.516
## genderfemale:famincome25k~55k	-8.772e-03	8.352e-03	-1.050
## genderfemale:famincome55k~75k	-8.052e-03	1.131e-02	-0.712
## genderfemale:famincome75k~100k	-8.783e-03	1.204e-02	-0.729
## genderfemale:famincomeabove 100k	-1.337e-02	1.074e-02	-1.245
## genderfemale:alcohol12yrno	-1.451e-02	9.281e-03	-1.564
## genderfemale:alcoholfrq	-1.148e-03	6.522e-04	-1.759
## genderfemale:log.grocery	-1.789e-03	3.337e-03	-0.536
## genderfemale:log.eatout	-1.900e-03	2.217e-03	-0.857
## genderfemale:log.delivery	2.654e-03	1.548e-03	1.714
## genderfemale:milkrare	-1.485e-02	9.784e-03	-1.518
## genderfemale:milksometimes	-2.755e-03	8.779e-03	-0.314
## genderfemale:milkoften	-6.557e-03	8.669e-03	-0.756
## genderfemale:milkvaried	2.490e-01	1.284e-01	1.938
## genderfemale:meals_nothome	-1.908e-04	1.075e-03	-0.177
## genderfemale:meals_fastfood	1.991e-03	1.566e-03	1.271
## genderfemale:depressedsometimes	8.246e-03	8.258e-03	0.998
## genderfemale:depressedoften	-1.261e-03	2.011e-02	-0.063
## genderfemale:depresseddalwyas	1.282e-02	2.263e-02	0.567
## genderfemale:sleep_troublesometimes	9.198e-03	7.179e-03	1.281
## genderfemale:sleep_troubleoften	2.619e-02	1.357e-02	1.930
## genderfemale:sleep_troublealways	1.858e-02	1.216e-02	1.527
## genderfemale:activityNo	3.942e-03	5.991e-03	0.658
## genderfemale:tv_hrs2~4hrs	2.661e-03	6.974e-03	0.382
## genderfemale:tv_hrs5hrs	3.872e-03	1.044e-02	0.371
## genderfemale:tv_hrs0hr	1.621e-02	3.196e-02	0.507
## genderfemale:sleep_hr	-3.503e-02	1.611e-02	-2.174
## genderfemale:smokesometimes	9.063e-03	1.850e-02	0.490
## genderfemale:smokeno	-1.233e-02	9.784e-03	-1.260
## genderfemale:smokemissing	-2.211e-02	9.092e-03	-2.432
## genderfemale:I(sleep_hr^2)	2.689e-03	1.167e-03	2.305
## age:raceother hispanic	9.576e-04	5.186e-04	1.846
## age:racewhite	3.425e-04	3.971e-04	0.863
## age:raceblack	6.256e-04	4.540e-04	1.378
## age:raceasian	7.619e-04	5.408e-04	1.409
## age:raceother	-2.664e-04	8.795e-04	-0.303
## age:eduhs	-1.855e-04	3.805e-04	-0.488
## age:eduabove hs	4.752e-04	3.662e-04	1.298
## age:marriagewidowed	3.546e-04	7.905e-04	0.449
## age:marriagedivorced	-5.148e-04	3.589e-04	-1.434
## age:marriagenever_married	6.047e-04	3.151e-04	1.919

## age:famsize	1.068e-04	7.983e-05	1.338
## age:famincome25k~55k	-1.230e-05	2.766e-04	-0.044
## age:famincome55k~75k	3.495e-04	3.830e-04	0.913
## age:famincome75k~100k	-2.240e-04	4.101e-04	-0.546
## age:famincomeabove 100k	-2.002e-04	3.647e-04	-0.549
## age:alcohol12yrno	-9.373e-05	3.181e-04	-0.295
## age:alcoholfrq	-4.255e-05	2.689e-05	-1.582
## age:log.grocery	-9.960e-05	1.230e-04	-0.810
## age:log.eatout	-1.117e-04	7.924e-05	-1.409
## age:log.delivery	1.220e-04	5.770e-05	2.115
## age:milk rarely	-6.254e-06	3.698e-04	-0.017
## age:milk sometimes	1.895e-04	3.280e-04	0.578
## age:milk often	-1.290e-04	3.070e-04	-0.420
## age:milk varied	-5.898e-02	2.391e-02	-2.467
## age:meals_nothome	5.597e-05	3.985e-05	1.404
## age:meals_fastfood	3.133e-05	5.597e-05	0.560
## age:depressedsometimes	-1.127e-04	3.096e-04	-0.364
## age:depressedoften	-1.049e-03	6.878e-04	-1.525
## age:depressedalways	2.710e-04	9.345e-04	0.290
## age:sleep_troublesometimes	2.775e-05	2.525e-04	0.110
## age:sleep_troubleoften	-4.133e-04	5.280e-04	-0.783
## age:sleep_troublealways	3.690e-04	4.589e-04	0.804
## age:activityNo	3.738e-04	2.125e-04	1.759
## age:tv_hours2~4hrs	-5.567e-04	2.607e-04	-2.135
## age:tv_hours5hrs	-4.021e-04	3.788e-04	-1.061
## age:tv_hours0hr	-7.850e-04	1.248e-03	-0.629
## age:sleep_hr	8.632e-04	5.828e-04	1.481
## age:smokesometimes	-8.006e-04	8.025e-04	-0.998
## age:smokeno	-1.180e-04	3.779e-04	-0.312
## age:smokemissing	-1.476e-04	3.489e-04	-0.423
## age:I(sleep_hr^2)	-5.559e-05	4.170e-05	-1.333
## raceother hispanic:eduhs	1.192e-02	1.894e-02	0.629
## racewhite:eduhs	3.176e-03	1.490e-02	0.213
## raceblack:eduhs	-2.026e-02	1.657e-02	-1.223
## raceasian:eduhs	-3.326e-02	3.048e-02	-1.091
## raceother:eduhs	-8.600e-02	4.582e-02	-1.877
## raceother hispanic:eduabove hs	1.430e-02	1.847e-02	0.774
## racewhite:eduabove hs	5.622e-03	1.350e-02	0.416
## raceblack:eduabove hs	-1.256e-02	1.527e-02	-0.822
## raceasian:eduabove hs	-1.460e-02	2.686e-02	-0.544
## raceother:eduabove hs	-1.289e-02	3.969e-02	-0.325
## raceother hispanic:marriagewidowed	1.803e-02	4.523e-02	0.399
## racewhite:marriagewidowed	4.903e-03	2.928e-02	0.167
## raceblack:marriagewidowed	2.150e-02	3.123e-02	0.688
## raceasian:marriagewidowed	-1.013e-02	4.134e-02	-0.245
## raceother:marriagewidowed	5.991e-02	9.446e-02	0.634
## raceother hispanic:marriagedivorced	1.880e-02	2.000e-02	0.940
## racewhite:marriagedivorced	6.794e-03	1.641e-02	0.414

## raceblack:marriagedivorced	-1.523e-04	1.737e-02	-0.009
## raceasian:marriagedivorced	1.961e-02	2.564e-02	0.765
## raceother:marriagedivorced	-2.173e-02	2.959e-02	-0.735
## raceother hispanic:marriagenever_married	3.226e-02	1.990e-02	1.621
## racewhite:marriagenever_married	8.482e-03	1.533e-02	0.553
## raceblack:marriagenever_married	8.347e-03	1.596e-02	0.523
## raceasian:marriagenever_married	-1.299e-02	2.035e-02	-0.638
## raceother:marriagenever_married	3.590e-03	3.108e-02	0.116
## raceother hispanic:famsize	1.123e-02	4.406e-03	2.549
## racewhite:famsize	6.921e-03	3.590e-03	1.928
## raceblack:famsize	6.805e-03	3.972e-03	1.714
## raceasian:famsize	3.579e-03	4.961e-03	0.721
## raceother:famsize	3.334e-03	6.581e-03	0.507
## raceother hispanic:famincome25k~55k	-2.168e-02	1.762e-02	-1.231
## racewhite:famincome25k~55k	-5.680e-03	1.300e-02	-0.437
## raceblack:famincome25k~55k	4.187e-03	1.411e-02	0.297
## raceasian:famincome25k~55k	4.322e-03	2.333e-02	0.185
## raceother:famincome25k~55k	5.602e-02	3.152e-02	1.777
## raceother hispanic:famincome55k~75k	1.693e-02	2.309e-02	0.733
## racewhite:famincome55k~75k	9.804e-03	1.581e-02	0.620
## raceblack:famincome55k~75k	4.087e-03	1.805e-02	0.226
## raceasian:famincome55k~75k	8.426e-03	2.914e-02	0.289
## raceother:famincome55k~75k	5.536e-03	4.507e-02	0.123
## raceother hispanic:famincome75k~100k	-3.285e-02	2.725e-02	-1.206
## racewhite:famincome75k~100k	-6.920e-03	2.018e-02	-0.343
## raceblack:famincome75k~100k	4.969e-03	2.222e-02	0.224
## raceasian:famincome75k~100k	-4.795e-03	2.908e-02	-0.165
## raceother:famincome75k~100k	8.592e-03	4.153e-02	0.207
## raceother hispanic:famincomeabove 100k	6.629e-03	2.490e-02	0.266
## racewhite:famincomeabove 100k	-1.243e-02	1.753e-02	-0.709
## raceblack:famincomeabove 100k	-4.641e-04	2.007e-02	-0.023
## raceasian:famincomeabove 100k	-6.145e-03	2.563e-02	-0.240
## raceother:famincomeabove 100k	2.858e-02	3.923e-02	0.728
## raceother hispanic:alcohol12yrno	1.097e-02	2.007e-02	0.547
## racewhite:alcohol12yrno	8.663e-03	1.498e-02	0.578
## raceblack:alcohol12yrno	-9.811e-03	1.584e-02	-0.619
## raceasian:alcohol12yrno	-2.213e-02	1.813e-02	-1.221
## raceother:alcohol12yrno	6.404e-02	3.251e-02	1.970
## raceother hispanic:alcoholfrq	3.961e-04	1.412e-03	0.281
## racewhite:alcoholfrq	8.114e-04	1.168e-03	0.694
## raceblack:alcoholfrq	-1.864e-04	1.304e-03	-0.143
## raceasian:alcoholfrq	1.183e-04	1.403e-03	0.084
## raceother:alcoholfrq	1.457e-03	1.709e-03	0.853
## raceother hispanic:log.grocery	-3.353e-03	6.313e-03	-0.531
## racewhite:log.grocery	-3.026e-03	5.236e-03	-0.578
## raceblack:log.grocery	-7.524e-03	5.555e-03	-1.355
## raceasian:log.grocery	-2.236e-03	9.710e-03	-0.230
## raceother:log.grocery	-1.012e-03	8.935e-03	-0.113

## raceother hispanic:log.eatout	1.282e-03	4.476e-03	0.286
## racewhite:log.eatout	4.870e-03	3.598e-03	1.354
## raceblack:log.eatout	4.130e-03	3.969e-03	1.040
## raceasian:log.eatout	-3.234e-03	5.153e-03	-0.628
## raceother:log.eatout	6.255e-03	7.357e-03	0.850
## raceother hispanic:log.delivery	3.680e-03	3.679e-03	1.000
## racewhite:log.delivery	-1.699e-03	2.548e-03	-0.667
## raceblack:log.delivery	-2.901e-03	2.831e-03	-1.025
## raceasian:log.delivery	-1.939e-03	3.425e-03	-0.566
## raceother:log.delivery	-3.349e-03	5.592e-03	-0.599
## raceother hispanic:milkrare	-1.586e-02	2.248e-02	-0.705
## racewhite:milkrare	-1.197e-02	1.762e-02	-0.680
## raceblack:milkrare	-7.575e-03	1.900e-02	-0.399
## raceasian:milkrare	-1.892e-02	2.175e-02	-0.870
## raceother:milkrare	5.254e-02	4.039e-02	1.301
## raceother hispanic:milksometimes	-1.056e-02	1.981e-02	-0.533
## racewhite:milksometimes	-1.304e-02	1.634e-02	-0.798
## raceblack:milksometimes	-3.441e-03	1.738e-02	-0.198
## raceasian:milksometimes	-2.435e-02	2.091e-02	-1.165
## raceother:milksometimes	6.738e-02	3.419e-02	1.971
## raceother hispanic:milkoften	-7.197e-03	1.994e-02	-0.361
## racewhite:milkoften	-3.359e-03	1.622e-02	-0.207
## raceblack:milkoften	-8.205e-03	1.782e-02	-0.460
## raceasian:milkoften	-1.395e-02	1.951e-02	-0.715
## raceother:milkoften	3.504e-02	3.362e-02	1.042
	NA	NA	NA
## raceother hispanic:milkvaried	2.017e+00	8.452e-01	2.386
## racewhite:milkvaried	-7.807e-02	1.033e-01	-0.756
	NA	NA	NA
## raceother:milkvaried		NA	NA
## raceother hispanic:meals_nothome	-1.713e-03	2.536e-03	-0.675
## racewhite:meals_nothome	-2.789e-04	2.038e-03	-0.137
## raceblack:meals_nothome	-1.232e-03	2.099e-03	-0.587
## raceasian:meals_nothome	8.906e-04	2.483e-03	0.359
## raceother:meals_nothome	8.684e-04	4.073e-03	0.213
## raceother hispanic:meals_fastfood	3.605e-03	3.262e-03	1.105
## racewhite:meals_fastfood	9.872e-04	2.515e-03	0.392
## raceblack:meals_fastfood	-2.383e-04	2.650e-03	-0.090
## raceasian:meals_fastfood	-3.207e-04	3.869e-03	-0.083
## raceother:meals_fastfood	-8.004e-03	5.321e-03	-1.504
## raceother hispanic:depressedsometimes	1.030e-03	1.771e-02	0.058
## racewhite:depressedsometimes	-1.078e-02	1.315e-02	-0.820
## raceblack:depressedsometimes	-1.581e-02	1.513e-02	-1.045
## raceasian:depressedsometimes	4.429e-03	1.997e-02	0.222
## raceother:depressedsometimes	5.486e-02	2.926e-02	1.875
## raceother hispanic:depressedoften	-6.991e-02	5.130e-02	-1.363
## racewhite:depressedoften	-3.423e-02	3.352e-02	-1.021
## raceblack:depressedoften	3.952e-02	4.043e-02	0.978

## raceasian:depressedoften	3.653e-02	4.409e-02	0.828
## raceother:depressedoften	2.516e-02	5.534e-02	0.455
## raceother hispanic:depresseddalwyas	-7.423e-02	4.168e-02	-1.781
## racewhite:depresseddalwyas	-2.341e-02	3.262e-02	-0.718
## raceblack:depresseddalwyas	-6.585e-02	3.681e-02	-1.789
## raceasian:depresseddalwyas	2.507e-02	7.071e-02	0.355
## raceother:depresseddalwyas	6.513e-02	7.299e-02	0.892
## raceother hispanic:sleep_troublesometimes	1.764e-02	1.663e-02	1.061
## racewhite:sleep_troublesometimes	1.613e-02	1.220e-02	1.322
## raceblack:sleep_troublesometimes	1.902e-02	1.388e-02	1.370
## raceasian:sleep_troublesometimes	1.062e-02	1.591e-02	0.668
## raceother:sleep_troublesometimes	3.705e-02	2.577e-02	1.438
## raceother hispanic:sleep_troubleoften	8.134e-03	3.901e-02	0.208
## racewhite:sleep_troubleoften	2.492e-02	2.399e-02	1.039
## raceblack:sleep_troubleoften	4.341e-02	2.681e-02	1.619
## raceasian:sleep_troubleoften	5.821e-02	3.284e-02	1.772
## raceother:sleep_troubleoften	4.071e-02	5.322e-02	0.765
## raceother hispanic:sleep_troublealways	2.748e-02	2.827e-02	0.972
## racewhite:sleep_troublealways	8.182e-03	2.218e-02	0.369
## raceblack:sleep_troublealways	-4.263e-03	2.433e-02	-0.175
## raceasian:sleep_troublealways	-1.067e-02	3.630e-02	-0.294
## raceother:sleep_troublealways	-5.575e-02	4.553e-02	-1.224
## raceother hispanic:activityNo	-3.339e-02	1.303e-02	-2.563
## racewhite:activityNo	-2.081e-02	9.744e-03	-2.136
## raceblack:activityNo	-3.526e-02	1.112e-02	-3.171
## raceasian:activityNo	-2.633e-02	1.341e-02	-1.963
## raceother:activityNo	-4.991e-03	2.179e-02	-0.229
## raceother hispanic:tv_hrs2~4hrs	-6.290e-03	1.440e-02	-0.437
## racewhite:tv_hrs2~4hrs	-5.601e-03	1.134e-02	-0.494
## raceblack:tv_hrs2~4hrs	-1.644e-02	1.375e-02	-1.196
## raceasian:tv_hrs2~4hrs	-2.758e-02	1.458e-02	-1.892
## raceother:tv_hrs2~4hrs	2.621e-02	2.330e-02	1.125
## raceother hispanic:tv_hrs5hrs	2.279e-02	2.314e-02	0.985
## racewhite:tv_hrs5hrs	3.285e-02	1.817e-02	1.808
## raceblack:tv_hrs5hrs	1.729e-02	2.001e-02	0.864
## raceasian:tv_hrs5hrs	-1.122e-02	2.612e-02	-0.430
## raceother:tv_hrs5hrs	1.693e-02	3.788e-02	0.447
## raceother hispanic:tv_hrs0hr	1.401e-01	6.122e-02	2.289
## racewhite:tv_hrs0hr	1.360e-01	4.581e-02	2.970
## raceblack:tv_hrs0hr	9.023e-02	5.474e-02	1.648
## raceasian:tv_hrs0hr	8.125e-02	6.515e-02	1.247
## raceother:tv_hrs0hr	NA	NA	NA
## raceother hispanic:sleep_hr	6.230e-02	3.728e-02	1.671
## racewhite:sleep_hr	1.901e-02	2.849e-02	0.667
## raceblack:sleep_hr	5.067e-03	2.748e-02	0.184
## raceasian:sleep_hr	-1.538e-02	4.401e-02	-0.349
## raceother:sleep_hr	-5.117e-02	4.705e-02	-1.088
## raceother hispanic:smokesometimes	-5.411e-02	4.922e-02	-1.099

## racewhite:smokesometimes	5.087e-03	2.946e-02	0.173
## raceblack:smokesometimes	3.113e-02	3.010e-02	1.034
## raceasian:smokesometimes	3.067e-02	5.276e-02	0.581
## raceother:smokesometimes	-4.321e-02	4.768e-02	-0.906
## raceother hispanic:smokeno	8.452e-03	2.679e-02	0.315
## racewhite:smokeno	3.119e-02	1.831e-02	1.703
## raceblack:smokeno	1.621e-02	2.034e-02	0.797
## raceasian:smokeno	1.826e-02	3.212e-02	0.568
## raceother:smokeno	5.724e-03	3.561e-02	0.161
## raceother hispanic:smokemissing	9.946e-04	2.571e-02	0.039
## racewhite:smokemissing	1.802e-02	1.732e-02	1.041
## raceblack:smokemissing	2.049e-02	1.866e-02	1.099
## raceasian:smokemissing	6.640e-03	3.062e-02	0.217
## raceother:smokemissing	-8.969e-03	2.944e-02	-0.305
## raceother hispanic:I(sleep_hr^2)	-4.655e-03	2.702e-03	-1.722
## racewhite:I(sleep_hr^2)	-1.457e-03	2.053e-03	-0.710
## raceblack:I(sleep_hr^2)	-6.567e-04	1.958e-03	-0.335
## raceasian:I(sleep_hr^2)	8.461e-04	3.197e-03	0.265
## raceother:I(sleep_hr^2)	4.160e-03	3.461e-03	1.202
## eduhs:marriagewidowed	2.360e-02	2.429e-02	0.971
## eduabove hs:marriagewidowed	1.104e-02	2.341e-02	0.471
## eduhs:marriagedivorced	1.504e-03	1.477e-02	0.102
## eduabove hs:marriagedivorced	1.214e-02	1.413e-02	0.859
## eduhs:marriagenever_married	2.547e-03	1.517e-02	0.168
## eduabove hs:marriagenever_married	2.197e-02	1.434e-02	1.532
## eduhs:famsize	2.844e-03	3.205e-03	0.888
## eduabove hs:famsize	6.233e-03	3.034e-03	2.054
## eduhs:famincome25k~55k	2.207e-02	1.155e-02	1.911
## eduabove hs:famincome25k~55k	1.669e-02	1.123e-02	1.486
## eduhs:famincome55k~75k	1.723e-02	1.829e-02	0.942
## eduabove hs:famincome55k~75k	3.730e-02	1.696e-02	2.199
## eduhs:famincome75k~100k	1.107e-02	2.419e-02	0.458
## eduabove hs:famincome75k~100k	-1.900e-04	2.226e-02	-0.009
## eduhs:famincomeabove 100k	-9.868e-03	2.321e-02	-0.425
## eduabove hs:famincomeabove 100k	-1.357e-02	2.180e-02	-0.622
## eduhs:alcohol12yrno	5.059e-03	1.443e-02	0.350
## eduabove hs:alcohol12yrno	-2.931e-04	1.340e-02	-0.022
## eduhs:alcoholfrq	-1.131e-04	1.145e-03	-0.099
## eduabove hs:alcoholfrq	-9.370e-04	1.121e-03	-0.836
## eduhs:log.grocery	-1.139e-03	5.323e-03	-0.214
## eduabove hs:log.grocery	-4.505e-04	4.679e-03	-0.096
## eduhs:log.eatout	-3.877e-03	3.243e-03	-1.196
## eduabove hs:log.eatout	-1.343e-03	3.111e-03	-0.432
## eduhs:log.delivery	1.105e-03	2.553e-03	0.433
## eduabove hs:log.delivery	1.653e-03	2.395e-03	0.690
## eduhs:milkrare	2.733e-02	1.654e-02	1.652
## eduabove hs:milkrare	7.175e-03	1.540e-02	0.466
## eduhs:milksometimes	1.766e-02	1.469e-02	1.202

## eduabove hs:milksometimes	1.269e-02	1.381e-02	0.919
## eduhhs:milkoften	1.224e-02	1.472e-02	0.832
## eduabove hs:milkoften	2.561e-03	1.376e-02	0.186
## eduhhs:milkvaried	1.317e+00	5.297e-01	2.486
## eduabove hs:milkvaried	-7.163e-01	3.717e-01	-1.927
## eduhhs:meals_nothome	-2.774e-03	2.137e-03	-1.298
## eduabove hs:meals_nothome	-2.624e-03	1.886e-03	-1.391
## eduhhs:meals_fastfood	4.277e-03	2.701e-03	1.583
## eduabove hs:meals_fastfood	3.271e-03	2.484e-03	1.317
## eduhhs:depressedsometimes	-2.800e-03	1.336e-02	-0.210
## eduabove hs:depressedsometimes	-4.209e-03	1.254e-02	-0.336
## eduhhs:depressedoften	-7.397e-02	3.086e-02	-2.397
## eduabove hs:depressedoften	-3.471e-02	3.146e-02	-1.103
## eduhhs:depresseddalwyas	-1.335e-02	2.724e-02	-0.490
## eduabove hs:depresseddalwyas	-2.730e-02	2.824e-02	-0.967
## eduhhs:sleep_troublesometimes	-1.011e-02	1.301e-02	-0.777
## eduabove hs:sleep_troublesometimes	-2.262e-02	1.233e-02	-1.834
## eduhhs:sleep_troubleoften	1.609e-02	2.109e-02	0.763
## eduabove hs:sleep_troubleoften	-2.153e-02	2.180e-02	-0.987
## eduhhs:sleep_troublealways	-8.369e-03	1.810e-02	-0.462
## eduabove hs:sleep_troublealways	-1.101e-02	1.701e-02	-0.647
## eduhhs:activityNo	8.093e-03	1.048e-02	0.772
## eduabove hs:activityNo	1.767e-02	9.906e-03	1.784
## eduhhs:tv_hrs2~4hrs	3.500e-02	1.269e-02	2.757
## eduabove hs:tv_hrs2~4hrs	2.303e-02	1.146e-02	2.009
## eduhhs:tv_hrs5hrs	2.052e-03	1.618e-02	0.127
## eduabove hs:tv_hrs5hrs	7.380e-03	1.533e-02	0.481
## eduhhs:tv_hrs0hr	-6.106e-02	4.852e-02	-1.258
## eduabove hs:tv_hrs0hr	-3.656e-02	4.431e-02	-0.825
## eduhhs:sleep_hr	-3.699e-02	2.098e-02	-1.763
## eduabove hs:sleep_hr	-4.363e-02	2.102e-02	-2.076
## eduhhs:smokesometimes	3.424e-02	2.792e-02	1.226
## eduabove hs:smokesometimes	1.052e-02	2.772e-02	0.380
## eduhhs:smokeno	1.449e-03	1.433e-02	0.101
## eduabove hs:smokeno	9.050e-03	1.414e-02	0.640
## eduhhs:smokemissing	2.798e-04	1.380e-02	0.020
## eduabove hs:smokemissing	1.348e-03	1.336e-02	0.101
## eduhhs:I(sleep_hr^2)	2.513e-03	1.506e-03	1.668
## eduabove hs:I(sleep_hr^2)	2.920e-03	1.537e-03	1.899
## marriagewidowed:famsize	7.619e-03	6.406e-03	1.189
## marriagedivorced:famsize	7.143e-04	3.416e-03	0.209
## marriagenever_married:famsize	1.268e-03	2.910e-03	0.436
## marriagewidowed:famincome25k~55k	7.582e-03	1.693e-02	0.448
## marriagedivorced:famincome25k~55k	-7.711e-03	1.115e-02	-0.692
## marriagenever_married:famincome25k~55k	2.033e-02	1.101e-02	1.846
## marriagewidowed:famincome55k~75k	-2.226e-02	2.772e-02	-0.803
## marriagedivorced:famincome55k~75k	-5.012e-03	1.619e-02	-0.310
## marriagenever_married:famincome55k~75k	3.428e-02	1.610e-02	2.130

## marriagewidowed:famincome75k~100k	-3.279e-03	4.922e-02	-0.067
## marrieddivorced:famincome75k~100k	-3.336e-03	2.062e-02	-0.162
## marriagenever_married:famincome75k~100k	1.782e-02	1.749e-02	1.019
## marriagewidowed:famincomeabove 100k	-5.192e-02	3.160e-02	-1.643
## marrieddivorced:famincomeabove 100k	-2.343e-02	1.871e-02	-1.253
## marriagenever_married:famincomeabove 100k	2.799e-02	1.518e-02	1.843
## marriagewidowed:alcohol12yrno	-3.043e-03	1.773e-02	-0.172
## marrieddivorced:alcohol12yrno	3.446e-02	1.320e-02	2.611
## marriagenever_married:alcohol12yrno	-1.842e-03	1.371e-02	-0.134
## marriagewidowed:alcoholfrq	-5.375e-04	1.667e-03	-0.323
## marrieddivorced:alcoholfrq	-5.955e-04	8.479e-04	-0.702
## marriagenever_married:alcoholfrq	6.383e-04	1.071e-03	0.596
## marriagewidowed:log.grocery	4.219e-04	7.471e-03	0.056
## marrieddivorced:log.grocery	-6.215e-03	5.693e-03	-1.092
## marriagenever_married:log.grocery	-6.036e-03	4.573e-03	-1.320
## marriagewidowed:log.eatout	2.697e-03	5.220e-03	0.517
## marrieddivorced:log.eatout	6.824e-04	3.203e-03	0.213
## marriagenever_married:log.eatout	1.215e-03	3.282e-03	0.370
## marriagewidowed:log.delivery	-3.635e-03	5.322e-03	-0.683
## marrieddivorced:log.delivery	-3.694e-03	2.442e-03	-1.513
## marriagenever_married:log.delivery	4.376e-03	2.254e-03	1.942
## marriagewidowed:milkraре	3.656e-03	2.905e-02	0.126
## marrieddivorced:milkraре	-1.766e-03	1.536e-02	-0.115
## marriagenever_married:milkraре	9.475e-03	1.402e-02	0.676
## marriagewidowed:milksometimes	-2.951e-02	2.077e-02	-1.421
## marrieddivorced:milksometimes	-1.807e-02	1.306e-02	-1.383
## marriagenever_married:milksometimes	2.336e-03	1.294e-02	0.181
## marriagewidowed:milkoften	-8.937e-03	2.109e-02	-0.424
## marrieddivorced:milkoften	-2.130e-04	1.314e-02	-0.016
## marriagenever_married:milkoften	5.238e-03	1.275e-02	0.411
## marriagewidowed:milkvaried	-7.595e-02	1.158e-01	-0.656
## marrieddivorced:milkvaried	-2.127e+00	9.208e-01	-2.310
	NA	NA	NA
## marriagewidowed:meals_nothome	-2.223e-03	3.040e-03	-0.731
## marrieddivorced:meals_nothome	-8.896e-04	1.679e-03	-0.530
## marriagenever_married:meals_nothome	-3.789e-04	1.524e-03	-0.249
## marriagewidowed:meals_fastfood	5.511e-06	5.811e-03	0.001
## marrieddivorced:meals_fastfood	1.949e-03	2.270e-03	0.858
## marriagenever_married:meals_fastfood	4.567e-04	1.887e-03	0.242
## marriagewidowed:depressedsometimes	-3.589e-02	1.906e-02	-1.884
## marrieddivorced:depressedsometimes	-6.742e-03	1.192e-02	-0.566
## marriagenever_married:depressedsometimes	-1.305e-03	1.240e-02	-0.105
## marriagewidowed:depressedoften	8.327e-03	4.649e-02	0.179
## marrieddivorced:depressedoften	3.587e-02	2.442e-02	1.469
## marriagenever_married:depressedoften	2.616e-02	2.867e-02	0.913
## marriagewidowed:depresseddalwyas	7.007e-03	4.515e-02	0.155
## marrieddivorced:depresseddalwyas	-3.245e-02	2.777e-02	-1.169
## marriagenever_married:depresseddalwyas	-8.558e-03	3.262e-02	-0.262

## marriagewidowed:sleep_troublesometimes	-3.571e-03	1.768e-02	-0.202
## marrieddivorced:sleep_troublesometimes	5.855e-03	1.133e-02	0.517
## marriagenever_married:sleep_troublesometimes	2.187e-03	1.052e-02	0.208
## marriagewidowed:sleep_troubleoften	2.493e-02	2.868e-02	0.869
## marrieddivorced:sleep_troubleoften	-1.648e-02	1.670e-02	-0.987
## marriagenever_married:sleep_troubleoften	-1.317e-02	2.162e-02	-0.609
## marriagewidowed:sleep_troublealways	9.970e-03	2.824e-02	0.353
## marrieddivorced:sleep_troublealways	-4.040e-03	1.626e-02	-0.248
## marriagenever_married:sleep_troublealways	-9.839e-04	1.844e-02	-0.053
## marriagewidowed:activityNo	-3.004e-03	1.438e-02	-0.209
## marrieddivorced:activityNo	-1.471e-02	9.319e-03	-1.579
## marriagenever_married:activityNo	-1.700e-04	8.917e-03	-0.019
## marriagewidowed:tv_hours2~4hrs	5.353e-03	1.970e-02	0.272
## marrieddivorced:tv_hours2~4hrs	-4.457e-03	1.051e-02	-0.424
## marriagenever_married:tv_hours2~4hrs	-2.830e-03	1.015e-02	-0.279
## marriagewidowed:tv_hours5hrs	-3.213e-03	2.311e-02	-0.139
## marrieddivorced:tv_hours5hrs	8.317e-03	1.422e-02	0.585
## marriagenever_married:tv_hours5hrs	-1.257e-02	1.617e-02	-0.777
## marriagewidowed:tv_hours0hr	-8.788e-02	1.297e-01	-0.678
## marrieddivorced:tv_hours0hr	1.202e-02	5.038e-02	0.239
## marriagenever_married:tv_hours0hr	-2.942e-02	3.875e-02	-0.759
## marriagewidowed:sleep_hr	2.441e-02	4.102e-02	0.595
## marrieddivorced:sleep_hr	3.105e-02	2.005e-02	1.549
## marriagenever_married:sleep_hr	2.489e-02	2.129e-02	1.169
## marriagewidowed:smokesometimes	1.097e-01	5.506e-02	1.992
## marrieddivorced:smokesometimes	3.318e-02	2.532e-02	1.310
## marriagenever_married:smokesometimes	2.291e-02	2.292e-02	0.999
## marriagewidowed:smokeno	-1.173e-02	2.940e-02	-0.399
## marrieddivorced:smokeno	-4.083e-03	1.385e-02	-0.295
## marriagenever_married:smokeno	5.168e-03	1.436e-02	0.360
## marriagewidowed:smokemissing	1.930e-02	2.931e-02	0.659
## marrieddivorced:smokemissing	-2.299e-02	1.296e-02	-1.774
## marriagenever_married:smokemissing	-2.396e-02	1.198e-02	-1.999
## marriagewidowed:I(sleep_hr^2)	-2.325e-03	2.834e-03	-0.820
## marrieddivorced:I(sleep_hr^2)	-2.525e-03	1.483e-03	-1.702
## marriagenever_married:I(sleep_hr^2)	-1.670e-03	1.572e-03	-1.062
## famsize:famincome25k~55k	-9.070e-04	2.799e-03	-0.324
## famsize:famincome55k~75k	-3.829e-05	3.958e-03	-0.010
## famsize:famincome75k~100k	-6.660e-04	4.151e-03	-0.160
## famsize:famincomeabove 100k	-5.063e-03	3.628e-03	-1.396
## famsize:alcohol12yrno	-4.715e-04	3.236e-03	-0.146
## famsize:alcoholfrq	1.177e-04	2.743e-04	0.429
## famsize:log.grocery	-6.440e-04	1.105e-03	-0.583
## famsize:log.eatout	-5.238e-04	7.187e-04	-0.729
## famsize:log.delivery	8.736e-04	5.197e-04	1.681
## famsize:milk rarely	-1.107e-03	3.318e-03	-0.334
## famsize:milksometimes	-4.371e-03	2.957e-03	-1.478
## famsize:milkoften	-1.215e-03	2.883e-03	-0.422

## famsize:milkvaried	NA	NA	NA
## famsize:meals_nothome	-2.509e-04	3.785e-04	-0.663
## famsize:meals_fastfood	9.080e-05	5.043e-04	0.180
## famsize:depressedsometimes	-8.055e-03	2.897e-03	-2.781
## famsize:depressedoften	-2.089e-02	8.210e-03	-2.544
## famsize:depresseddalwyas	-1.934e-02	7.260e-03	-2.663
## famsize:sleep_troublesometimes	4.137e-04	2.498e-03	0.166
## famsize:sleep_troubleoften	2.888e-03	5.001e-03	0.577
## famsize:sleep_troublealways	1.101e-03	4.393e-03	0.251
## famsize:activityNo	-2.396e-03	2.080e-03	-1.152
## famsize:tv_hours2~4hrs	-3.888e-03	2.315e-03	-1.679
## famsize:tv_hours5hrs	-5.039e-03	3.618e-03	-1.393
## famsize:tv_hours0hr	-8.100e-03	1.122e-02	-0.722
## famsize:sleep_hr	5.478e-03	4.604e-03	1.190
## famsize:smokesometimes	1.292e-02	5.870e-03	2.201
## famsize:smokeno	1.685e-03	3.251e-03	0.518
## famsize:smokemissing	2.301e-03	3.017e-03	0.763
## famsize:I(sleep_hr^2)	-4.418e-04	3.462e-04	-1.276
## famincome25k~55k:alcohol12yrno	-1.509e-03	1.143e-02	-0.132
## famincome55k~75k:alcohol12yrno	1.363e-02	1.644e-02	0.829
## famincome75k~100k:alcohol12yrno	3.337e-02	1.731e-02	1.927
## famincomeabove 100k:alcohol12yrno	3.922e-02	1.530e-02	2.563
## famincome25k~55k:alcoholfrq	8.509e-04	9.563e-04	0.890
## famincome55k~75k:alcoholfrq	1.610e-03	1.297e-03	1.241
## famincome75k~100k:alcoholfrq	9.343e-04	1.403e-03	0.666
## famincomeabove 100k:alcoholfrq	1.462e-03	1.176e-03	1.244
## famincome25k~55k:log.grocery	-1.452e-03	3.814e-03	-0.381
## famincome55k~75k:log.grocery	2.514e-03	6.969e-03	0.361
## famincome75k~100k:log.grocery	-1.140e-02	6.720e-03	-1.697
## famincomeabove 100k:log.grocery	-5.057e-03	5.506e-03	-0.918
## famincome25k~55k:log.eatout	4.212e-03	2.684e-03	1.569
## famincome55k~75k:log.eatout	1.994e-03	4.081e-03	0.489
## famincome75k~100k:log.eatout	-5.807e-04	5.174e-03	-0.112
## famincomeabove 100k:log.eatout	-4.023e-05	4.136e-03	-0.010
## famincome25k~55k:log.delivery	-1.436e-03	2.115e-03	-0.679
## famincome55k~75k:log.delivery	-1.558e-03	2.737e-03	-0.569
## famincome75k~100k:log.delivery	1.167e-03	2.994e-03	0.390
## famincomeabove 100k:log.delivery	-5.471e-04	2.586e-03	-0.212
## famincome25k~55k:milkrare	1.034e-02	1.340e-02	0.772
## famincome55k~75k:milkrare	-3.336e-03	1.828e-02	-0.182
## famincome75k~100k:milkrare	3.810e-02	1.941e-02	1.962
## famincomeabove 100k:milkrare	1.617e-02	1.679e-02	0.963
## famincome25k~55k:milksometimes	5.407e-03	1.200e-02	0.451
## famincome55k~75k:milksometimes	-2.550e-02	1.533e-02	-1.663
## famincome75k~100k:milksometimes	-1.124e-02	1.751e-02	-0.642
## famincomeabove 100k:milksometimes	-6.496e-03	1.491e-02	-0.436
## famincome25k~55k:milkoften	5.406e-03	1.190e-02	0.454
## famincome55k~75k:milkoften	-2.281e-02	1.549e-02	-1.473

## famincome75k~100k:milkoften	1.453e-03	1.708e-02	0.085
## famincomeabove 100k:milkoften	-5.077e-03	1.456e-02	-0.349
## famincome25k~55k:milkvaried	NA	NA	NA
## famincome55k~75k:milkvaried	NA	NA	NA
## famincome75k~100k:milkvaried	NA	NA	NA
## famincomeabove 100k:milkvaried	NA	NA	NA
## famincome25k~55k:meals_nothome	-1.517e-05	1.650e-03	-0.009
## famincome55k~75k:meals_nothome	-2.989e-03	2.054e-03	-1.456
## famincome75k~100k:meals_nothome	4.416e-04	2.260e-03	0.195
## famincomeabove 100k:meals_nothome	1.317e-03	1.872e-03	0.704
## famincome25k~55k:meals_fastfood	-4.043e-04	1.990e-03	-0.203
## famincome55k~75k:meals_fastfood	1.118e-03	2.625e-03	0.426
## famincome75k~100k:meals_fastfood	-1.940e-03	2.929e-03	-0.662
## famincomeabove 100k:meals_fastfood	-1.934e-03	2.446e-03	-0.791
## famincome25k~55k:depressedsometimes	-1.378e-03	1.030e-02	-0.134
## famincome55k~75k:depressedsometimes	-9.718e-03	1.395e-02	-0.697
## famincome75k~100k:depressedsometimes	3.490e-03	1.654e-02	0.211
## famincomeabove 100k:depressedsometimes	4.102e-03	1.505e-02	0.273
## famincome25k~55k:depressedoften	-1.497e-02	2.380e-02	-0.629
## famincome55k~75k:depressedoften	-1.145e-01	4.456e-02	-2.570
## famincome75k~100k:depressedoften	5.167e-02	5.903e-02	0.875
## famincomeabove 100k:depressedoften	-6.707e-02	3.833e-02	-1.750
## famincome25k~55k:depressedalwyas	-2.533e-02	2.622e-02	-0.966
## famincome55k~75k:depressedalwyas	-4.717e-03	4.184e-02	-0.113
## famincome75k~100k:depressedalwyas	5.307e-02	5.291e-02	1.003
## famincomeabove 100k:depressedalwyas	-1.302e-01	5.730e-02	-2.273
## famincome25k~55k:sleep_troublesometimes	-7.135e-03	9.596e-03	-0.744
## famincome55k~75k:sleep_troublesometimes	4.245e-03	1.352e-02	0.314
## famincome75k~100k:sleep_troublesometimes	1.230e-02	1.374e-02	0.895
## famincomeabove 100k:sleep_troublesometimes	-1.060e-03	1.251e-02	-0.085
## famincome25k~55k:sleep_troubleoften	-3.773e-03	1.781e-02	-0.212
## famincome55k~75k:sleep_troubleoften	-2.141e-02	2.310e-02	-0.927
## famincome75k~100k:sleep_troubleoften	-3.627e-02	2.796e-02	-1.297
## famincomeabove 100k:sleep_troubleoften	-4.017e-03	2.456e-02	-0.164
## famincome25k~55k:sleep_troublealways	2.107e-02	1.453e-02	1.450
## famincome55k~75k:sleep_troublealways	2.278e-02	2.094e-02	1.088
## famincome75k~100k:sleep_troublealways	-4.106e-03	3.366e-02	-0.122
## famincomeabove 100k:sleep_troublealways	3.745e-02	2.036e-02	1.839
## famincome25k~55k:activityNo	9.928e-04	7.969e-03	0.125
## famincome55k~75k:activityNo	-4.558e-03	1.111e-02	-0.410
## famincome75k~100k:activityNo	-1.036e-02	1.135e-02	-0.913
## famincomeabove 100k:activityNo	-5.081e-03	9.975e-03	-0.509
## famincome25k~55k:tv_hrs2~4hrs	9.285e-05	9.515e-03	0.010
## famincome55k~75k:tv_hrs2~4hrs	-1.114e-02	1.278e-02	-0.871
## famincome75k~100k:tv_hrs2~4hrs	1.106e-02	1.275e-02	0.868
## famincomeabove 100k:tv_hrs2~4hrs	2.380e-02	1.151e-02	2.068
## famincome25k~55k:tv_hrs5hrs	-2.937e-03	1.320e-02	-0.222
## famincome55k~75k:tv_hrs5hrs	1.348e-02	1.830e-02	0.736

## famincome75k~100k:tv_hours	2.574e-02	1.923e-02	1.338
## famincomeabove 100k:tv_hours	1.503e-02	1.862e-02	0.807
## famincome25k~55k:tv_hours0hr	-2.901e-02	3.930e-02	-0.738
## famincome55k~75k:tv_hours0hr	-7.355e-02	4.770e-02	-1.542
## famincome75k~100k:tv_hours0hr	1.909e-02	4.870e-02	0.392
## famincomeabove 100k:tv_hours0hr	-4.297e-02	4.937e-02	-0.871
## famincome25k~55k:sleep_hr	3.840e-02	1.859e-02	2.066
## famincome55k~75k:sleep_hr	2.805e-02	3.064e-02	0.916
## famincome75k~100k:sleep_hr	3.269e-02	3.328e-02	0.982
## famincomeabove 100k:sleep_hr	4.896e-02	2.866e-02	1.708
## famincome25k~55k:smokesometimes	-4.161e-03	2.042e-02	-0.204
## famincome55k~75k:smokesometimes	-2.898e-02	3.290e-02	-0.881
## famincome75k~100k:smokesometimes	-9.149e-02	4.374e-02	-2.092
## famincomeabove 100k:smokesometimes	-3.985e-02	2.987e-02	-1.334
## famincome25k~55k:smokeno	4.806e-03	1.176e-02	0.409
## famincome55k~75k:smokeno	-2.693e-02	1.724e-02	-1.562
## famincome75k~100k:smokeno	-1.867e-02	2.183e-02	-0.855
## famincomeabove 100k:smokeno	-2.453e-02	1.837e-02	-1.335
## famincome25k~55k:smokemissing	-3.444e-03	1.113e-02	-0.309
## famincome55k~75k:smokemissing	-1.754e-02	1.604e-02	-1.093
## famincome75k~100k:smokemissing	-1.296e-02	2.084e-02	-0.622
## famincomeabove 100k:smokemissing	-3.021e-02	1.737e-02	-1.739
## famincome25k~55k:I(sleep_hr^2)	-2.889e-03	1.369e-03	-2.110
## famincome55k~75k:I(sleep_hr^2)	-1.949e-03	2.223e-03	-0.877
## famincome75k~100k:I(sleep_hr^2)	-2.357e-03	2.439e-03	-0.966
## famincomeabove 100k:I(sleep_hr^2)	-3.845e-03	2.102e-03	-1.829
## alcohol12yrno:alcoholfrq	-3.723e-03	1.914e-03	-1.945
## alcohol12yrno:log.grocery	-1.373e-03	4.223e-03	-0.325
## alcohol12yrno:log.eatout	2.752e-03	3.280e-03	0.839
## alcohol12yrno:log.delivery	-1.299e-04	2.344e-03	-0.055
## alcohol12yrno:milk rarely	2.743e-02	1.495e-02	1.834
## alcohol12yrno:milksometimes	5.806e-03	1.311e-02	0.443
## alcohol12yrno:milkoften	1.063e-02	1.279e-02	0.831
## alcohol12yrno:milkvaried	NA	NA	NA
## alcohol12yrno:meals_nothome	2.613e-03	1.705e-03	1.532
## alcohol12yrno:meals_fastfood	-4.936e-03	2.384e-03	-2.070
## alcohol12yrno:depressedsometimes	-2.383e-02	1.126e-02	-2.117
## alcohol12yrno:depressedoften	-7.625e-02	3.036e-02	-2.512
## alcohol12yrno:depressedalways	-8.564e-02	3.126e-02	-2.740
## alcohol12yrno:sleep_troublesometimes	-1.637e-02	1.040e-02	-1.575
## alcohol12yrno:sleep_troubleoften	4.622e-04	1.880e-02	0.025
## alcohol12yrno:sleep_troublealways	-1.331e-03	1.690e-02	-0.079
## alcohol12yrno:activityNo	3.902e-03	8.728e-03	0.447
## alcohol12yrno:tv_hours2~4hrs	-5.806e-03	1.025e-02	-0.566
## alcohol12yrno:tv_hours5hrs	-7.020e-04	1.439e-02	-0.049
## alcohol12yrno:tv_hours0hr	-4.989e-03	4.559e-02	-0.109
## alcohol12yrno:sleep_hr	2.611e-03	2.224e-02	0.117
## alcohol12yrno:smokesometimes	4.347e-02	3.767e-02	1.154

## alcohol12yrno:smokeno	-1.401e-02	1.716e-02	-0.817
## alcohol12yrno:smokemissing	-7.562e-03	1.531e-02	-0.494
## alcohol12yrno:I(sleep_hr^2)	2.990e-04	1.646e-03	0.182
## alcoholfrq:log.grocery	-7.072e-04	4.172e-04	-1.695
## alcoholfrq:log.eatout	-1.151e-04	2.303e-04	-0.500
## alcoholfrq:log.delivery	-1.336e-04	1.737e-04	-0.769
## alcoholfrq:milkrale	8.392e-04	9.547e-04	0.879
## alcoholfrq:milksometimes	-1.878e-04	9.022e-04	-0.208
## alcoholfrq:milkoften	8.815e-04	7.322e-04	1.204
## alcoholfrq:milkvaried		NA	NA
## alcoholfrq:meals_nothome	-4.593e-05	1.188e-04	-0.387
## alcoholfrq:meals_fastfood	9.612e-06	1.811e-04	0.053
## alcoholfrq:depressedsometimes	1.746e-03	9.771e-04	1.787
## alcoholfrq:depressedoften	2.482e-03	2.012e-03	1.234
## alcoholfrq:depresseddalwyas	-1.352e-03	2.455e-03	-0.551
## alcoholfrq:sleep_troublesometimes	-9.341e-05	8.332e-04	-0.112
## alcoholfrq:sleep_troubleoften	-7.690e-04	1.147e-03	-0.671
## alcoholfrq:sleep_troublealways	-1.954e-03	2.095e-03	-0.933
## alcoholfrq:activityNo	-6.801e-04	6.385e-04	-1.065
## alcoholfrq:tv_hours2~4hrs	-2.784e-04	7.555e-04	-0.369
## alcoholfrq:tv_hours5hrs	-1.045e-03	1.272e-03	-0.821
## alcoholfrq:tv_hours0hr	1.101e-03	2.571e-03	0.428
## alcoholfrq:sleep_hr	-1.966e-03	1.648e-03	-1.193
## alcoholfrq:smokesometimes	9.870e-04	1.884e-03	0.524
## alcoholfrq:smokeno	1.437e-03	1.069e-03	1.343
## alcoholfrq:smokemissing	1.975e-03	1.112e-03	1.777
## alcoholfrq:I(sleep_hr^2)	1.713e-04	1.188e-04	1.442
## log.grocery:log.eatout	-6.379e-05	1.055e-03	-0.060
## log.grocery:log.delivery	-3.059e-05	8.547e-04	-0.036
## log.grocery:milkrale	2.674e-03	5.575e-03	0.480
## log.grocery:milksometimes	1.965e-03	4.749e-03	0.414
## log.grocery:milkoften	7.613e-04	4.583e-03	0.166
## log.grocery:milkvaried		NA	NA
## log.grocery:meals_nothome	-3.517e-04	4.989e-04	-0.705
## log.grocery:meals_fastfood	7.021e-04	6.782e-04	1.035
## log.grocery:depressedsometimes	2.839e-03	4.389e-03	0.647
## log.grocery:depressedoften	2.150e-03	8.225e-03	0.261
## log.grocery:depresseddalwyas	-3.276e-03	1.109e-02	-0.295
## log.grocery:sleep_troublesometimes	2.698e-03	4.029e-03	0.670
## log.grocery:sleep_troubleoften	-1.377e-02	8.702e-03	-1.583
## log.grocery:sleep_troublealways	2.889e-03	6.803e-03	0.425
## log.grocery:activityNo	-1.297e-03	3.231e-03	-0.401
## log.grocery:tv_hours2~4hrs	-1.246e-04	3.590e-03	-0.035
## log.grocery:tv_hours5hrs	5.241e-03	4.678e-03	1.120
## log.grocery:tv_hours0hr	2.791e-02	2.635e-02	1.059
## log.grocery:sleep_hr	-4.314e-03	6.932e-03	-0.622
## log.grocery:smokesometimes	-9.773e-04	8.851e-03	-0.110
## log.grocery:smokeno	-1.369e-03	5.329e-03	-0.257

## log.grocery:smokemissing	4.965e-03	4.430e-03	1.121
## log.grocery:I(sleep_hr^2)	3.093e-04	5.444e-04	0.568
## log.eatout:log.delivery	-1.302e-04	5.508e-04	-0.236
## log.eatout:milk rare	1.219e-03	3.788e-03	0.322
## log.eatout:milk sometimes	-2.042e-03	3.163e-03	-0.646
## log.eatout:milk often	1.777e-03	3.108e-03	0.572
## log.eatout:milk varied	NA	NA	NA
## log.eatout:meals_nothome	-3.312e-04	3.784e-04	-0.875
## log.eatout:meals_fastfood	6.976e-05	5.495e-04	0.127
## log.eatout:depressedsometimes	-1.577e-03	2.768e-03	-0.570
## log.eatout:depressedoften	7.160e-03	7.549e-03	0.948
## log.eatout:depressedalwyas	8.426e-03	7.324e-03	1.150
## log.eatout:sleep_troublesometimes	1.312e-03	2.671e-03	0.491
## log.eatout:sleep_troubleoften	4.571e-03	5.136e-03	0.890
## log.eatout:sleep_troublealways	-5.963e-03	4.262e-03	-1.399
## log.eatout:activityNo	1.389e-03	2.289e-03	0.607
## log.eatout:tv_hrs2~4hrs	-4.072e-03	2.537e-03	-1.605
## log.eatout:tv_hrs5hrs	3.022e-03	3.560e-03	0.849
## log.eatout:tv_hrs0hr	8.310e-03	1.318e-02	0.631
## log.eatout:sleep_hr	-4.955e-03	4.730e-03	-1.048
## log.eatout:smokesometimes	-8.370e-04	6.351e-03	-0.132
## log.eatout:smokeno	3.797e-03	3.143e-03	1.208
## log.eatout:smokemissing	-5.674e-04	3.065e-03	-0.185
## log.eatout:I(sleep_hr^2)	3.170e-04	3.467e-04	0.914
## log.delivery:milk rare	2.724e-03	2.345e-03	1.162
## log.delivery:milk sometimes	1.655e-03	2.146e-03	0.771
## log.delivery:milk often	3.665e-03	2.112e-03	1.735
## log.delivery:milk varied	NA	NA	NA
## log.delivery:meals_nothome	1.735e-04	2.424e-04	0.716
## log.delivery:meals_fastfood	-1.423e-05	3.366e-04	-0.042
## log.delivery:depressedsometimes	-2.329e-04	2.091e-03	-0.111
## log.delivery:depressedoften	6.512e-03	4.826e-03	1.349
## log.delivery:depressedalwyas	8.228e-03	5.265e-03	1.563
## log.delivery:sleep_troublesometimes	-1.634e-04	1.796e-03	-0.091
## log.delivery:sleep_troubleoften	6.540e-03	3.563e-03	1.835
## log.delivery:sleep_troublealways	-2.071e-04	2.941e-03	-0.070
## log.delivery:activityNo	5.855e-05	1.498e-03	0.039
## log.delivery:tv_hrs2~4hrs	1.264e-03	1.670e-03	0.757
## log.delivery:tv_hrs5hrs	-2.032e-03	2.565e-03	-0.792
## log.delivery:tv_hrs0hr	-1.983e-02	9.389e-03	-2.112
## log.delivery:sleep_hr	6.364e-04	3.928e-03	0.162
## log.delivery:smokesometimes	2.929e-03	4.189e-03	0.699
## log.delivery:smokeno	1.714e-03	2.434e-03	0.704
## log.delivery:smokemissing	1.948e-03	2.295e-03	0.849
## log.delivery:I(sleep_hr^2)	-1.508e-05	2.868e-04	-0.053
## milk rare:meals_nothome	-1.992e-03	1.615e-03	-1.233
## milk sometimes:meals_nothome	-8.307e-05	1.503e-03	-0.055
## milk often:meals_nothome	-6.084e-05	1.440e-03	-0.042

## milkvaried:meals_nothome	NA	NA	NA
## milkrare:meals_fastfood	2.490e-03	2.202e-03	1.131
## milksometimes:meals_fastfood	1.222e-03	1.992e-03	0.613
## milkoften:meals_fastfood	-7.416e-04	2.027e-03	-0.366
## milkvaried:meals_fastfood	NA	NA	NA
## milkrare:depressedsometimes	1.829e-02	1.313e-02	1.392
## milksometimes:depressedsometimes	4.195e-03	1.191e-02	0.352
## milkoften:depressedsometimes	1.108e-02	1.159e-02	0.956
## milkvaried:depressedsometimes	NA	NA	NA
## milkrare:depressedoften	-3.986e-02	2.950e-02	-1.351
## milksometimes:depressedoften	3.082e-02	3.057e-02	1.008
## milkoften:depressedoften	2.412e-02	2.738e-02	0.881
## milkvaried:depressedoften	NA	NA	NA
## milkrare:depresseddalwyas	2.761e-02	3.202e-02	0.862
## milksometimes:depresseddalwyas	-2.092e-02	3.140e-02	-0.666
## milkoften:depresseddalwyas	3.956e-02	3.095e-02	1.278
## milkvaried:depresseddalwyas	NA	NA	NA
## milkrare:sleep_troublesometimes	-1.383e-02	1.151e-02	-1.202
## milksometimes:sleep_troublesometimes	-1.631e-03	1.027e-02	-0.159
## milkoften:sleep_troublesometimes	-4.435e-03	1.014e-02	-0.437
## milkvaried:sleep_troublesometimes	NA	NA	NA
## milkrare:sleep_troubleoften	2.093e-02	2.386e-02	0.877
## milksometimes:sleep_troubleoften	1.494e-02	1.940e-02	0.770
## milkoften:sleep_troubleoften	2.030e-02	1.845e-02	1.100
## milkvaried:sleep_troubleoften	NA	NA	NA
## milkrare:sleep_troublealways	1.434e-02	1.842e-02	0.779
## milksometimes:sleep_troublealways	1.078e-02	1.736e-02	0.621
## milkoften:sleep_troublealways	1.709e-02	1.760e-02	0.971
## milkvaried:sleep_troublealways	NA	NA	NA
## milkrare:activityNo	-4.357e-03	9.586e-03	-0.455
## milksometimes:activityNo	-5.871e-03	8.648e-03	-0.679
## milkoften:activityNo	-3.685e-03	8.412e-03	-0.438
## milkvaried:activityNo	NA	NA	NA
## milkrare:tv_hrs2~4hrs	3.712e-03	1.068e-02	0.347
## milksometimes:tv_hrs2~4hrs	4.370e-03	9.843e-03	0.444
## milkoften:tv_hrs2~4hrs	-4.048e-03	9.450e-03	-0.428
## milkvaried:tv_hrs2~4hrs	NA	NA	NA
## milkrare:tv_hrs5hrs	1.215e-02	1.618e-02	0.751
## milksometimes:tv_hrs5hrs	-1.672e-02	1.478e-02	-1.131
## milkoften:tv_hrs5hrs	-1.731e-02	1.452e-02	-1.192
## milkvaried:tv_hrs5hrs	NA	NA	NA
## milkrare:tv_hrs0hr	9.909e-03	4.235e-02	0.234
## milksometimes:tv_hrs0hr	-1.442e-03	4.315e-02	-0.033
## milkoften:tv_hrs0hr	3.155e-02	4.006e-02	0.788
## milkvaried:tv_hrs0hr	NA	NA	NA
## milkrare:sleep_hr	3.903e-02	2.519e-02	1.550
## milksometimes:sleep_hr	1.747e-02	2.244e-02	0.779
## milkoften:sleep_hr	-4.483e-03	2.318e-02	-0.193

## milkvaried:sleep_hr	NA	NA	NA
## milkrare:smokesometimes	5.074e-03	2.680e-02	0.189
## milksometimes:smokesometimes	4.409e-03	2.624e-02	0.168
## milkoften:smokesometimes	-8.074e-04	2.630e-02	-0.031
## milkvaried:smokesometimes	NA	NA	NA
## milkrare:smokeno	-5.912e-03	1.520e-02	-0.389
## milksometimes:smokeno	1.859e-02	1.386e-02	1.342
## milkoften:smokeno	6.799e-03	1.391e-02	0.489
## milkvaried:smokeno	NA	NA	NA
## milkrare:smokemissing	2.735e-05	1.410e-02	0.002
## milksometimes:smokemissing	1.408e-02	1.289e-02	1.092
## milkoften:smokemissing	-2.205e-03	1.307e-02	-0.169
## milkvaried:smokemissing	NA	NA	NA
## milkrare:I(sleep_hr^2)	-2.504e-03	1.843e-03	-1.359
## milksometimes:I(sleep_hr^2)	-1.154e-03	1.640e-03	-0.704
## milkoften:I(sleep_hr^2)	3.704e-04	1.699e-03	0.218
## milkvaried:I(sleep_hr^2)	NA	NA	NA
## meals_nothome:meals_fastfood	-1.880e-05	1.159e-04	-0.162
## meals_nothome:depressedsometimes	-1.263e-04	1.354e-03	-0.093
## meals_nothome:depressedoften	-8.614e-03	4.783e-03	-1.801
## meals_nothome:depressedalwyas	-3.925e-03	4.702e-03	-0.835
## meals_nothome:sleep_troublesometimes	3.427e-04	1.169e-03	0.293
## meals_nothome:sleep_troubleoften	3.590e-03	2.832e-03	1.268
## meals_nothome:sleep_troublealways	3.018e-04	2.301e-03	0.131
## meals_nothome:activityNo	-3.831e-04	1.016e-03	-0.377
## meals_nothome:tv_hours2~4hrs	-1.325e-03	1.166e-03	-1.136
## meals_nothome:tv_hours5hrs	-3.340e-03	1.976e-03	-1.691
## meals_nothome:tv_hours0hr	-7.831e-03	8.935e-03	-0.876
## meals_nothome:sleep_hr	1.819e-04	2.895e-03	0.063
## meals_nothome:smokesometimes	9.883e-04	3.288e-03	0.301
## meals_nothome:smokeno	1.082e-04	1.895e-03	0.057
## meals_nothome:smokemissing	-1.503e-03	1.739e-03	-0.864
## meals_nothome:I(sleep_hr^2)	-3.902e-06	2.106e-04	-0.019
## meals_fastfood:depressedsometimes	-1.873e-03	2.037e-03	-0.920
## meals_fastfood:depressedoften	-2.772e-03	5.551e-03	-0.499
## meals_fastfood:depressedalwyas	1.090e-03	5.426e-03	0.201
## meals_fastfood:sleep_troublesometimes	1.631e-03	1.709e-03	0.954
## meals_fastfood:sleep_troubleoften	-2.069e-03	3.766e-03	-0.549
## meals_fastfood:sleep_troublealways	6.529e-03	3.087e-03	2.115
## meals_fastfood:activityNo	1.977e-03	1.447e-03	1.367
## meals_fastfood:tv_hours2~4hrs	9.277e-04	1.647e-03	0.563
## meals_fastfood:tv_hours5hrs	3.692e-03	2.542e-03	1.452
## meals_fastfood:tv_hours0hr	1.855e-02	1.104e-02	1.680
## meals_fastfood:sleep_hr	8.019e-04	3.678e-03	0.218
## meals_fastfood:smokesometimes	5.879e-03	4.691e-03	1.253
## meals_fastfood:smokeno	1.915e-03	2.409e-03	0.795
## meals_fastfood:smokemissing	2.380e-03	2.156e-03	1.104
## meals_fastfood:I(sleep_hr^2)	-3.460e-05	2.710e-04	-0.128

## depressedsometimes:sleep_troublesometimes	-1.555e-02	8.852e-03	-1.757
## depressedoften:sleep_troublesometimes	1.672e-02	2.287e-02	0.731
## depresseddalwyas:sleep_troublesometimes	-1.828e-02	3.509e-02	-0.521
## depressedsometimes:sleep_troubleoften	3.962e-03	1.371e-02	0.289
## depressedoften:sleep_troubleoften	1.785e-03	3.324e-02	0.054
## depresseddalwyas:sleep_troubleoften	9.135e-04	3.031e-02	0.030
## depressedsometimes:sleep_troublealways	4.496e-03	1.371e-02	0.328
## depressedoften:sleep_troublealways	5.058e-02	2.811e-02	1.799
## depresseddalwyas:sleep_troublealways	-2.040e-02	2.773e-02	-0.736
## depressedsometimes:activityNo	4.792e-03	8.070e-03	0.594
## depressedoften:activityNo	1.162e-02	2.351e-02	0.494
## depresseddalwyas:activityNo	9.250e-03	2.212e-02	0.418
## depressedsometimes:tv_hrs2~4hrs	1.331e-02	9.308e-03	1.430
## depressedoften:tv_hrs2~4hrs	-2.715e-02	2.801e-02	-0.969
## depresseddalwyas:tv_hrs2~4hrs	-6.714e-03	2.729e-02	-0.246
## depressedsometimes:tv_hrs5hrs	1.852e-02	1.308e-02	1.416
## depressedoften:tv_hrs5hrs	2.047e-02	3.694e-02	0.554
## depresseddalwyas:tv_hrs5hrs	-3.417e-02	2.824e-02	-1.210
## depressedsometimes:tv_hrs0hr	1.514e-02	4.570e-02	0.331
## depressedoften:tv_hrs0hr	7.533e-02	5.954e-02	1.265
## depresseddalwyas:tv_hrs0hr	-3.209e-01	1.687e-01	-1.903
## depressedsometimes:sleep_hr	2.656e-02	1.920e-02	1.384
## depressedoften:sleep_hr	7.953e-03	2.971e-02	0.268
## depresseddalwyas:sleep_hr	-2.589e-03	3.559e-02	-0.073
## depressedsometimes:smokesometimes	-1.658e-02	2.390e-02	-0.694
## depressedoften:smokesometimes	-5.843e-02	6.402e-02	-0.913
## depresseddalwyas:smokesometimes	3.888e-03	4.404e-02	0.088
## depressedsometimes:smokeno	1.494e-02	1.211e-02	1.234
## depressedoften:smokeno	-1.671e-02	2.762e-02	-0.605
## depresseddalwyas:smokeno	7.824e-03	2.885e-02	0.271
## depressedsometimes:smokemissing	3.678e-03	1.121e-02	0.328
## depressedoften:smokemissing	-3.407e-02	2.460e-02	-1.385
## depresseddalwyas:smokemissing	3.745e-02	2.550e-02	1.469
## depressedsometimes:I(sleep_hr^2)	-1.988e-03	1.428e-03	-1.392
## depressedoften:I(sleep_hr^2)	-1.480e-03	2.119e-03	-0.699
## depresseddalwyas:I(sleep_hr^2)	2.808e-04	2.645e-03	0.106
## sleep_troublesometimes:activityNo	8.821e-03	6.940e-03	1.271
## sleep_troubleoften:activityNo	3.078e-03	1.409e-02	0.218
## sleep_troublealways:activityNo	-4.603e-03	1.234e-02	-0.373
## sleep_troublesometimes:tv_hrs2~4hrs	-6.866e-04	8.130e-03	-0.084
## sleep_troubleoften:tv_hrs2~4hrs	1.181e-02	1.617e-02	0.730
## sleep_troublealways:tv_hrs2~4hrs	-1.466e-02	1.433e-02	-1.023
## sleep_troublesometimes:tv_hrs5hrs	7.169e-03	1.198e-02	0.598
## sleep_troubleoften:tv_hrs5hrs	2.318e-02	2.221e-02	1.044
## sleep_troublealways:tv_hrs5hrs	-1.262e-03	1.769e-02	-0.071
## sleep_troublesometimes:tv_hrs0hr	5.800e-02	5.019e-02	1.156
## sleep_troubleoften:tv_hrs0hr	-1.140e-01	8.762e-02	-1.301
## sleep_troublealways:tv_hrs0hr	8.366e-02	6.457e-02	1.296

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## sleep_troublesometimes:sleep_hr          -1.629e-02  1.861e-02 -0.875
## sleep_troubleoften:sleep_hr             4.196e-03  2.844e-02  0.148
## sleep_troublealways:sleep_hr            3.591e-03  2.365e-02  0.152
## sleep_troublesometimes:smokesometimes  4.322e-02  2.067e-02  2.091
## sleep_troubleoften:smokesometimes      -1.343e-02  4.164e-02 -0.323
## sleep_troublealways:smokesometimes     4.882e-02  3.427e-02  1.424
## sleep_troublesometimes:smokeno         1.374e-02  1.180e-02  1.164
## sleep_troubleoften:smokeno              4.079e-02  2.096e-02  1.946
## sleep_troublealways:smokeno             1.383e-02  1.737e-02  0.796
## sleep_troublesometimes:smokemissing    1.880e-02  1.103e-02  1.704
## sleep_troubleoften:smokemissing         1.503e-02  2.005e-02  0.750
## sleep_troublealways:smokemissing        1.842e-02  1.605e-02  1.148
## sleep_troublesometimes:I(sleep_hr^2)   1.370e-03  1.355e-03  1.011
## sleep_troubleoften:I(sleep_hr^2)         3.919e-05  2.215e-03  0.018
## sleep_troublealways:I(sleep_hr^2)        1.641e-04  1.802e-03  0.091
## activityNo:tv_hrs2~4hrs                -4.200e-03  6.526e-03 -0.644
## activityNo:tv_hrs5hrs                  1.024e-03  1.030e-02  0.099
## activityNo:tv_hrs0hr                  2.786e-02  3.711e-02  0.751
## activityNo:sleep_hr                   -1.085e-02  1.535e-02 -0.707
## activityNo:smokesometimes             -7.639e-03  1.766e-02 -0.433
## activityNo:smokeno                   -9.838e-03  9.880e-03 -0.996
## activityNo:smokemissing              -1.310e-02  9.061e-03 -1.446
## activityNo:I(sleep_hr^2)               8.213e-04  1.118e-03  0.734
## tv_hrs2~4hrs:sleep_hr                 2.287e-02  1.832e-02  1.248
## tv_hrs5hrs:sleep_hr                  2.345e-02  2.337e-02  1.004
## tv_hrs0hr:sleep_hr                  1.701e-02  6.056e-02  0.281
## tv_hrs2~4hrs:smokesometimes          -3.899e-02  2.081e-02 -1.874
## tv_hrs5hrs:smokesometimes            -5.550e-02  3.686e-02 -1.506
## tv_hrs0hr:smokesometimes            -2.981e-02  1.627e-01 -0.183
## tv_hrs2~4hrs:smokeno                 -3.559e-03  1.165e-02 -0.305
## tv_hrs5hrs:smokeno                  -1.265e-02  1.532e-02 -0.826
## tv_hrs0hr:smokeno                  -1.906e-02  6.365e-02 -0.299
## tv_hrs2~4hrs:smokemissing           -9.587e-03  1.091e-02 -0.879
## tv_hrs5hrs:smokemissing             -2.821e-03  1.404e-02 -0.201
## tv_hrs0hr:smokemissing              5.314e-02  5.332e-02  0.997
## tv_hrs2~4hrs:I(sleep_hr^2)          -1.998e-03  1.351e-03 -1.479
## tv_hrs5hrs:I(sleep_hr^2)            -1.874e-03  1.738e-03 -1.078
## tv_hrs0hr:I(sleep_hr^2)              -1.657e-03  4.878e-03 -0.340
## sleep_hr:smokesometimes             7.354e-02  4.243e-02  1.733
## sleep_hr:smokeno                   -8.125e-03  2.104e-02 -0.386
## sleep_hr:smokemissing              -4.360e-03  1.904e-02 -0.229
## sleep_hr:I(sleep_hr^2)               9.362e-05  2.110e-04  0.444
## smokesometimes:I(sleep_hr^2)         -4.787e-03  3.114e-03 -1.537
## smokeno:I(sleep_hr^2)                1.045e-03  1.537e-03  0.680
## smokemissing:I(sleep_hr^2)           6.919e-04  1.409e-03  0.491
##
## (Intercept)                         1.88e-07 *** 
## genderfemale                          0.02591 *

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## age	0.13832
## raceother hispanic	0.05481 .
## racewhite	0.27709
## raceblack	0.97671
## raceasian	0.75178
## raceother	0.76492
## eduhs	0.16266
## eduabove hs	0.25246
## marriagewidowed	0.48678
## marrieddivorced	0.88907
## marriagenever_married	0.13633
## famsize	0.30324
## famincome25k~55k	0.06102 .
## famincome55k~75k	0.29297
## famincome75k~100k	0.85419
## famincomeabove 100k	0.51872
## alcohol12yrno	0.78412
## alcoholfrq	0.17490
## log.grocery	0.26249
## log.eatout	0.13797
## log.delivery	0.24260
## milkrare	0.08846 .
## milksometimes	0.49498
## milkoften	0.85771
## milkvaried	0.01714 *
## meals_nothome	0.58964
## meals_fastfood	0.22299
## depressedsometimes	0.29943
## depressedoften	0.16299
## depresseddalwyas	0.51681
## sleep_troublesometimes	0.96157
## sleep_troubleoften	0.72618
## sleep_troublealways	0.37942
## activityNo	0.34757
## tv_hours2~4hrs	0.99103
## tv_hours5hrs	0.42389
## tv_hours0hr	0.26308
## sleep_hr	0.57881
## smokesometimes	0.06710 .
## smokeno	0.96009
## smokemissing	0.96798
## I(sleep_hr^2)	0.79816
## genderfemale:age	0.04068 *
## genderfemale:raceother hispanic	0.45540
## genderfemale:racewhite	0.17192
## genderfemale:raceblack	0.48939
## genderfemale:raceasian	0.10221
## genderfemale:raceother	0.47902

## genderfemale:eduhs	0.71646
## genderfemale:eduabove hs	0.81400
## genderfemale:marriagewidowed	0.53055
## genderfemale:marriagedivorced	0.58570
## genderfemale:marriagenever_married	0.99143
## genderfemale:famsize	0.60622
## genderfemale:famincome25k~55k	0.29372
## genderfemale:famincome55k~75k	0.47654
## genderfemale:famincome75k~100k	0.46597
## genderfemale:famincomeabove 100k	0.21319
## genderfemale:alcohol12yrno	0.11800
## genderfemale:alcoholfrq	0.07866 .
## genderfemale:log.grocery	0.59190
## genderfemale:log.eatout	0.39150
## genderfemale:log.delivery	0.08662 .
## genderfemale:milkrare	0.12922
## genderfemale:milksometimes	0.75372
## genderfemale:milkoften	0.44951
## genderfemale:milkvaried	0.05270 .
## genderfemale:meals_nothome	0.85917
## genderfemale:meals_fastfood	0.20381
## genderfemale:depressedsometimes	0.31817
## genderfemale:depressedoften	0.95003
## genderfemale:depresseddalwyas	0.57107
## genderfemale:sleep_troublesometimes	0.20024
## genderfemale:sleep_troubleoften	0.05368 .
## genderfemale:sleep_troublealways	0.12689
## genderfemale:activityNo	0.51063
## genderfemale:tv_hours2~4hrs	0.70281
## genderfemale:tv_hours5hrs	0.71073
## genderfemale:tv_hours0hr	0.61191
## genderfemale:sleep_hr	0.02981 *
## genderfemale:smokesometimes	0.62435
## genderfemale:smokeno	0.20764
## genderfemale:smokemissing	0.01509 *
## genderfemale:I(sleep_hr^2)	0.02129 *
## age:raceother hispanic	0.06498 .
## age:racewhite	0.38849
## age:raceblack	0.16835
## age:raceasian	0.15900
## age:raceother	0.76195
## age:eduhs	0.62595
## age:eduabove hs	0.19457
## age:marriagewidowed	0.65378
## age:marriagedivorced	0.15164
## age:marriagenever_married	0.05513 .
## age:famsize	0.18106
## age:famincome25k~55k	0.96454

## age:famincome55k~75k	0.36157
## age:famincome75k~100k	0.58497
## age:famincomeabove 100k	0.58307
## age:alcohol12yrno	0.76828
## age:alcoholfrq	0.11369
## age:log.grocery	0.41818
## age:log.eatout	0.15896
## age:log.delivery	0.03456 *
## age:milkraре	0.98651
## age:milksometimes	0.56353
## age:milkoften	0.67449
## age:milkvaried	0.01372 *
## age:meals_nothome	0.16036
## age:meals_fastfood	0.57571
## age:depressedsometimes	0.71585
## age:depressedoften	0.12741
## age:depressedalways	0.77187
## age:sleep_troublesometimes	0.91251
## age:sleep_troubleoften	0.43380
## age:sleep_troublealways	0.42153
## age:activityNo	0.07870 .
## age:tv_hours2~4hrs	0.03285 *
## age:tv_hours5hrs	0.28859
## age:tv_hours0hr	0.52934
## age:sleep_hr	0.13869
## age:smokesometimes	0.31859
## age:smokeno	0.75496
## age:smokemissing	0.67232
## age:I(sleep_hr^2)	0.18268
## raceother hispanic:eduhs	0.52929
## racewhite:eduhs	0.83122
## raceblack:eduhs	0.22160
## raceasian:eduhs	0.27525
## raceother:eduhs	0.06065 .
## raceother hispanic:eduabove hs	0.43911
## racewhite:eduabove hs	0.67716
## raceblack:eduabove hs	0.41100
## raceasian:eduabove hs	0.58673
## raceother:eduabove hs	0.74547
## raceother hispanic:marriagewidowed	0.69019
## racewhite:marriagewidowed	0.86704
## raceblack:marriagewidowed	0.49122
## raceasian:marriagewidowed	0.80656
## raceother:marriagewidowed	0.52605
## raceother hispanic:marriagedivorced	0.34731
## racewhite:marriagedivorced	0.67894
## raceblack:marriagedivorced	0.99301
## raceasian:marriagedivorced	0.44449

## raceother:marriagedivorced	0.46269
## raceother hispanic:marriagenever_married	0.10522
## racewhite:marriagenever_married	0.58003
## raceblack:marriagenever_married	0.60094
## raceasian:marriagenever_married	0.52323
## raceother:marriagenever_married	0.90804
## raceother hispanic:famsize	0.01087 *
## racewhite:famsize	0.05401 .
## raceblack:famsize	0.08676 .
## raceasian:famsize	0.47079
## raceother:famsize	0.61242
## raceother hispanic:famincome25k~55k	0.21849
## racewhite:famincome25k~55k	0.66228
## raceblack:famincome25k~55k	0.76673
## raceasian:famincome25k~55k	0.85307
## raceother:famincome25k~55k	0.07572 .
## raceother hispanic:famincome55k~75k	0.46357
## racewhite:famincome55k~75k	0.53534
## raceblack:famincome55k~75k	0.82091
## raceasian:famincome55k~75k	0.77252
## raceother:famincome55k~75k	0.90226
## raceother hispanic:famincome75k~100k	0.22811
## racewhite:famincome75k~100k	0.73166
## raceblack:famincome75k~100k	0.82310
## raceasian:famincome75k~100k	0.86904
## raceother:famincome75k~100k	0.83610
## raceother hispanic:famincomeabove 100k	0.79013
## racewhite:famincomeabove 100k	0.47835
## raceblack:famincomeabove 100k	0.98155
## raceasian:famincomeabove 100k	0.81053
## raceother:famincomeabove 100k	0.46644
## raceother hispanic:alcohol12yrno	0.58462
## racewhite:alcohol12yrno	0.56318
## raceblack:alcohol12yrno	0.53584
## raceasian:alcohol12yrno	0.22233
## raceother:alcohol12yrno	0.04894 *
## raceother hispanic:alcoholfrq	0.77911
## racewhite:alcoholfrq	0.48747
## raceblack:alcoholfrq	0.88641
## raceasian:alcoholfrq	0.93279
## raceother:alcoholfrq	0.39398
## raceother hispanic:log.grocery	0.59537
## racewhite:log.grocery	0.56331
## raceblack:log.grocery	0.17569
## raceasian:log.grocery	0.81788
## raceother:log.grocery	0.90983
## raceother hispanic:log.eatout	0.77460
## racewhite:log.eatout	0.17603

## raceblack:log.eatout	0.29826
## raceasian:log.eatout	0.53038
## raceother:log.eatout	0.39530
## raceother hispanic:log.delivery	0.31722
## racewhite:log.delivery	0.50498
## raceblack:log.delivery	0.30559
## raceasian:log.delivery	0.57140
## raceother:log.delivery	0.54934
## raceother hispanic:milkrare	0.48061
## racewhite:milkrare	0.49686
## raceblack:milkrare	0.69013
## raceasian:milkrare	0.38443
## raceother:milkrare	0.19348
## raceother hispanic:milksometimes	0.59411
## racewhite:milksometimes	0.42489
## raceblack:milksometimes	0.84308
## raceasian:milksometimes	0.24432
## raceother:milksometimes	0.04887 *
## raceother hispanic:milkoften	0.71818
## racewhite:milkoften	0.83596
## raceblack:milkoften	0.64526
## raceasian:milkoften	0.47485
## raceother:milkoften	0.29734
## raceother hispanic:milkvaried	NA
## racewhite:milkvaried	0.01712 *
## raceblack:milkvaried	0.45003
## raceasian:milkvaried	NA
## raceother:milkvaried	NA
## raceother hispanic:meals_nothome	0.49963
## racewhite:meals_nothome	0.89117
## raceblack:meals_nothome	0.55744
## raceasian:meals_nothome	0.71986
## raceother:meals_nothome	0.83120
## raceother hispanic:meals_fastfood	0.26914
## racewhite:meals_fastfood	0.69477
## raceblack:meals_fastfood	0.92835
## raceasian:meals_fastfood	0.93394
## raceother:meals_fastfood	0.13265
## raceother hispanic:depressedsometimes	0.95365
## racewhite:depressedsometimes	0.41255
## raceblack:depressedsometimes	0.29625
## raceasian:depressedsometimes	0.82455
## raceother:depressedsometimes	0.06097 .
## raceother hispanic:depressedoften	0.17312
## racewhite:depressedoften	0.30734
## raceblack:depressedoften	0.32841
## raceasian:depressedoften	0.40753
## raceother:depressedoften	0.64940

## raceother hispanic:depresseddalwyas	0.07507 .
## racewhite:depresseddalwyas	0.47306
## raceblack:depresseddalwyas	0.07379 .
## raceasian:depresseddalwyas	0.72295
## raceother:depresseddalwyas	0.37231
## raceother hispanic:sleep_troublesometimes	0.28878
## racewhite:sleep_troublesometimes	0.18628
## raceblack:sleep_troublesometimes	0.17080
## raceasian:sleep_troublesometimes	0.50445
## raceother:sleep_troublesometimes	0.15064
## raceother hispanic:sleep_troubleoften	0.83486
## racewhite:sleep_troubleoften	0.29892
## raceblack:sleep_troubleoften	0.10554
## raceasian:sleep_troubleoften	0.07651 .
## raceother:sleep_troubleoften	0.44443
## raceother hispanic:sleep_troublealways	0.33102
## racewhite:sleep_troublealways	0.71224
## raceblack:sleep_troublealways	0.86094
## raceasian:sleep_troublealways	0.76887
## raceother:sleep_troublealways	0.22093
## raceother hispanic:activityNo	0.01044 *
## racewhite:activityNo	0.03280 *
## raceblack:activityNo	0.00154 **
## raceasian:activityNo	0.04980 *
## raceother:activityNo	0.81887
## raceother hispanic:tv_hrs2~4hrs	0.66222
## racewhite:tv_hrs2~4hrs	0.62135
## raceblack:tv_hrs2~4hrs	0.23191
## raceasian:tv_hrs2~4hrs	0.05861 .
## raceother:tv_hrs2~4hrs	0.26064
## raceother hispanic:tv_hrs5hrs	0.32466
## racewhite:tv_hrs5hrs	0.07078 .
## raceblack:tv_hrs5hrs	0.38754
## raceasian:tv_hrs5hrs	0.66757
## raceother:tv_hrs5hrs	0.65495
## raceother hispanic:tv_hrs0hr	0.02218 *
## racewhite:tv_hrs0hr	0.00301 **
## raceblack:tv_hrs0hr	0.09944 .
## raceasian:tv_hrs0hr	0.21249
## raceother:tv_hrs0hr	NA
## raceother hispanic:sleep_hr	0.09487 .
## racewhite:sleep_hr	0.50478
## raceblack:sleep_hr	0.85370
## raceasian:sleep_hr	0.72675
## raceother:sleep_hr	0.27686
## raceother hispanic:smokesometimes	0.27174
## racewhite:smokesometimes	0.86294
## raceblack:smokesometimes	0.30128

## raceasian:smokesometimes	0.56101
## raceother:smokesometimes	0.36486
## raceother hispanic:smokeno	0.75245
## racewhite:smokeno	0.08864 .
## raceblack:smokeno	0.42567
## raceasian:smokeno	0.56981
## raceother:smokeno	0.87231
## raceother hispanic:smokemissing	0.96915
## racewhite:smokemissing	0.29814
## raceblack:smokemissing	0.27210
## raceasian:smokemissing	0.82836
## raceother:smokemissing	0.76064
## raceother hispanic:I(sleep_hr^2)	0.08513 .
## racewhite:I(sleep_hr^2)	0.47800
## raceblack:I(sleep_hr^2)	0.73740
## raceasian:I(sleep_hr^2)	0.79128
## raceother:I(sleep_hr^2)	0.22956
## eduhs:marriagewidowed	0.33148
## eduabove hs:marriagewidowed	0.63735
## eduhs:marriagedivorced	0.91890
## eduabove hs:marriagedivorced	0.39032
## eduhs:marriagenever_married	0.86670
## eduabove hs:marriagenever_married	0.12556
## eduhs:famsize	0.37489
## eduabove hs:famsize	0.04008 *
## eduhs:famincome25k~55k	0.05613 .
## eduabove hs:famincome25k~55k	0.13739
## eduhs:famincome55k~75k	0.34636
## eduabove hs:famincome55k~75k	0.02797 *
## eduhs:famincome75k~100k	0.64721
## eduabove hs:famincome75k~100k	0.99319
## eduhs:famincomeabove 100k	0.67082
## eduabove hs:famincomeabove 100k	0.53371
## eduhs:alcohol12yrno	0.72601
## eduabove hs:alcohol12yrno	0.98255
## eduhs:alcoholfrq	0.92126
## eduabove hs:alcoholfrq	0.40352
## eduhs:log.grocery	0.83061
## eduabove hs:log.grocery	0.92331
## eduhs:log.eatout	0.23196
## eduabove hs:log.eatout	0.66606
## eduhs:log.delivery	0.66533
## eduabove hs:log.delivery	0.49005
## eduhs:milkrrare	0.09871 .
## eduabove hs:milkrrare	0.64141
## eduhs:milksometimes	0.22951
## eduabove hs:milksometimes	0.35842
## eduhs:milkoften	0.40566

## eduabove hs:milkoften	0.85243
## eduhs:milkvaried	0.01299 *
## eduabove hs:milkvaried	0.05414 .
## eduhs:meals_nothome	0.19436
## eduabove hs:meals_nothome	0.16432
## eduhs:meals_fastfood	0.11355
## eduabove hs:meals_fastfood	0.18801
## eduhs:depressedsometimes	0.83405
## eduabove hs:depressedsometimes	0.73728
## eduhs:depressedoften	0.01661 *
## eduabove hs:depressedoften	0.27009
## eduhs:depresseddalwyas	0.62423
## eduabove hs:depresseddalwyas	0.33388
## eduhs:sleep_troublesometimes	0.43729
## eduabove hs:sleep_troublesometimes	0.06674 .
## eduhs:sleep_troubleoften	0.44554
## eduabove hs:sleep_troubleoften	0.32353
## eduhs:sleep_troublealways	0.64394
## eduabove hs:sleep_troublealways	0.51761
## eduhs:activityNo	0.44002
## eduabove hs:activityNo	0.07454 .
## eduhs:tv_hrs2~4hrs	0.00588 **
## eduabove hs:tv_hrs2~4hrs	0.04464 *
## eduhs:tv_hrs5hrs	0.89907
## eduabove hs:tv_hrs5hrs	0.63040
## eduhs:tv_hrs0hr	0.20839
## eduabove hs:tv_hrs0hr	0.40937
## eduhs:sleep_hr	0.07800 .
## eduabove hs:sleep_hr	0.03802 *
## eduhs:smokesometimes	0.22030
## eduabove hs:smokesometimes	0.70419
## eduhs:smokeno	0.91948
## eduabove hs:smokeno	0.52233
## eduhs:smokemissing	0.98382
## eduabove hs:smokemissing	0.91963
## eduhs:I(sleep_hr^2)	0.09540 .
## eduabove hs:I(sleep_hr^2)	0.05766 .
## marriagewidowed:famsize	0.23442
## marrieddivorced:famsize	0.83439
## marriagenever_married:famsize	0.66316
## marriagewidowed:famincome25k~55k	0.65427
## marrieddivorced:famincome25k~55k	0.48924
## marriagenever_married:famincome25k~55k	0.06497 .
## marriagewidowed:famincome55k~75k	0.42192
## marrieddivorced:famincome55k~75k	0.75694
## marriagenever_married:famincome55k~75k	0.03332 *
## marriagewidowed:famincome75k~100k	0.94689
## marrieddivorced:famincome75k~100k	0.87151

## marriagenever_married:famincome75k~100k	0.30848
## marriagewidowed:famincomeabove 100k	0.10055
## marrieddivorced:famincomeabove 100k	0.21044
## marriagenever_married:famincomeabove 100k	0.06541 .
## marriagewidowed:alcohol12yrno	0.86373
## marrieddivorced:alcohol12yrno	0.00909 **
## marriagenever_married:alcohol12yrno	0.89316
## marriagewidowed:alcoholfrq	0.74710
## marrieddivorced:alcoholfrq	0.48253
## marriagenever_married:alcoholfrq	0.55141
## marriagewidowed:log.grocery	0.95496
## marrieddivorced:log.grocery	0.27512
## marriagenever_married:log.grocery	0.18707
## marriagewidowed:log.eatout	0.60544
## marrieddivorced:log.eatout	0.83133
## marriagenever_married:log.eatout	0.71118
## marriagewidowed:log.delivery	0.49467
## marrieddivorced:log.delivery	0.13056
## marriagenever_married:log.delivery	0.05231 .
## marriagewidowed:milkrrare	0.89986
## marrieddivorced:milkrrare	0.90848
## marriagenever_married:milkrrare	0.49925
## marriagewidowed:milksometimes	0.15552
## marrieddivorced:milksometimes	0.16667
## marriagenever_married:milksometimes	0.85677
## marriagewidowed:milkoften	0.67173
## marrieddivorced:milkoften	0.98708
## marriagenever_married:milkoften	0.68120
## marriagewidowed:milkvaried	0.51190
## marrieddivorced:milkvaried	0.02098 *
## marriagenever_married:milkvaried	NA
## marriagewidowed:meals_nothome	0.46466
## marrieddivorced:meals_nothome	0.59621
## marriagenever_married:meals_nothome	0.80362
## marriagewidowed:meals_fastfood	0.99924
## marrieddivorced:meals_fastfood	0.39078
## marriagenever_married:meals_fastfood	0.80875
## marriagewidowed:depressedsometimes	0.05975 .
## marrieddivorced:depressedsometimes	0.57173
## marriagenever_married:depressedsometimes	0.91622
## marriagewidowed:depressedoften	0.85789
## marrieddivorced:depressedoften	0.14202
## marriagenever_married:depressedoften	0.36160
## marriagewidowed:depresseddalwyas	0.87668
## marrieddivorced:depresseddalwyas	0.24273
## marriagenever_married:depresseddalwyas	0.79304
## marriagewidowed:sleep_troublesometimes	0.83997
## marrieddivorced:sleep_troublesometimes	0.60535

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## marriagenever_married:sleep_troublesometimes  0.83540
## marriagewidowed:sleep_troubleoften          0.38496
## marriagedivorced:sleep_troubleoften         0.32384
## marriagenever_married:sleep_troubleoften     0.54231
## marriagewidowed:sleep_troublealways          0.72408
## marriagedivorced:sleep_troublealways         0.80385
## marriagenever_married:sleep_troublealways    0.95745
## marriagewidowed:activityNo                  0.83448
## marriagedivorced:activityNo                 0.11459
## marriagenever_married:activityNo            0.98479
## marriagewidowed:tv_hours2~4hrs             0.78587
## marriagedivorced:tv_hours2~4hrs            0.67152
## marriagenever_married:tv_hours2~4hrs        0.78047
## marriagewidowed:tv_hours5hrs              0.88942
## marriagedivorced:tv_hours5hrs             0.55875
## marriagenever_married:tv_hours5hrs         0.43717
## marriagewidowed:tv_hours0hr               0.49799
## marriagedivorced:tv_hours0hr              0.81146
## marriagenever_married:tv_hours0hr         0.44781
## marriagewidowed:sleep_hr                  0.55182
## marriagedivorced:sleep_hr                 0.12156
## marriagenever_married:sleep_hr            0.24243
## marriagewidowed:smokesometimes           0.04649 *
## marriagedivorced:smokesometimes          0.19019
## marriagenever_married:smokesometimes      0.31767
## marriagewidowed:smokeno                  0.69008
## marriagedivorced:smokeno                 0.76812
## marriagenever_married:smokeno            0.71889
## marriagewidowed:smokemissing            0.51028
## marriagedivorced:smokemissing           0.07619 .
## marriagenever_married:smokemissing       0.04572 *
## marriagewidowed:I(sleep_hr^2)            0.41219
## marriagedivorced:I(sleep_hr^2)           0.08882 .
## marriagenever_married:I(sleep_hr^2)       0.28831
## famsize:famincome25k~55k                0.74599
## famsize:famincome55k~75k                0.99228
## famsize:famincome75k~100k              0.87254
## famsize:famincomeabove 100k            0.16294
## famsize:alcohol12yrno                 0.88415
## famsize:alcoholfrq                   0.66780
## famsize:log.grocery                  0.56022
## famsize:log.eatout                   0.46621
## famsize:log.delivery                 0.09291 .
## famsize:milkrare                     0.73856
## famsize:milksometimes                0.13948
## famsize:milkoften                     0.67340
## famsize:milkvaried                  NA
## famsize:meals_nothome                0.50757

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## famsize:meals_fastfood	0.85713
## famsize:depressedsometimes	0.00547 **
## famsize:depressedoften	0.01103 *
## famsize:depresseddalwyas	0.00779 **
## famsize:sleep_troublesometimes	0.86846
## famsize:sleep_troubleoften	0.56368
## famsize:sleep_troublealways	0.80214
## famsize:activityNo	0.24942
## famsize:tv_hours2~4hrs	0.09322 .
## famsize:tv_hours5hrs	0.16389
## famsize:tv_hours0hr	0.47049
## famsize:sleep_hr	0.23421
## famsize:smokesometimes	0.02784 *
## famsize:smokeno	0.60427
## famsize:smokemissing	0.44582
## famsize:I(sleep_hr^2)	0.20203
## famincome25k~55k:alcohol12yrno	0.89500
## famincome55k~75k:alcohol12yrno	0.40701
## famincome75k~100k:alcohol12yrno	0.05408 .
## famincomeabove 100k:alcohol12yrno	0.01045 *
## famincome25k~55k:alcoholfrq	0.37364
## famincome55k~75k:alcoholfrq	0.21462
## famincome75k~100k:alcoholfrq	0.50563
## famincomeabove 100k:alcoholfrq	0.21367
## famincome25k~55k:log.grocery	0.70353
## famincome55k~75k:log.grocery	0.71838
## famincome75k~100k:log.grocery	0.08982 .
## famincomeabove 100k:log.grocery	0.35849
## famincome25k~55k:log.eatout	0.11676
## famincome55k~75k:log.eatout	0.62513
## famincome75k~100k:log.eatout	0.91064
## famincomeabove 100k:log.eatout	0.99224
## famincome25k~55k:log.delivery	0.49711
## famincome55k~75k:log.delivery	0.56939
## famincome75k~100k:log.delivery	0.69685
## famincomeabove 100k:log.delivery	0.83247
## famincome25k~55k:milkraре	0.44008
## famincome55k~75k:milkraре	0.85522
## famincome75k~100k:milkraре	0.04984 *
## famincomeabove 100k:milkraре	0.33558
## famincome25k~55k:milksometimes	0.65238
## famincome55k~75k:milksometimes	0.09644 .
## famincome75k~100k:milksometimes	0.52070
## famincomeabove 100k:milksometimes	0.66316
## famincome25k~55k:milkoften	0.64962
## famincome55k~75k:milkoften	0.14095
## famincome75k~100k:milkoften	0.93219
## famincomeabove 100k:milkoften	0.72729

## famincome25k~55k:milkvaried	NA
## famincome55k~75k:milkvaried	NA
## famincome75k~100k:milkvaried	NA
## famincomeabove 100k:milkvaried	NA
## famincome25k~55k:meals_nothome	0.99266
## famincome55k~75k:meals_nothome	0.14563
## famincome75k~100k:meals_nothome	0.84510
## famincomeabove 100k:meals_nothome	0.48173
## famincome25k~55k:meals_fastfood	0.83906
## famincome55k~75k:meals_fastfood	0.67006
## famincome75k~100k:meals_fastfood	0.50781
## famincomeabove 100k:meals_fastfood	0.42923
## famincome25k~55k:depressedsometimes	0.89355
## famincome55k~75k:depressedsometimes	0.48594
## famincome75k~100k:depressedsometimes	0.83291
## famincomeabove 100k:depressedsometimes	0.78518
## famincome25k~55k:depressedoften	0.52947
## famincome55k~75k:depressedoften	0.01023 *
## famincome75k~100k:depressedoften	0.38154
## famincomeabove 100k:depressedoften	0.08030 .
## famincome25k~55k:depressedalwyas	0.33409
## famincome55k~75k:depressedalwyas	0.91023
## famincome75k~100k:depressedalwyas	0.31603
## famincomeabove 100k:depressedalwyas	0.02314 *
## famincome25k~55k:sleep_troublesometimes	0.45724
## famincome55k~75k:sleep_troublesometimes	0.75352
## famincome75k~100k:sleep_troublesometimes	0.37079
## famincomeabove 100k:sleep_troublesometimes	0.93250
## famincome25k~55k:sleep_troubleoften	0.83222
## famincome55k~75k:sleep_troubleoften	0.35424
## famincome75k~100k:sleep_troubleoften	0.19474
## famincomeabove 100k:sleep_troubleoften	0.87009
## famincome25k~55k:sleep_troublealways	0.14730
## famincome55k~75k:sleep_troublealways	0.27674
## famincome75k~100k:sleep_troublealways	0.90294
## famincomeabove 100k:sleep_troublealways	0.06599 .
## famincome25k~55k:activityNo	0.90087
## famincome55k~75k:activityNo	0.68164
## famincome75k~100k:activityNo	0.36140
## famincomeabove 100k:activityNo	0.61057
## famincome25k~55k:tv_hrs2~4hrs	0.99222
## famincome55k~75k:tv_hrs2~4hrs	0.38362
## famincome75k~100k:tv_hrs2~4hrs	0.38562
## famincomeabove 100k:tv_hrs2~4hrs	0.03873 *
## famincome25k~55k:tv_hrs5hrs	0.82396
## famincome55k~75k:tv_hrs5hrs	0.46162
## famincome75k~100k:tv_hrs5hrs	0.18098
## famincomeabove 100k:tv_hrs5hrs	0.41962

## famincome25k~55k:tv_hours0hr	0.46040
## famincome55k~75k:tv_hours0hr	0.12326
## famincome75k~100k:tv_hours0hr	0.69513
## famincomeabove 100k:tv_hours0hr	0.38412
## famincome25k~55k:sleep_hr	0.03894 *
## famincome55k~75k:sleep_hr	0.36002
## famincome75k~100k:sleep_hr	0.32607
## famincomeabove 100k:sleep_hr	0.08775 .
## famincome25k~55k:smokesometimes	0.83860
## famincome55k~75k:smokesometimes	0.37851
## famincome75k~100k:smokesometimes	0.03659 *
## famincomeabove 100k:smokesometimes	0.18235
## famincome25k~55k:smokeno	0.68284
## famincome55k~75k:smokeno	0.11839
## famincome75k~100k:smokeno	0.39241
## famincomeabove 100k:smokeno	0.18188
## famincome25k~55k:smokemissing	0.75704
## famincome55k~75k:smokemissing	0.27437
## famincome75k~100k:smokemissing	0.53413
## famincomeabove 100k:smokemissing	0.08215 .
## famincome25k~55k:I(sleep_hr^2)	0.03502 *
## famincome55k~75k:I(sleep_hr^2)	0.38068
## famincome75k~100k:I(sleep_hr^2)	0.33394
## famincomeabove 100k:I(sleep_hr^2)	0.06751 .
## alcohol12yrno:alcoholfrq	0.05187 .
## alcohol12yrno:log.grocery	0.74504
## alcohol12yrno:log.eatout	0.40151
## alcohol12yrno:log.delivery	0.95582
## alcohol12yrno:milk rarely	0.06678 .
## alcohol12yrno:milksometimes	0.65798
## alcohol12yrno:milkoften	0.40601
## alcohol12yrno:milkvaried	NA
## alcohol12yrno:meals_nothome	0.12559
## alcohol12yrno:meals_fastfood	0.03856 *
## alcohol12yrno:depressedsometimes	0.03438 *
## alcohol12yrno:depressedoften	0.01209 *
## alcohol12yrno:depressedalways	0.00620 **
## alcohol12yrno:sleep_troublesometimes	0.11542
## alcohol12yrno:sleep_troubleoften	0.98038
## alcohol12yrno:sleep_troublealways	0.93722
## alcohol12yrno:activityNo	0.65491
## alcohol12yrno:tv_hours2~4hrs	0.57131
## alcohol12yrno:tv_hours5hrs	0.96109
## alcohol12yrno:tv_hours0hr	0.91288
## alcohol12yrno:sleep_hr	0.90655
## alcohol12yrno:smokesometimes	0.24857
## alcohol12yrno:smokeno	0.41430
## alcohol12yrno:smokemissing	0.62148

## alcohol12yrno:I(sleep_hr^2)	0.85591
## alcoholfrq:log.grocery	0.09021 .
## alcoholfrq:log.eatout	0.61736
## alcoholfrq:log.delivery	0.44183
## alcoholfrq:milkrare	0.37951
## alcoholfrq:milksometimes	0.83514
## alcoholfrq:milkoften	0.22872
## alcoholfrq:milkvaried	NA
## alcoholfrq:meals_nothome	0.69897
## alcoholfrq:meals_fastfood	0.95767
## alcoholfrq:depressedsometimes	0.07415 .
## alcoholfrq:depressedoften	0.21742
## alcoholfrq:depressedalwyas	0.58182
## alcoholfrq:sleep_troublesometimes	0.91075
## alcoholfrq:sleep_troubleoften	0.50249
## alcoholfrq:sleep_troublealways	0.35108
## alcoholfrq:activityNo	0.28698
## alcoholfrq:tv_hours2~4hrs	0.71250
## alcoholfrq:tv_hours5hrs	0.41158
## alcoholfrq:tv_hours0hr	0.66847
## alcoholfrq:sleep_hr	0.23287
## alcoholfrq:smokesometimes	0.60052
## alcoholfrq:smokeno	0.17927
## alcoholfrq:smokemissing	0.07579 .
## alcoholfrq:I(sleep_hr^2)	0.14950
## log.grocery:log.eatout	0.95178
## log.grocery:log.delivery	0.97146
## log.grocery:milkrare	0.63158
## log.grocery:milksometimes	0.67901
## log.grocery:milkoften	0.86810
## log.grocery:milkvaried	NA
## log.grocery:meals_nothome	0.48090
## log.grocery:meals_fastfood	0.30069
## log.grocery:depressedsometimes	0.51785
## log.grocery:depressedoften	0.79377
## log.grocery:depressedalwyas	0.76768
## log.grocery:sleep_troublesometimes	0.50320
## log.grocery:sleep_troubleoften	0.11364
## log.grocery:sleep_troublealways	0.67111
## log.grocery:activityNo	0.68818
## log.grocery:tv_hours2~4hrs	0.97233
## log.grocery:tv_hours5hrs	0.26276
## log.grocery:tv_hours0hr	0.28961
## log.grocery:sleep_hr	0.53376
## log.grocery:smokesometimes	0.91209
## log.grocery:smokeno	0.79734
## log.grocery:smokemissing	0.26249
## log.grocery:I(sleep_hr^2)	0.57002

## log.eatout:log.delivery	0.81314
## log.eatout:milkrare	0.74770
## log.eatout:milksometimes	0.51850
## log.eatout:milkoften	0.56758
## log.eatout:milkvaried	NA
## log.eatout:meals_nothome	0.38159
## log.eatout:meals_fastfood	0.89899
## log.eatout:depressedsometimes	0.56899
## log.eatout:depressedoften	0.34304
## log.eatout:depresseddalwyas	0.25008
## log.eatout:sleep_troublesometimes	0.62329
## log.eatout:sleep_troubleoften	0.37355
## log.eatout:sleep_troublealways	0.16200
## log.eatout:activityNo	0.54409
## log.eatout:tv_hrs2~4hrs	0.10870
## log.eatout:tv_hrs5hrs	0.39615
## log.eatout:tv_hrs0hr	0.52841
## log.eatout:sleep_hr	0.29492
## log.eatout:smokesometimes	0.89516
## log.eatout:smokeno	0.22720
## log.eatout:smokemissing	0.85315
## log.eatout:I(sleep_hr^2)	0.36074
## log.delivery:milkrare	0.24540
## log.delivery:milksometimes	0.44068
## log.delivery:milkoften	0.08286 .
## log.delivery:milkvaried	NA
## log.delivery:meals_nothome	0.47436
## log.delivery:meals_fastfood	0.96627
## log.delivery:depressedsometimes	0.91130
## log.delivery:depressedoften	0.17733
## log.delivery:depresseddalwyas	0.11824
## log.delivery:sleep_troublesometimes	0.92754
## log.delivery:sleep_troubleoften	0.06658 .
## log.delivery:sleep_troublealways	0.94387
## log.delivery:activityNo	0.96882
## log.delivery:tv_hrs2~4hrs	0.44899
## log.delivery:tv_hrs5hrs	0.42830
## log.delivery:tv_hrs0hr	0.03477 *
## log.delivery:sleep_hr	0.87133
## log.delivery:smokesometimes	0.48448
## log.delivery:smokeno	0.48151
## log.delivery:smokemissing	0.39607
## log.delivery:I(sleep_hr^2)	0.95807
## milkrare:meals_nothome	0.21766
## milksometimes:meals_nothome	0.95593
## milkoften:meals_nothome	0.96629
## milkvaried:meals_nothome	NA
## milkrare:meals_fastfood	0.25810

## milksometimes:meals_fastfood	0.53979
## milkoften:meals_fastfood	0.71457
## milkvaried:meals_fastfood	NA
## milkrare:depressedsometimes	0.16393
## milksometimes:depressedsometimes	0.72465
## milkoften:depressedsometimes	0.33919
## milkvaried:depressedsometimes	NA
## milkrare:depressedoften	0.17687
## milksometimes:depressedoften	0.31352
## milkoften:depressedoften	0.37839
## milkvaried:depressedoften	NA
## milkrare:depressedalwyas	0.38867
## milksometimes:depressedalwyas	0.50533
## milkoften:depressedalwyas	0.20130
## milkvaried:depressedalwyas	NA
## milkrare:sleep_troublesometimes	0.22942
## milksometimes:sleep_troublesometimes	0.87383
## milkoften:sleep_troublesometimes	0.66198
## milkvaried:sleep_troublesometimes	NA
## milkrare:sleep_troubleoften	0.38042
## milksometimes:sleep_troubleoften	0.44138
## milkoften:sleep_troubleoften	0.27136
## milkvaried:sleep_troubleoften	NA
## milkrare:sleep_troublealways	0.43626
## milksometimes:sleep_troublealways	0.53489
## milkoften:sleep_troublealways	0.33171
## milkvaried:sleep_troublealways	NA
## milkrare:activityNo	0.64948
## milksometimes:activityNo	0.49728
## milkoften:activityNo	0.66138
## milkvaried:activityNo	NA
## milkrare:tv_hrs2~4hrs	0.72826
## milksometimes:tv_hrs2~4hrs	0.65712
## milkoften:tv_hrs2~4hrs	0.66847
## milkvaried:tv_hrs2~4hrs	NA
## milkrare:tv_hrs5hrs	0.45293
## milksometimes:tv_hrs5hrs	0.25806
## milkoften:tv_hrs5hrs	0.23333
## milkvaried:tv_hrs5hrs	NA
## milkrare:tv_hrs0hr	0.81503
## milksometimes:tv_hrs0hr	0.97335
## milkoften:tv_hrs0hr	0.43107
## milkvaried:tv_hrs0hr	NA
## milkrare:sleep_hr	0.12138
## milksometimes:sleep_hr	0.43634
## milkoften:sleep_hr	0.84663
## milkvaried:sleep_hr	NA
## milkrare:smokesometimes	0.84989

## milksometimes:smokesometimes	0.86659
## milkoften:smokesometimes	0.97552
## milkvaried:smokesometimes	NA
## milkrare:smokeno	0.69735
## milksometimes:smokeno	0.17984
## milkoften:smokeno	0.62493
## milkvaried:smokeno	NA
## milkrare:smokemissing	0.99845
## milksometimes:smokemissing	0.27483
## milkoften:smokemissing	0.86608
## milkvaried:smokemissing	NA
## milkrare:I(sleep_hr^2)	0.17429
## milksometimes:I(sleep_hr^2)	0.48161
## milkoften:I(sleep_hr^2)	0.82744
## milkvaried:I(sleep_hr^2)	NA
## meals_nothome:meals_fastfood	0.87118
## meals_nothome:depressedsometimes	0.92571
## meals_nothome:depressedoftentimes	0.07185 .
## meals_nothome:depresseddalwyas	0.40393
## meals_nothome:sleep_troublesometimes	0.76942
## meals_nothome:sleep_troubleoften	0.20508
## meals_nothome:sleep_troublealways	0.89568
## meals_nothome:activityNo	0.70625
## meals_nothome:tv_hours2~4hrs	0.25628
## meals_nothome:tv_hours5hrs	0.09107 .
## meals_nothome:tv_hours0hr	0.38091
## meals_nothome:sleep_hr	0.94990
## meals_nothome:smokesometimes	0.76378
## meals_nothome:smokeno	0.95448
## meals_nothome:smokemissing	0.38766
## meals_nothome:I(sleep_hr^2)	0.98522
## meals_fastfood:depressedsometimes	0.35793
## meals_fastfood:depressedoftentimes	0.61754
## meals_fastfood:depresseddalwyas	0.84076
## meals_fastfood:sleep_troublesometimes	0.34002
## meals_fastfood:sleep_troubleoften	0.58281
## meals_fastfood:sleep_troublealways	0.03453 *
## meals_fastfood:activityNo	0.17182
## meals_fastfood:tv_hours2~4hrs	0.57325
## meals_fastfood:tv_hours5hrs	0.14655
## meals_fastfood:tv_hours0hr	0.09310 .
## meals_fastfood:sleep_hr	0.82743
## meals_fastfood:smokesometimes	0.21030
## meals_fastfood:smokeno	0.42664
## meals_fastfood:smokemissing	0.26981
## meals_fastfood:I(sleep_hr^2)	0.89843
## depressedsometimes:sleep_troublesometimes	0.07906 .
## depressedoften:sleep_troublesometimes	0.46476

## depresseddalwyas:sleep_troublesometimes	0.60253
## depressedsometimes:sleep_troubleoften	0.77269
## depressedoften:sleep_troubleoften	0.95717
## depresseddalwyas:sleep_troubleoften	0.97596
## depressedsometimes:sleep_troublealways	0.74306
## depressedoften:sleep_troublealways	0.07211 .
## depresseddalwyas:sleep_troublealways	0.46205
## depressedsometimes:activityNo	0.55274
## depressedoften:activityNo	0.62125
## depresseddalwyas:activityNo	0.67584
## depressedsometimes:tv_hrs2~4hrs	0.15300
## depressedoften:tv_hrs2~4hrs	0.33261
## depresseddalwyas:tv_hrs2~4hrs	0.80566
## depressedsometimes:tv_hrs5hrs	0.15688
## depressedoften:tv_hrs5hrs	0.57954
## depresseddalwyas:tv_hrs5hrs	0.22644
## depressedsometimes:tv_hrs0hr	0.74045
## depressedoften:tv_hrs0hr	0.20596
## depresseddalwyas:tv_hrs0hr	0.05719 .
## depressedsometimes:sleep_hr	0.16656
## depressedoften:sleep_hr	0.78894
## depresseddalwyas:sleep_hr	0.94203
## depressedsometimes:smokesometimes	0.48807
## depressedoften:smokesometimes	0.36150
## depresseddalwyas:smokesometimes	0.92967
## depressedsometimes:smokeno	0.21745
## depressedoften:smokeno	0.54527
## depresseddalwyas:smokeno	0.78625
## depressedsometimes:smokemissing	0.74283
## depressedoften:smokemissing	0.16609
## depresseddalwyas:smokemissing	0.14207
## depressedsometimes:I(sleep_hr^2)	0.16393
## depressedoften:I(sleep_hr^2)	0.48486
## depresseddalwyas:I(sleep_hr^2)	0.91547
## sleep_troublesometimes:activityNo	0.20384
## sleep_troubleoften:activityNo	0.82712
## sleep_troublealways:activityNo	0.70915
## sleep_troublesometimes:tv_hrs2~4hrs	0.93271
## sleep_troubleoften:tv_hrs2~4hrs	0.46522
## sleep_troublealways:tv_hrs2~4hrs	0.30644
## sleep_troublesometimes:tv_hrs5hrs	0.54969
## sleep_troubleoften:tv_hrs5hrs	0.29681
## sleep_troublealways:tv_hrs5hrs	0.94315
## sleep_troublesometimes:tv_hrs0hr	0.24795
## sleep_troubleoften:tv_hrs0hr	0.19329
## sleep_troublealways:tv_hrs0hr	0.19524
## sleep_troublesometimes:sleep_hr	0.38167
## sleep_troubleoften:sleep_hr	0.88273

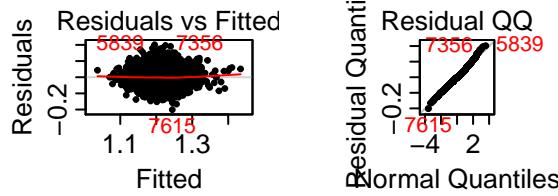
```

## sleep_troublealways:sleep_hr          0.87932
## sleep_troublesometimes:smokesometimes 0.03668 *
## sleep_troubleoften:smokesometimes     0.74702
## sleep_troublealways:smokesometimes    0.15448
## sleep_troublesometimes:smokeno        0.24440
## sleep_troubleoften:smokeno           0.05183 .
## sleep_troublealways:smokeno          0.42587
## sleep_troublesometimes:smokemissing   0.08861 .
## sleep_troubleoften:smokemissing       0.45361
## sleep_troublealways:smokemissing      0.25111
## sleep_troublesometimes:I(sleep_hr^2)  0.31208
## sleep_troubleoften:I(sleep_hr^2)       0.98589
## sleep_troublealways:I(sleep_hr^2)      0.92743
## activityNo:tv_hours2~4hrs            0.51992
## activityNo:tv_hours5hrs              0.92088
## activityNo:tv_hours0hr               0.45287
## activityNo:sleep_hr                 0.47980
## activityNo:smokesometimes           0.66532
## activityNo:smokeno                  0.31950
## activityNo:smokemissing             0.14832
## activityNo:I(sleep_hr^2)             0.46275
## tv_hours2~4hrs:sleep_hr            0.21214
## tv_hours5hrs:sleep_hr              0.31572
## tv_hours0hr:sleep_hr               0.77887
## tv_hours2~4hrs:smokesometimes      0.06105 .
## tv_hours5hrs:smokesometimes         0.13222
## tv_hours0hr:smokesometimes         0.85464
## tv_hours2~4hrs:smokeno             0.76014
## tv_hours5hrs:smokeno               0.40908
## tv_hours0hr:smokeno                0.76466
## tv_hours2~4hrs:smokemissing         0.37949
## tv_hours5hrs:smokemissing          0.84083
## tv_hours0hr:smokemissing           0.31910
## tv_hours2~4hrs:I(sleep_hr^2)        0.13931
## tv_hours5hrs:I(sleep_hr^2)          0.28101
## tv_hours0hr:I(sleep_hr^2)           0.73414
## sleep_hr:smokesometimes            0.08317 .
## sleep_hr:smokeno                  0.69935
## sleep_hr:smokemissing              0.81891
## sleep_hr:I(sleep_hr^2)              0.65737
## smokesometimes:I(sleep_hr^2)         0.12437
## smokeno:I(sleep_hr^2)                0.49665
## smokemissing:I(sleep_hr^2)           0.62354
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.06141 on 2082 degrees of freedom
## Multiple R-squared:  0.416,  Adjusted R-squared:  0.1703

```

```
## F-statistic: 1.693 on 876 and 2082 DF, p-value: < 2.2e-16
```

Full int...



```
## [1] "Full interaction model cv results:"
```

```
## [1] "RMSE: 0.10828100395133 Rsquared: 0.00792280241585269"
```

```
# Based on model1, add interaction terms between famsize and (famincome, log.grocery, log.eatout and log.delivery)
model1b = lm(update.formula(base_form, . ~ . + famsize * (famincome + log.grocery + log.eatout + log.delivery)))
summary(model1b)
```

```
##
```

```
## Call:
```

```
## lm(formula = update.formula(base_form, . ~ . + famsize * (famincome +
##     log.grocery + log.eatout + log.delivery)), data = df_adult)
```

```
##
```

```
## Residuals:
```

```
##      Min        1Q    Median        3Q       Max
## -0.209609 -0.042518 -0.001918  0.038004  0.251493
```

```
##
```

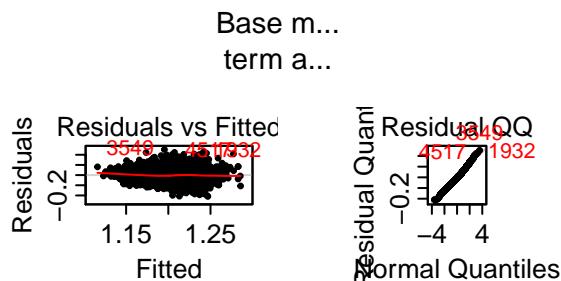
```
## Coefficients:
```

	Estimate	Std. Error	t value	Pr(> t)
## (Intercept)	1.172e+00	1.754e-02	66.848	< 2e-16 ***
## genderfemale	6.408e-03	2.547e-03	2.516	0.01193 *
## age	7.272e-06	9.150e-05	0.079	0.93666
## raceother hispanic	-2.008e-02	5.460e-03	-3.677	0.00024 ***
## racewhite	-1.809e-02	4.145e-03	-4.366	1.31e-05 ***
## raceblack	-6.803e-03	4.631e-03	-1.469	0.14188
## raceasian	-5.624e-02	5.657e-03	-9.943	< 2e-16 ***
## raceother	-1.419e-02	7.690e-03	-1.846	0.06505 .
## eduhs	6.189e-03	4.094e-03	1.511	0.13078
## eduabove hs	8.169e-03	3.843e-03	2.125	0.03364 *
## marriagewidowed	-8.811e-03	5.835e-03	-1.510	0.13114
## marrieddivorced	1.416e-03	3.747e-03	0.378	0.70552
## marriagenever_married	-6.349e-03	3.693e-03	-1.719	0.08568 .
## famsize	1.549e-03	4.431e-03	0.350	0.72671
## famincome25k~55k	-3.448e-04	6.063e-03	-0.057	0.95465
## famincome55k~75k	-1.083e-02	8.797e-03	-1.231	0.21845
## famincome75k~100k	-4.531e-03	9.952e-03	-0.455	0.64891
## famincomeabove 100k	-1.931e-02	8.424e-03	-2.292	0.02196 *
## alcohol12yrno	4.568e-03	3.577e-03	1.277	0.20168
## alcoholfrq	-1.561e-04	6.714e-05	-2.324	0.02017 *
## log.grocery	3.137e-03	2.340e-03	1.341	0.18015

```

## log.eatout          2.197e-04  1.673e-03  0.131  0.89557
## log.delivery        -1.679e-03 1.300e-03 -1.292  0.19663
## milkrare           8.252e-03  3.977e-03  2.075  0.03811 *
## milksometimes      1.019e-02  3.582e-03  2.846  0.00446 **
## milkoften          3.346e-03  3.529e-03  0.948  0.34320
## milkvaried         5.503e-02  2.159e-02  2.549  0.01085 *
## meals_nothome       3.887e-05  4.140e-04  0.094  0.92521
## meals_fastfood      7.890e-04  5.690e-04  1.387  0.16565
## depressedsometimes -2.092e-04  3.311e-03 -0.063  0.94963
## depressedoften      2.135e-02  6.625e-03  3.222  0.00129 **
## depresseddalwyas    8.538e-03  6.976e-03  1.224  0.22113
## sleep_troublesometimes -2.479e-04  2.986e-03 -0.083  0.93386
## sleep_troubleoften   6.576e-03  5.102e-03  1.289  0.19759
## sleep_troublealways  9.998e-03  4.616e-03  2.166  0.03040 *
## activityNo          5.708e-03  2.452e-03  2.328  0.01998 *
## tv_hrs2~4hrs         1.634e-02  2.859e-03  5.717  1.19e-08 ***
## tv_hrs5hrs          2.755e-02  4.116e-03  6.693  2.62e-11 ***
## tv_hrs0hr            1.469e-02  8.731e-03  1.683  0.09255 .
## sleep_hr             -1.531e-03  8.885e-04 -1.723  0.08503 .
## smokesometimes       6.450e-03  6.568e-03  0.982  0.32615
## smokeno              2.348e-02  3.949e-03  5.946  3.08e-09 ***
## smokemissing         1.651e-02  3.677e-03  4.489  7.42e-06 ***
## famsize:famincome25k~55k 1.460e-03  1.858e-03  0.786  0.43200
## famsize:famincome55k~75k 3.285e-03  2.675e-03  1.228  0.21952
## famsize:famincome75k~100k 7.298e-04  2.837e-03  0.257  0.79700
## famsize:famincomeabove 100k 2.099e-03  2.359e-03  0.890  0.37368
## famsize:log.grocery   -8.507e-04  6.742e-04 -1.262  0.20714
## famsize:log.eatout     5.918e-04  4.662e-04  1.269  0.20439
## famsize:log.delivery   3.596e-04  3.639e-04  0.988  0.32311
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.06387 on 2909 degrees of freedom
## Multiple R-squared:  0.1174, Adjusted R-squared:  0.1026
## F-statistic:  7.9 on 49 and 2909 DF,  p-value: < 2.2e-16
plotres(model1b, which=3:4, caption = "Base model plus family interaction \n term assumption check")

```



```

## 
## Call:

```

```

## lm(formula = log2.bmi ~ race + tv_hrs + smoke + depressed + milk +
##      famincome + gender + log.eatout + activity + alcoholfrq +
##      marriage + meals_fastfood + sleep_trouble + tv_hrs:depressed +
##      famincome:gender + race:gender + smoke:gender + race:activity +
##      smoke:marriage + race:meals_fastfood + gender:meals_fastfood +
##      depressed:milk + tv_hrs:log.eatout, data = df_adult)
##
## Residuals:
##       Min     1Q   Median     3Q    Max 
## -0.200795 -0.040473 -0.002891  0.037567  0.219548
##
## Coefficients: (2 not defined because of singularities)
##                                     Estimate Std. Error t value
## (Intercept)                   1.148e+00  1.215e-02 94.550
## raceother hispanic          -6.377e-03  1.051e-02 -0.607
## racewhite                     -1.149e-02  7.842e-03 -1.465
## raceblack                     1.110e-02  8.875e-03  1.251
## raceasian                     -2.578e-02  1.012e-02 -2.548
## raceother                     2.100e-02  1.562e-02  1.344
## tv_hrs2~4hrs                 2.176e-02  9.357e-03  2.326
## tv_hrs5hrs                   7.280e-03  1.153e-02  0.631
## tv_hrs0hr                     1.184e-02  2.673e-02  0.443
## smokesometimes                -5.033e-03  1.018e-02 -0.494
## smokeno                       3.052e-02  5.810e-03  5.254
## smokemissing                  3.314e-02  5.636e-03  5.880
## depressedsometimes             -1.944e-02  9.465e-03 -2.054
## depressedoften                 -1.178e-02  1.770e-02 -0.666
## depresseddalwyas              7.267e-03  2.083e-02  0.349
## milkrare                      5.320e-03  4.487e-03  1.186
## milksometimes                 8.312e-03  4.003e-03  2.076
## milkoften                      1.192e-04  3.950e-03  0.030
## milkvaried                     5.257e-02  2.242e-02  2.344
## famincome25k~55k               1.041e-02  4.465e-03  2.332
## famincome55k~75k               6.884e-03  5.673e-03  1.213
## famincome75k~100k              7.329e-03  6.120e-03  1.198
## famincomeabove 100k            2.493e-03  5.163e-03  0.483
## genderfemale                   3.552e-02  9.897e-03  3.589
## log.eatout                     3.181e-03  1.595e-03  1.994
## activityNo                     1.815e-02  6.950e-03  2.611
## alcoholfrq                     -1.759e-04  6.576e-05 -2.674
## marriagewidowed                -2.478e-02  1.886e-02 -1.314
## marriagedivorced               9.006e-03  7.573e-03  1.189
## marriagenever_married         -1.730e-03  7.144e-03 -0.242
## meals_fastfood                  8.205e-04  1.207e-03  0.680
## sleep_troublesometimes          8.224e-05  2.936e-03  0.028
## sleep_troubleoften              8.354e-03  4.983e-03  1.677
## sleep_troublealways             9.883e-03  4.490e-03  2.201
## tv_hrs2~4hrs:depressedsometimes 8.323e-03  7.516e-03  1.107

```

## tv_hrs5hrs:depressedsometimes	1.577e-02	9.635e-03	1.636
## tv_hrs0hr:depressedsometimes	3.996e-02	2.244e-02	1.781
## tv_hrs2~4hrs:depressedoften	1.555e-02	1.575e-02	0.987
## tv_hrs5hrs:depressedoften	7.323e-02	2.011e-02	3.640
## tv_hrs0hr:depressedoften	2.634e-03	2.919e-02	0.090
## tv_hrs2~4hrs:depresseddalwyas	-1.618e-02	1.735e-02	-0.933
## tv_hrs5hrs:depresseddalwyas	-1.862e-02	1.884e-02	-0.988
## tv_hrs0hr:depresseddalwyas	-6.512e-02	6.578e-02	-0.990
## famincome25k~55k:genderfemale	-1.037e-02	6.296e-03	-1.648
## famincome55k~75k:genderfemale	-1.300e-02	8.367e-03	-1.554
## famincome75k~100k:genderfemale	-1.710e-02	8.864e-03	-1.929
## famincomeabove 100k:genderfemale	-2.853e-02	7.044e-03	-4.050
## raceother hispanic:genderfemale	-1.402e-02	1.084e-02	-1.293
## racewhite:genderfemale	-8.346e-03	7.754e-03	-1.076
## raceblack:genderfemale	8.942e-03	8.740e-03	1.023
## raceasian:genderfemale	-2.434e-02	1.083e-02	-2.248
## raceother:genderfemale	-2.078e-02	1.569e-02	-1.324
## smokesometimes:genderfemale	-2.045e-03	1.334e-02	-0.153
## smokeno:genderfemale	-4.893e-03	7.585e-03	-0.645
## smokemissing:genderfemale	-2.318e-02	7.008e-03	-3.308
## raceother hispanic:activityNo	-1.373e-02	1.077e-02	-1.275
## racewhite:activityNo	-7.821e-03	7.703e-03	-1.015
## raceblack:activityNo	-2.208e-02	8.838e-03	-2.498
## raceasian:activityNo	-3.017e-02	1.062e-02	-2.842
## raceother:activityNo	-1.405e-02	1.512e-02	-0.929
## smokesometimes:marriagewidowed	2.820e-02	3.554e-02	0.793
## smokeno:marriagewidowed	-3.129e-03	2.063e-02	-0.152
## smokemissing:marriagewidowed	3.382e-02	2.023e-02	1.672
## smokesometimes:marriagedivorced	2.225e-02	1.785e-02	1.247
## smokeno:marriagedivorced	-1.047e-02	9.743e-03	-1.075
## smokemissing:marriagedivorced	-1.556e-02	9.094e-03	-1.711
## smokesometimes:marriagenever_married	2.818e-02	1.527e-02	1.845
## smokeno:marriagenever_married	4.362e-03	1.032e-02	0.423
## smokemissing:marriagenever_married	-1.494e-02	8.293e-03	-1.802
## raceother hispanic:meals_fastfood	9.099e-04	1.922e-03	0.473
## racewhite:meals_fastfood	8.098e-04	1.332e-03	0.608
## raceblack:meals_fastfood	-3.007e-03	1.432e-03	-2.101
## raceasian:meals_fastfood	-1.690e-03	2.511e-03	-0.673
## raceother:meals_fastfood	-4.747e-03	2.427e-03	-1.956
## genderfemale:meals_fastfood	2.647e-03	9.281e-04	2.852
## depressedsometimes:milkRare	1.830e-02	1.047e-02	1.749
## depressedoften:milkRare	-6.829e-03	2.010e-02	-0.340
## depresseddalwyas:milkRare	3.656e-02	2.106e-02	1.736
## depressedsometimes:milkSometimes	7.195e-03	9.558e-03	0.753
## depressedoften:milkSometimes	3.048e-02	1.904e-02	1.601
## depresseddalwyas:milkSometimes	-1.515e-02	1.937e-02	-0.782
## depressedsometimes:milkOften	1.525e-02	9.384e-03	1.625
## depressedoften:milkOften	2.109e-02	1.767e-02	1.193

## depresseddalwyas:milkoften	3.418e-02	1.905e-02	1.794
## depressedsometimes:milkvaried	1.003e-01	6.727e-02	1.491
## depressedoften:milkvaried	NA	NA	NA
## depresseddalwyas:milkvaried	NA	NA	NA
## tv_hrs2~4hrs:log.eatout	-1.934e-03	1.863e-03	-1.038
## tv_hrs5hrs:log.eatout	3.814e-03	2.370e-03	1.609
## tv_hrs0hr:log.eatout	-3.707e-04	5.890e-03	-0.063
##	Pr(> t)		
## (Intercept)	< 2e-16 ***		
## raceother hispanic	0.543892		
## racewhite	0.142916		
## raceblack	0.210948		
## raceasian	0.010872 *		
## raceother	0.178922		
## tv_hrs2~4hrs	0.020088 *		
## tv_hrs5hrs	0.527863		
## tv_hrs0hr	0.657737		
## smokesometimes	0.621020		
## smokeno	1.60e-07 ***		
## smokemissing	4.58e-09 ***		
## depressedsometimes	0.040052 *		
## depressedoften	0.505640		
## depresseddalwyas	0.727259		
## milkrare	0.235859		
## milksometimes	0.037947 *		
## milkoften	0.975925		
## milkvaried	0.019130 *		
## famincome25k~55k	0.019794 *		
## famincome55k~75k	0.225075		
## famincome75k~100k	0.231208		
## famincomeabove 100k	0.629275		
## genderfemale	0.000338 ***		
## log.eatout	0.046259 *		
## activityNo	0.009063 **		
## alcoholfrq	0.007533 **		
## marriagewidowed	0.189031		
## marrieddivorced	0.234445		
## marriagenever_married	0.808701		
## meals_fastfood	0.496494		
## sleep_troublesometimes	0.977659		
## sleep_troubleoften	0.093744 .		
## sleep_troublealways	0.027823 *		
## tv_hrs2~4hrs:depressedsometimes	0.268203		
## tv_hrs5hrs:depressedsometimes	0.101873		
## tv_hrs0hr:depressedsometimes	0.075022 .		
## tv_hrs2~4hrs:depressedoften	0.323580		
## tv_hrs5hrs:depressedoften	0.000277 ***		
## tv_hrs0hr:depressedoften	0.928104		

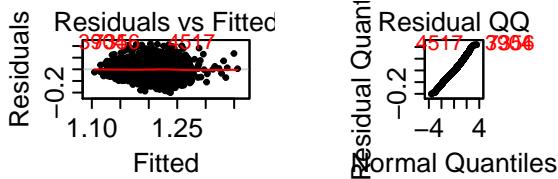
## tv_hrs2~4hrs:depresseddalwyas	0.351029
## tv_hrs5hrs:depresseddalwyas	0.323085
## tv_hrs0hr:depresseddalwyas	0.322296
## famincome25k~55k:genderfemale	0.099523 .
## famincome55k~75k:genderfemale	0.120323
## famincome75k~100k:genderfemale	0.053776 .
## famincomeabove 100k:genderfemale	5.25e-05 ***
## raceother hispanic:genderfemale	0.195981
## racewhite:genderfemale	0.281832
## raceblack:genderfemale	0.306336
## raceasian:genderfemale	0.024639 *
## raceother:genderfemale	0.185608
## smokesometimes:genderfemale	0.878136
## smokeno:genderfemale	0.518889
## smokemissing:genderfemale	0.000952 ***
## raceother hispanic:activityNo	0.202484
## racewhite:activityNo	0.310063
## raceblack:activityNo	0.012535 *
## raceasian:activityNo	0.004516 **
## raceother:activityNo	0.352884
## smokesometimes:marriagewidowed	0.427572
## smokeno:marriagewidowed	0.879435
## smokemissing:marriagewidowed	0.094677 .
## smokesometimes:marriagedivorced	0.212546
## smokeno:marriagedivorced	0.282530
## smokemissing:marriagedivorced	0.087206 .
## smokesometimes:marriagenever_married	0.065179 .
## smokeno:marriagenever_married	0.672569
## smokemissing:marriagenever_married	0.071681 .
## raceother hispanic:meals_fastfood	0.635912
## racewhite:meals_fastfood	0.543311
## raceblack:meals_fastfood	0.035759 *
## raceasian:meals_fastfood	0.500897
## raceother:meals_fastfood	0.050541 .
## genderfemale:meals_fastfood	0.004371 **
## depressedsometimes:milkrare	0.080461 .
## depressedoften:milkrare	0.734057
## depresseddalwyas:milkrare	0.082692 .
## depressedsometimes:milksometimes	0.451671
## depressedoften:milksometimes	0.109455
## depresseddalwyas:milksometimes	0.434429
## depressedsometimes:milkoften	0.104281
## depressedoften:milkoften	0.232896
## depresseddalwyas:milkoften	0.072965 .
## depressedsometimes:milkvaried	0.136021
## depressedoften:milkvaried	NA
## depresseddalwyas:milkvaried	NA
## tv_hrs2~4hrs:log.eatout	0.299346

```

## tv_hrs5hrs:log.eatout          0.107636
## tv_hrs0hr:log.eatout          0.949828
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.06233 on 2871 degrees of freedom
## Multiple R-squared:  0.1705, Adjusted R-squared:  0.1453
## F-statistic: 6.782 on 87 and 2871 DF,  p-value: < 2.2e-16
## [1]    88.00 -16337.73

```

Forward...
model ...



```

## [1] "Forward selected full interaction model cv results:"
## [1] "RMSE: 0.0637652920097733 Rsquared: 0.114065082144124"
anova(model1, model1b)

```

```

## Analysis of Variance Table
##
## Model 1: log2.bmi ~ gender + age + race + edu + marriage + famsize + famincome +
##           alcohol12yr + alcoholfrq + log.grocery + log.eatout + log.delivery +
##           milk + meals_nothome + meals_fastfood + depressed + sleep_trouble +
##           activity + tv_hours + sleep_hr + smoke
## Model 2: log2.bmi ~ gender + age + race + edu + marriage + famsize + famincome +
##           alcohol12yr + alcoholfrq + log.grocery + log.eatout + log.delivery +
##           milk + meals_nothome + meals_fastfood + depressed + sleep_trouble +
##           activity + tv_hours + sleep_hr + smoke + famsize:famincome +
##           famsize:log.grocery + famsize:log.eatout + famsize:log.delivery
##   Res.Df   RSS Df Sum of Sq    F Pr(>F)
## 1   2916 11.896
## 2   2909 11.867  7  0.028946 1.0137 0.4192

```

```

#lasso cv
x.lasso = model.matrix(update(full_intr_form, .~.+0), data=df_adult)
cv_lasso = cv.glmnet(x.lasso, df_adult$log2.bmi, nfolds = 5)

```

```

lasso.lambda.min = cv_lasso$lambda.min
lasso.mse.min = min(cv_lasso$cvm)

```

```

coef.lasso = coef(cv_lasso, s = "lambda.min")

```

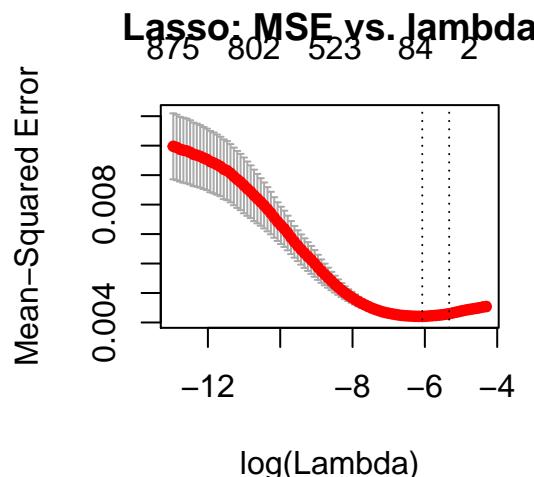
```

nonzero_coef_lasso = cbind(rownames(coef.lasso)[which(coef.lasso != 0)], coef.lasso[which(coef.lasso != 0)])

```

```
#lasso
model_lasso = glmnet(x.lasso, df_adult$log2.bmi, lambda = lasso.lambda.min)

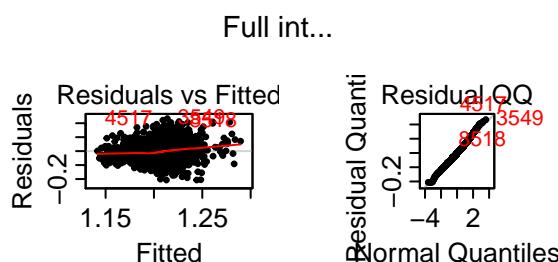
#plot
plot(cv_lasso, main="Lasso: MSE vs. lambda")
```



```
summary(model_lasso)
```

```
##          Length Class      Mode
## a0            1   -none- numeric
## beta         909   dgCMatrix S4
## df             1   -none- numeric
## dim            2   -none- numeric
## lambda         1   -none- numeric
## dev.ratio      1   -none- numeric
## nulldev        1   -none- numeric
## npasses        1   -none- numeric
## jerr            1   -none- numeric
## offset          1   -none- logical
## call            4   -none- call
## nobs            1   -none- numeric
```

```
plotres(model_lasso, which=3:4, caption = "Full interaction Lasso model assumption check")
```



```
#ridge cv
x.ridge = model.matrix(update(full_intr_form, .~.+0), data=df_adult)
cv_ridge = cv.glmnet(x.ridge, df_adult$log2.bmi, alpha = 0, nfolds = 5)
```

```

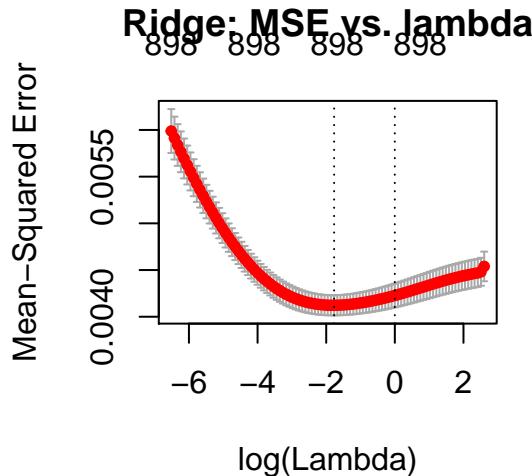
ridge.lambda.min = cv_ridge$lambda.min
ridge.mse.min = min(cv_ridge$cvm)

coef.ridge = coef(cv_ridge, s = "lambda.min")
nonzero_coef_ridge = cbind(rownames(coef.ridge)[which(coef.ridge != 0)], coef.ridge[which(coef.ridge != 0),])

#ridge
model_ridge = glmnet(x.ridge, df_adult$log2.bmi, lambda = ridge.lambda.min, alpha = 0)

#plot
plot(cv_ridge, main="Ridge: MSE vs. lambda")

```

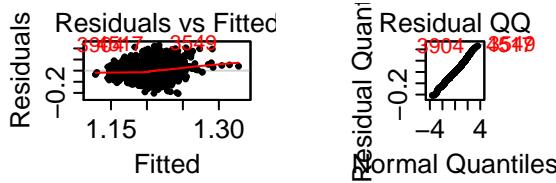


```
summary(model_ridge)
```

	Length	Class	Mode
## a0	1	-none-	numeric
## beta	909	dgCMatrix	S4
## df	1	-none-	numeric
## dim	2	-none-	numeric
## lambda	1	-none-	numeric
## dev.ratio	1	-none-	numeric
## nulldev	1	-none-	numeric
## npasses	1	-none-	numeric
## jerr	1	-none-	numeric
## offset	1	-none-	logical
## call	5	-none-	call
## nobs	1	-none-	numeric

```
plotres(model_ridge, which=3:4, caption = "Full interaction Lasso model \n assumption check")
```

Full in...
assump...



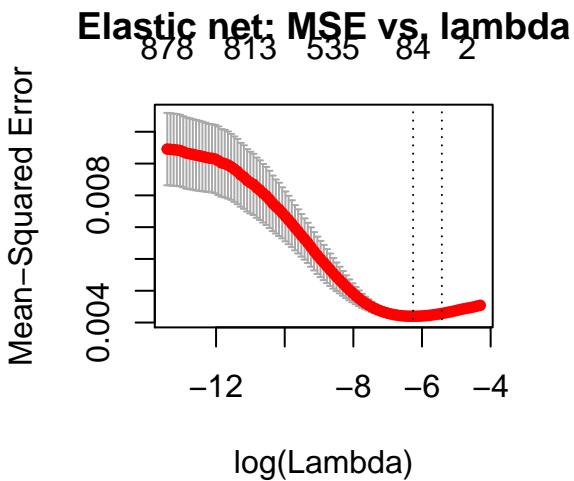
```
#elastic net cv
x.elastic = model.matrix(update(full_intr_form, .~.+0), data=df_adult)
cv_elastic = cv.glmnet(x.elastic, df_adult$log2.bmi, nfolds = 5)

elastic.lambda.min = cv_elastic$lambda.min
elastic.mse.min = min(cv_elastic$cvm)

coef.elastic = coef(cv_elastic, s = "lambda.min")
nonzero_coef_elastic = cbind(rownames(coef.elastic)[which(coef.elastic != 0)], coef.elastic[which(coef.elastic != 0),])

#elastic net
model_elastic = glmnet(x.elastic, df_adult$log2.bmi, lambda = elastic.lambda.min, alpha=0.5)

#plot
plot(cv_elastic, main="Elastic net: MSE vs. lambda")
```



```
summary(model_elastic)
```

```
##          Length Class      Mode
## a0            1   -none-  numeric
## beta         909 dgCMatrix S4
## df            1   -none-  numeric
## dim           2   -none-  numeric
## lambda        1   -none-  numeric
## dev.ratio     1   -none-  numeric
## nulldev       1   -none-  numeric
```

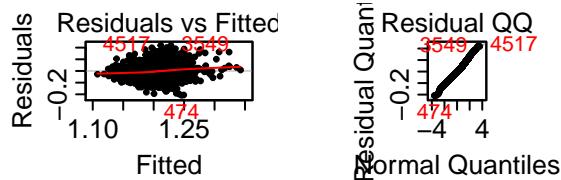
```

## npasses      1    -none-    numeric
## jerr         1    -none-    numeric
## offset       1    -none-    logical
## call         5    -none-    call
## nobs         1    -none-    numeric

plotres(model_elastic, which=3:4, caption = "Full interaction Elastic model \n assumption check")

```

Full in...
assump...



```

# best model (model1c) bootstrapping

# Bootstrap 95% CI for regression coefficients
library(boot)

```

```

##
## Attaching package: 'boot'
## The following object is masked from 'package:lattice':
## melanoma

# function to obtain regression weights
bs <- function(formula, data, indices) {
  d <- data[indices,] # allows boot to select sample
  fit <- lm(formula, data=d)
  return(coef(fit))
}
# bootstrapping with 1000 replications
nsim = 1000
results <- boot(data=df_adult, statistic=bs, R=nsim, formula=formula(model1c))
names_ = names(coef(lm(formula(model1c), data=df_adult)))

ci = data.frame(matrix(ncol = 3, nrow = length(names_)))

print("the following coef is statistically significant from 0:")

## [1] "the following coef is statistically significant from 0:"
for (i in c(1:85, 88:90)){
  ci[i, 1:2] = boot.ci(results, conf = 0.95, type = "perc", index= i)$perc[,4:5]
  ci[i, 3] = (0 < ci[i, 2]) & (0 > ci[i, 1])
  if (ci[i, 3] == FALSE) {print(names_[i])}
}

```

```

## [1] "(Intercept)"
## [1] "raceasian"
## [1] "tv_hrs2~4hrs"
## [1] "smokeno"
## [1] "smokemissing"
## [1] "milksometimes"
## [1] "milkvaried"
## [1] "famincome25k~55k"
## [1] "genderfemale"
## [1] "log.eatout"
## [1] "activityNo"
## [1] "alcoholfrq"
## [1] "sleep_troublealways"
## [1] "tv_hrs5hrs:depressedoften"
## [1] "tv_hrs0hr:depressedalwyas"
## [1] "famincomeabove 100k:genderfemale"
## [1] "raceasian:genderfemale"
## [1] "smokemissing:genderfemale"
## [1] "raceblack:activityNo"
## [1] "raceasian:activityNo"
## [1] "raceblack:meals_fastfood"
## [1] "raceother:meals_fastfood"
## [1] "genderfemale:meals_fastfood"
## [1] "depressedsometimes:milkvaried"

## [1] "Multinomial classification base model cv accuracy: 0.402479680162096"
## [1] "Multinomial classification forward selected full interaction model cv results: 0.38662410945027"
```
write.csv(data.frame(summary(model1)$coefficients), file="table1.csv")
write.csv(data.frame(summary(model1a)$coefficients), file="table1a.csv")
write.csv(data.frame(summary(model1b)$coefficients), file="table1b.csv")
write.csv(data.frame(summary(model1c)$coefficients), file="table1c.csv")

write.csv(data.frame(nonzero_coef_lasso), file="table_lasso.csv")
write.csv(data.frame(nonzero_coef_ridge), file="table_ridge.csv")
write.csv(data.frame(nonzero_coef_elastic), file="table_elastic.csv")

```