

new

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2023-11-26

## (1) Data cleaning

```
rm(list = ls())
gc()

##          used (Mb) gc trigger (Mb) max used (Mb)
## Ncells 470298 25.2   1013278 54.2   660860 35.3
## Vcells 883262  6.8    8388608 64.0  1800812 13.8

set.seed(123)
##### (1) Data cleaning #####
## select variables
library(NHANES)
library(car)

## Loading required package: carData

library(naniar)
library(ggplot2)
df0 <- NHANES
df <- NHANES[NHANES$Age >= 18 & NHANES$Age < 60,]
# colSums(is.na(df)) / nrow(df)
df <- df[, which(colSums(is.na(df)) / nrow(df) < 0.3)]
# exclude duplication
df <- df[!duplicated(df),]
names(df)

## [1] "ID" "SurveyYr" "Gender" "Age"
## [5] "AgeDecade" "Race1" "Education" "MaritalStatus"
## [9] "HHIncome" "HHIncomeMid" "Poverty" "HomeRooms"
## [13] "HomeOwn" "Work" "Weight" "Height"
## [17] "BMI" "BMI_WHO" "Pulse" "BPSysAve"
## [21] "BPDiaAve" "BPSys1" "BPDia1" "BPSys2"
## [25] "BPDia2" "BPSys3" "BPDia3" "DirectChol"
## [29] "TotChol" "UrineVol1" "UrineFlow1" "Diabetes"
## [33] "HealthGen" "DaysPhysHlthBad" "DaysMentHlthBad" "LittleInterest"
## [37] "Depressed" "SleepHrsNight" "SleepTrouble" "PhysActive"
## [41] "Alcohol12PlusYr" "AlcoholYear" "Smoke100" "Smoke100n"
## [45] "Marijuana" "RegularMarij" "HardDrugs" "SexEver"
## [49] "SexAge" "SexNumPartnLife" "SexNumPartYear" "SameSex"
## [53] "SexOrientation"
```

```

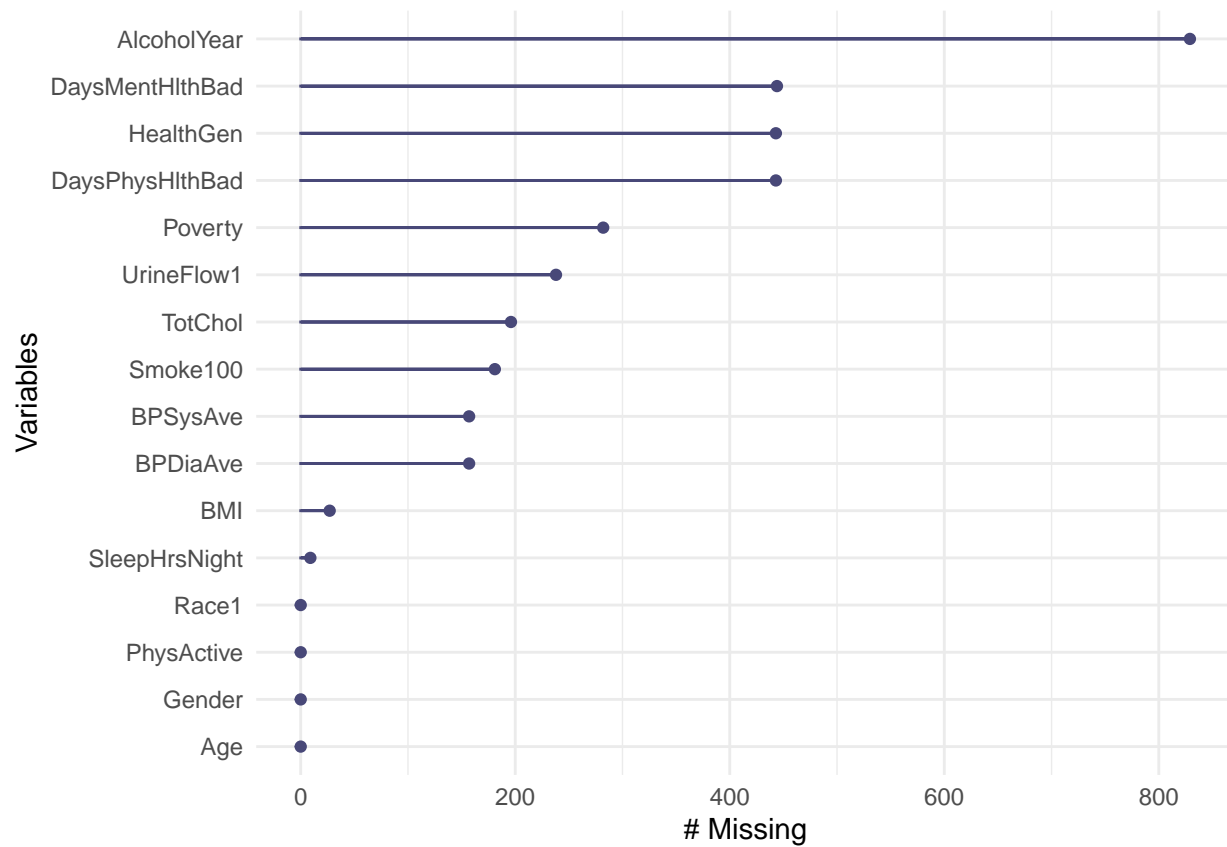
# df$BPSysAve
library(dplyr)

##
## Attaching package: 'dplyr'
## The following object is masked from 'package:car':
##
##      recode
## The following objects are masked from 'package:stats':
##
##      filter, lag
## The following objects are masked from 'package:base':
##
##      intersect, setdiff, setequal, union

df2 <- df %>% select(
  SleepHrsNight,
  BMI,
  Age,
  Gender,
  Race1,
  TotChol,
  BPDiaAve,
  BPSysAve,
  AlcoholYear,
  Poverty,
  DaysMentHlthBad,
  UrineFlow1,
  PhysActive,
  DaysPhysHlthBad,
  Smoke100,
  HealthGen
)

(p <- gg_miss_var(df2))

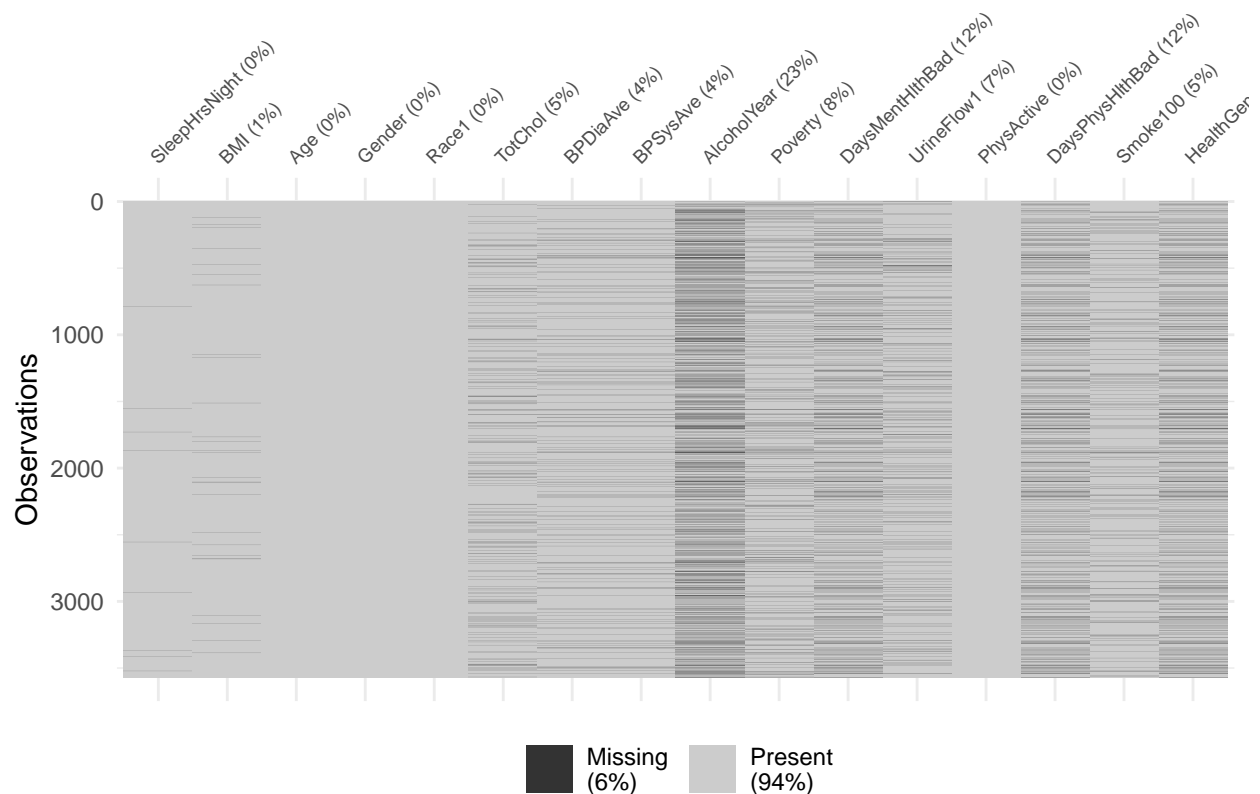
```



```
ggsave("picture/miss1.pdf", plot = p, device = "pdf")
```

```
## Saving 6.5 x 4.5 in image
```

```
(p <- vis_miss(df2) + theme(axis.text.x = element_text(size = 7)))
```



```
ggsave("picture/miss2.pdf", plot = p, device = "pdf")
```

```
## Saving 6.5 x 4.5 in image
```

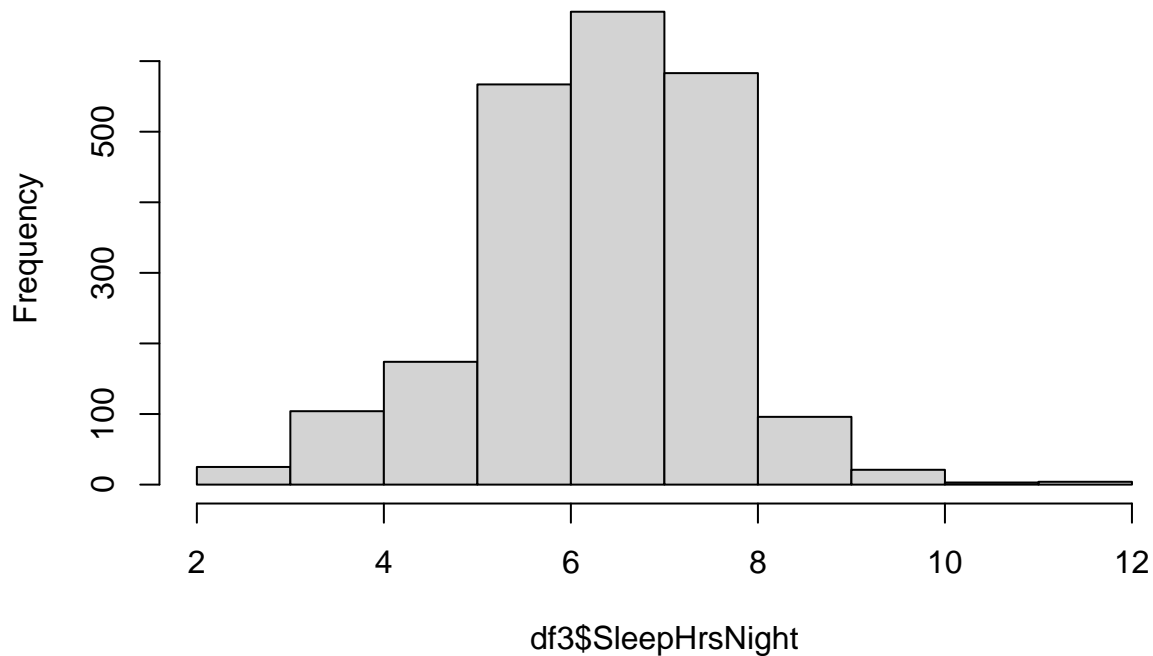
```
df3 <- na.omit(df2)
#df3$SleepHrsNight <- df3$SleepHrsNight * 60
#df3 <- df3[, -which(names(df3) %in% "SleepHrsNight")]
# cor(df3$BPSysAve, df3$BPDiaAve)
psych::describe(df3)
```

##	vars	n	mean	sd	median	trimmed	mad	min	max	range
## SleepHrsNight	1	2247	6.80	1.31	7.00	6.87	1.48	2.00	12.00	10.00
## BMI	2	2247	28.75	6.72	27.65	28.08	5.86	15.02	69.00	53.98
## Age	3	2247	39.12	11.40	39.00	39.08	14.83	20.00	59.00	39.00
## Gender*	4	2247	1.53	0.50	2.00	1.54	0.00	1.00	2.00	1.00
## Race1*	5	2247	3.43	1.16	4.00	3.56	0.00	1.00	5.00	4.00
## TotChol	6	2247	5.08	1.06	4.99	5.02	1.04	1.53	13.65	12.12
## BPDiaAve	7	2247	71.24	11.75	71.00	71.32	10.38	0.00	116.00	116.00
## BPSysAve	8	2247	117.60	14.57	116.00	116.61	13.34	78.00	226.00	148.00
## AlcoholYear	9	2247	70.43	94.41	24.00	50.67	35.58	0.00	364.00	364.00
## Poverty	10	2247	2.81	1.69	2.75	2.85	2.46	0.00	5.00	5.00
## DaysMentHlthBad	11	2247	4.45	8.00	0.00	2.38	0.00	0.00	30.00	30.00
## UrineFlow1	12	2247	1.08	0.97	0.81	0.91	0.60	0.00	10.14	10.14
## PhysActive*	13	2247	1.58	0.49	2.00	1.60	0.00	1.00	2.00	1.00
## DaysPhysHlthBad	14	2247	3.17	7.20	0.00	1.12	0.00	0.00	30.00	30.00
## Smoke100*	15	2247	1.46	0.50	1.00	1.45	0.00	1.00	2.00	1.00
## HealthGen*	16	2247	2.65	0.94	3.00	2.66	1.48	1.00	5.00	4.00

```
##          skew kurtosis  se
## SleepHrsNight -0.31    0.68 0.03
## BMI           1.27    2.92 0.14
## Age            0.02   -1.17 0.24
## Gender*       -0.13   -1.98 0.01
## Race1*        -1.10    0.04 0.02
## TotChol        0.91    3.31 0.02
## BPDiaAve      -0.38    3.10 0.25
## BPSysAve       1.14    3.95 0.31
## AlcoholYear    1.67    2.02 1.99
## Poverty        0.01   -1.48 0.04
## DaysMentHlthBad 2.18    3.82 0.17
## UrineFlow1     2.84   13.50 0.02
## PhysActive*   -0.33   -1.90 0.01
## DaysPhysHlthBad 2.79    6.98 0.15
## Smoke100*      0.16   -1.97 0.01
## HealthGen*     0.11   -0.36 0.02
```

```
# psych::pairs.panels(df3)
hist(df3$SleepHrsNight)
```

**Histogram of df3\$SleepHrsNight**



```
# colSums(is.na(df2)) / nrow(df2)
fit0 <-
  lm(SleepHrsNight ~ .,
     data = df3)
#data type
df3$Gender <- ifelse(df3$Gender == "male", 0, 1)
```

```
df3 <- df3 %>%
  mutate(
    Race1 = case_when(
      Race1 == 'Black' ~ 1,
      Race1 == 'Hispanic' ~ 2,
      Race1 == 'Mexican' ~ 3,
      Race1 == 'White' ~ 4,
      Race1 == 'Other' ~ 5,
      TRUE ~ NA_integer_ # Default value if none of the conditions are met
    )
  )
```

```
library(psych)
```

```
##
```

```
## Attaching package: 'psych'
```

```
## The following objects are masked from 'package:ggplot2':
```

```
##
```

```
## %>%, alpha
```

```
## The following object is masked from 'package:car':
```

```
##
```

```
## logit
```

```
library(ggplot2)
```

```
library(reshape2)
```

```
# psych::describe
```

```
desc_stats <- psych::describe(df3)
```

```
# Transform the data format for easy visualization
```

```
# Use the measure.vars parameter to specify the columns to melt
```

```
desc_stats_long <- melt(desc_stats, measure.vars = colnames(desc_stats), variable.name = "Statistic", v
```

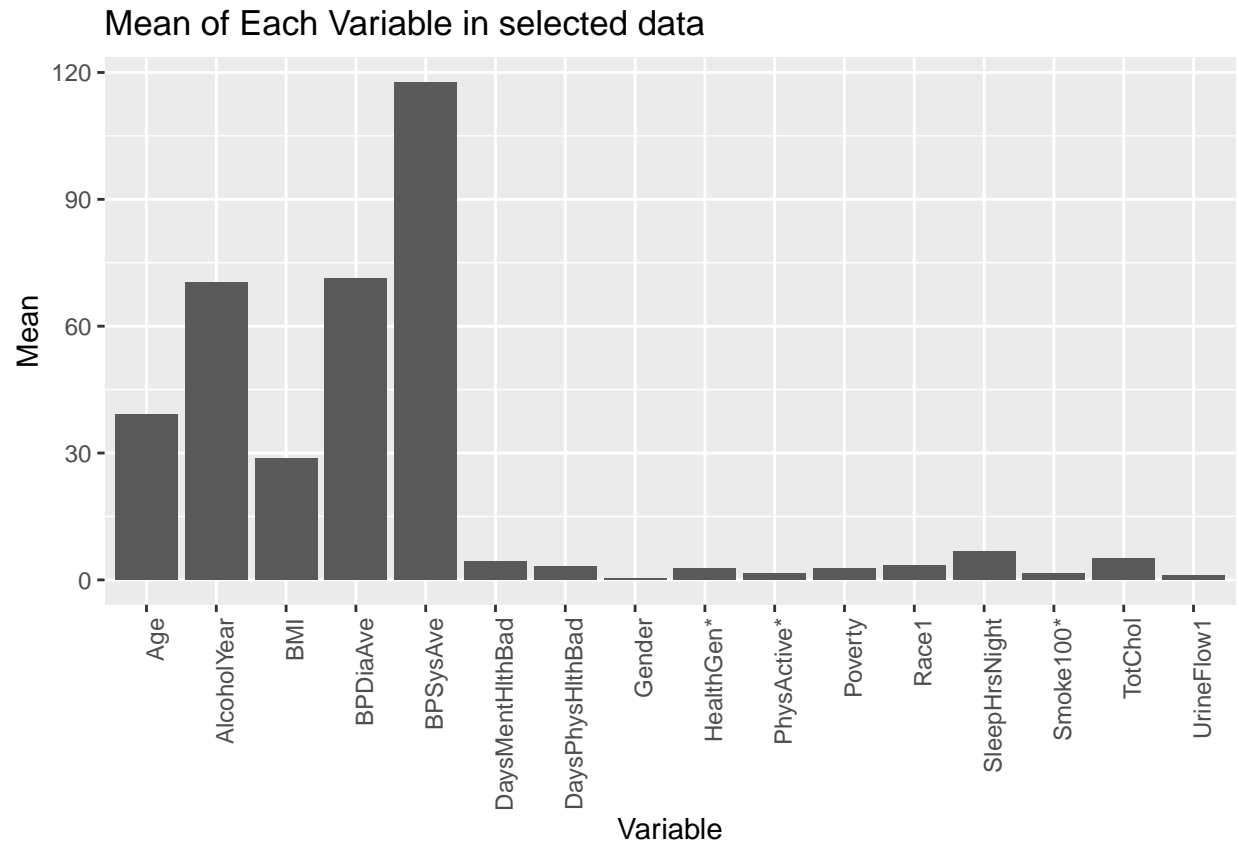
```
# Corrected ggplot2 visual code
```

```
(p <- ggplot(desc_stats_long[desc_stats_long$Statistic == "mean", ], aes(x = rownames(desc_stats), y = V
```

```
  geom_bar(stat = "identity") +
```

```
  theme(axis.text.x = element_text(angle = 90, hjust = 1)) +
```

```
  labs(x = "Variable", y = "Mean", title = "Mean of Each Variable in selected data"))
```

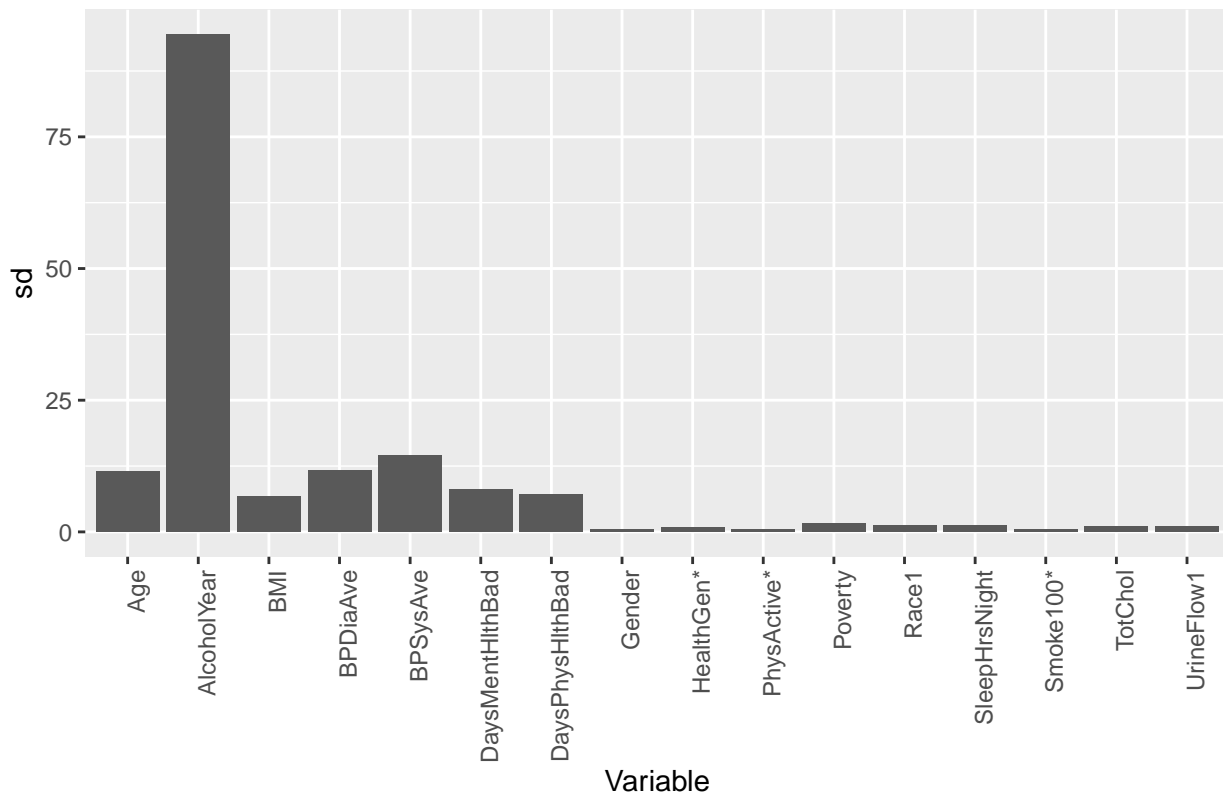


```
ggsave("picture/mean.pdf", plot = p, device = "pdf")
```

```
## Saving 6.5 x 4.5 in image
```

```
(p <- ggplot(desc_stats_long[desc_stats_long$Statistic == "sd", ], aes(x = rownames(desc_stats), y = Value)) +
  geom_bar(stat = "identity") +
  theme(axis.text.x = element_text(angle = 90, hjust = 1)) +
  labs(x = "Variable", y = "sd", title = "sd of Each Variable in selected data"))
```

sd of Each Variable in selected data



```
ggsave("picture/sd.pdf", plot = p, device = "pdf")
```

```
## Saving 6.5 x 4.5 in image
```

```
#Raw data normality analysis
```

```
# Assuming 'df3' is your dataframe from the NHANES dataset.
```

```
# Load necessary libraries
```

```
library(e1071)
```

```
library(ggplot2)
```

```
library(rlang)
```

```
# Function to perform normality analysis on a given column
```

```
perform_normality_analysis <- function(data, column_x, column_y) {
```

```
  # Check if the columns are numeric
```

```
  if(!is.numeric(data[[column_x]]) || !is.numeric(data[[column_y]])) {
```

```
    return(paste("One or both columns are not numeric. Skipping."))
```

```
  }
```

```
# Shapiro-Wilk Test for Y column
```

```
shapiro_test <- shapiro.test(data[[column_y]])
```

```
# Skewness and Kurtosis for Y column
```

```
skewness_value <- skewness(data[[column_y]])
```

```
kurtosis_value <- kurtosis(data[[column_y]])
```

```
# Q-Q Plot for Y column
```



```

qqplot <- ggplot(data, aes_string(sample = column_y)) +
  stat_qq() +
  stat_qq_line() +
  ggtitle(paste("Q-Q Plot for", column_y))

# Histogram with Normal Distribution Fit for Y column
hist_plot <- ggplot(data, aes_string(x = column_y)) +
  geom_histogram(aes(y = ..density..), binwidth = 1, fill = "blue", alpha = 0.5) +
  geom_density(color = "red", size = 1) +
  theme_bw() +
  xlab(paste(column_y, "(Value)")) +
  ylab("Density") +
  ggtitle(paste("Histogram with Normal Distribution Fit for", column_y))

# Scatter Plot with Jittering and Alpha adjustment
scatter_plot <- ggplot(df3, aes_string(x = "SleepHrsNight", y = "BMI")) +
  geom_jitter(alpha = 0.5, width = 0.2) + # Add jittering and alpha adjustment
  geom_smooth(method = "lm", color = "red") +
  theme_bw() +
  ggtitle("Scatter Plot with Regression Line for SleepHrsNight vs BMI")

# Boxplot for Y column
boxplot <- ggplot(data, aes_string(y = column_y)) +
  geom_boxplot() +
  theme_bw() +
  ggtitle(paste("Boxplot for", column_y))

# Density Plot for Y column
density_plot <- ggplot(data, aes_string(x = column_y)) +
  geom_density(fill = "blue", alpha = 0.5) +
  theme_bw() +
  ggtitle(paste("Density Plot for", column_y))

# Output results
list(
  Column_Y = column_y,
  Shapiro_Test = shapiro_test,
  Skewness = skewness_value,
  Kurtosis = kurtosis_value,
  QQPlot = qqplot,
  Histogram = hist_plot,
  ScatterPlot = scatter_plot,
  Boxplot = boxplot,
  DensityPlot = density_plot
)
}

# Analyze BMI with SleepHrsNight as X-axis
bmi_sleep_analysis <- perform_normality_analysis(df3, "SleepHrsNight", "BMI")

## Warning: `aes_string()` was deprecated in ggplot2 3.0.0.
## i Please use tidy evaluation idioms with `aes()``.
## i See also `vignette("ggplot2-in-packages")` for more information.
## This warning is displayed once every 8 hours.

```

```
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was
## generated.
```

```
## Warning: Using `size` aesthetic for lines was deprecated in ggplot2 3.4.0.
## i Please use `linewidth` instead.
## This warning is displayed once every 8 hours.
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was
## generated.
```

```
# Display the results
print(bmi_sleep_analysis$Shapiro_Test)
```

```
##
##  Shapiro-Wilk normality test
##
## data:  data[[column_y]]
## W = 0.92828, p-value < 2.2e-16
```

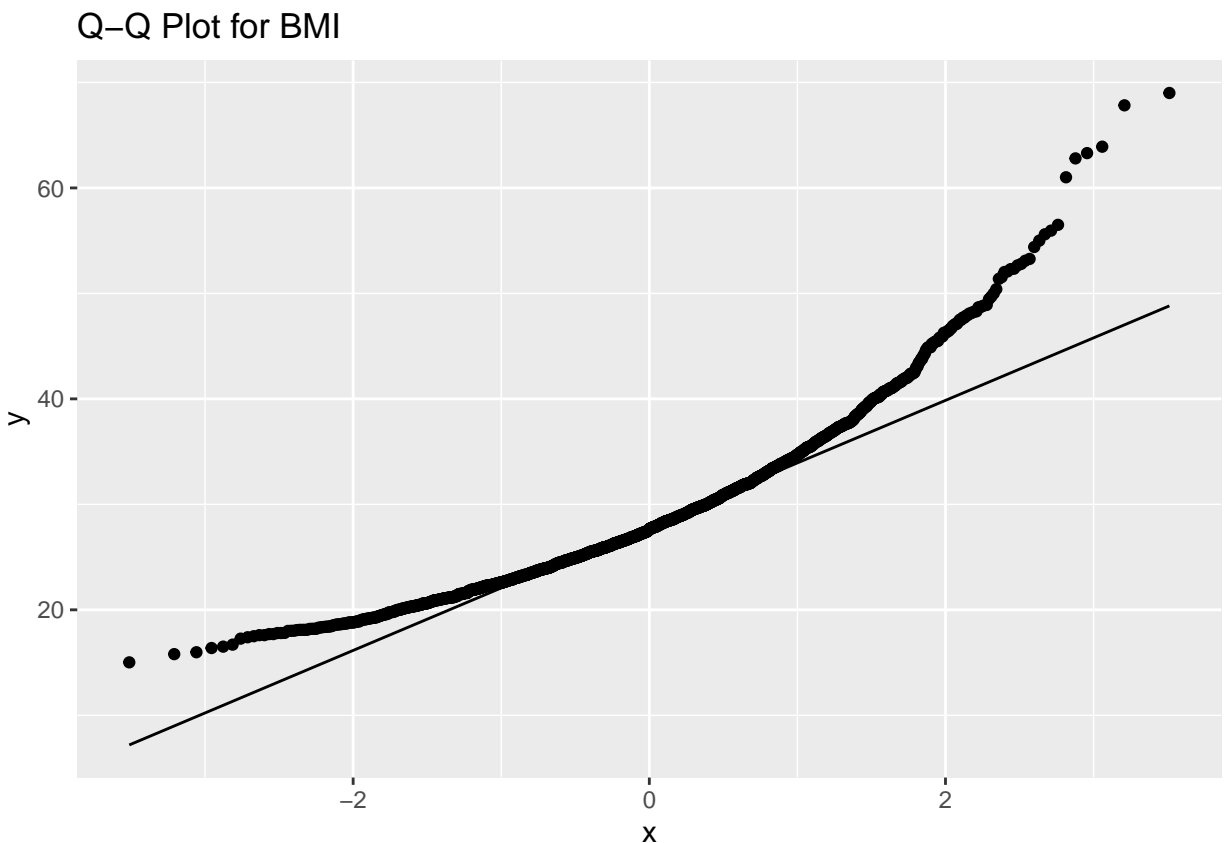
```
print(paste("Skewness:", bmi_sleep_analysis$Skewness))
```

```
## [1] "Skewness: 1.26620366771869"
```

```
print(paste("Kurtosis:", bmi_sleep_analysis$Kurtosis))
```

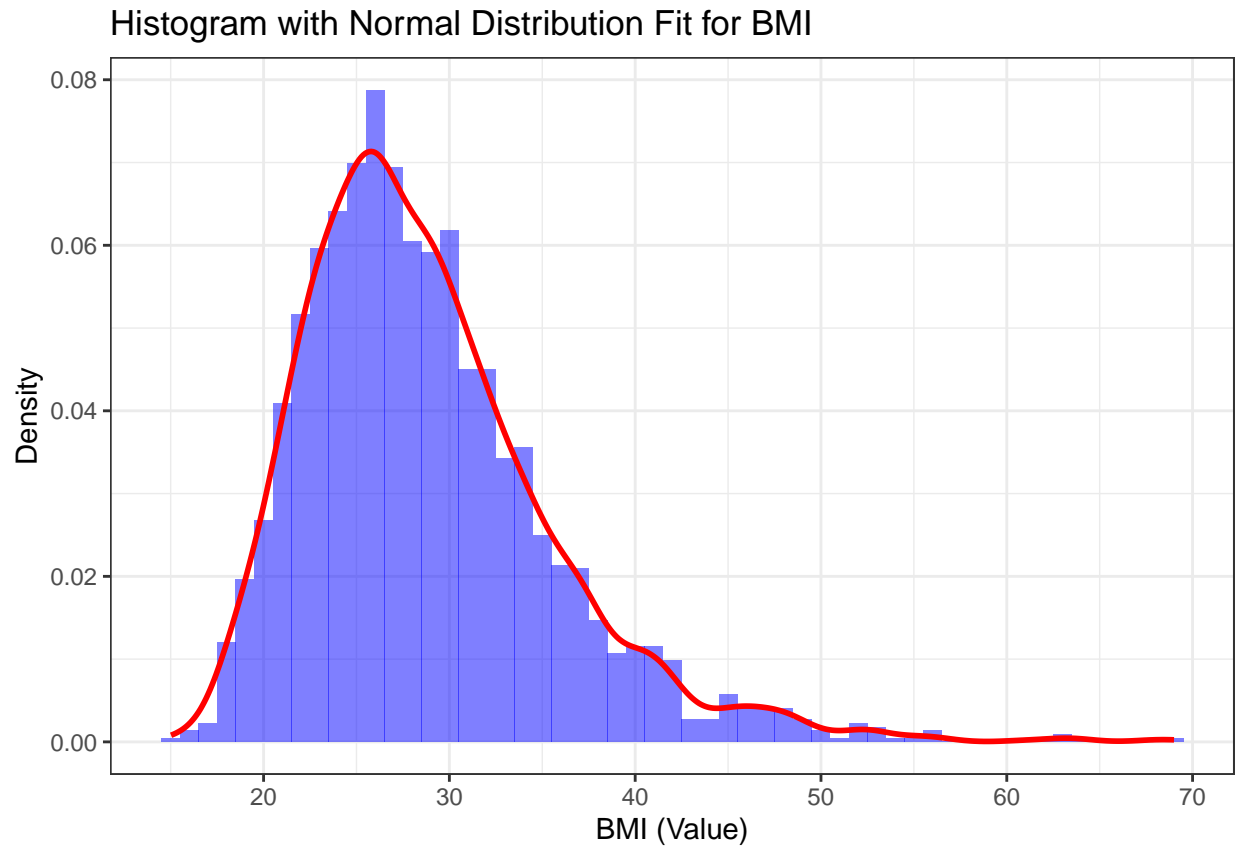
```
## [1] "Kurtosis: 2.9210614116705"
```

```
print(bmi_sleep_analysis$QQPlot)
```



```
print(bmi_sleep_analysis$Histogram)
```

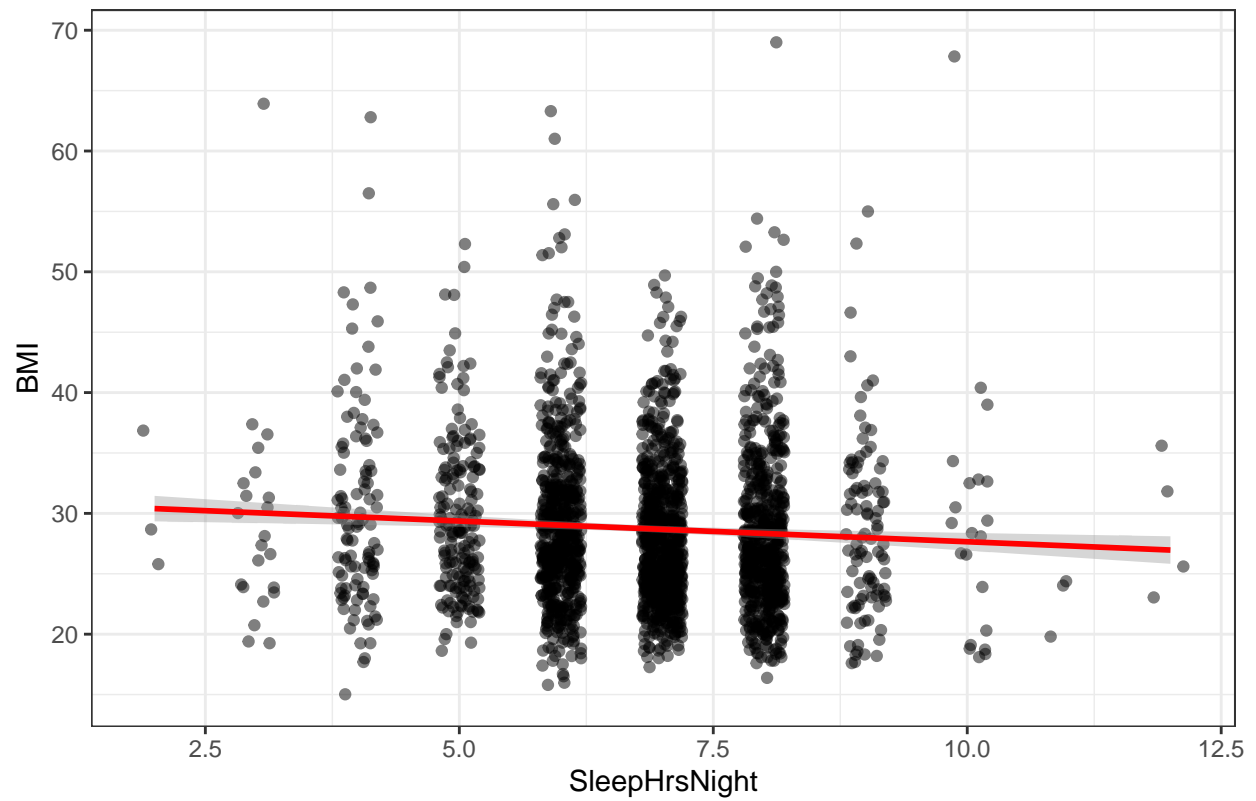
```
## Warning: The dot-dot notation (`..density..`) was deprecated in ggplot2 3.4.0.  
## i Please use `after_stat(density)` instead.  
## This warning is displayed once every 8 hours.  
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was  
## generated.
```



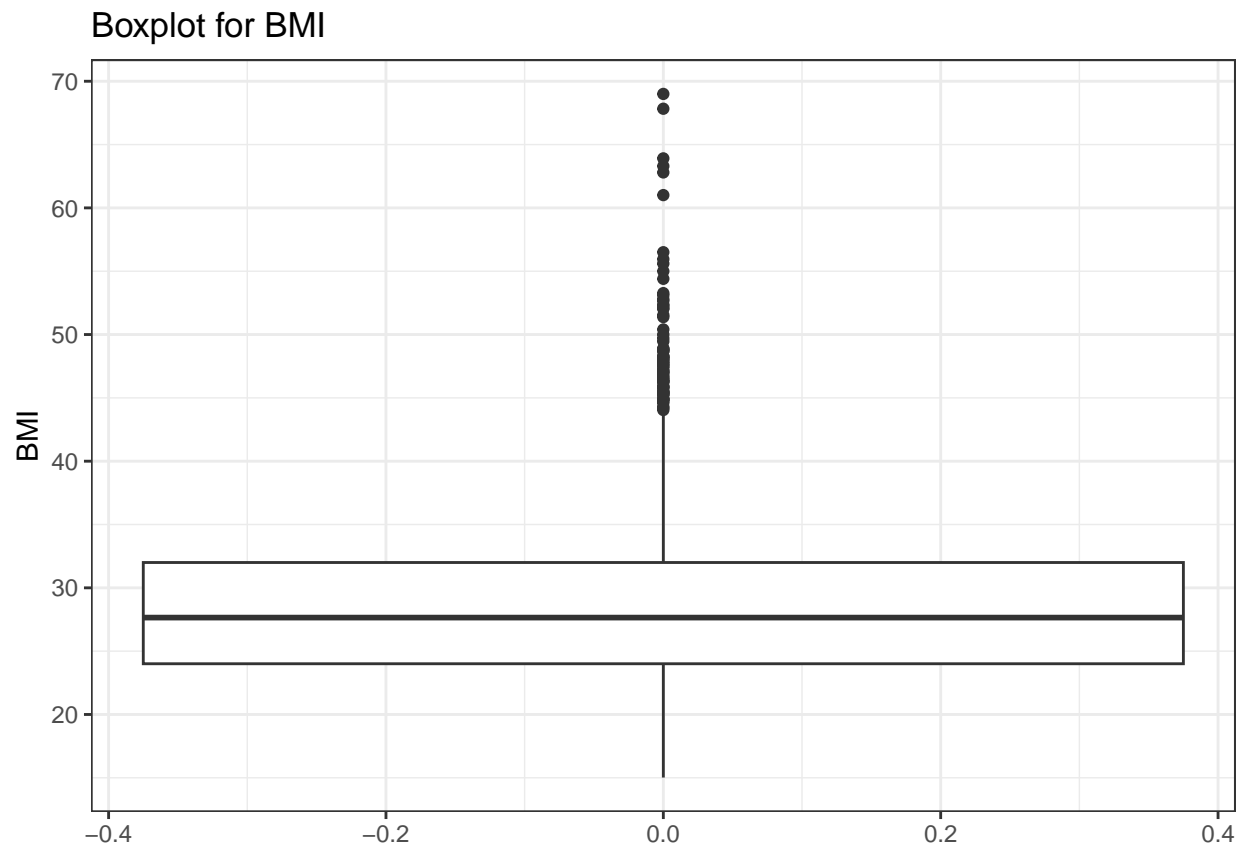
```
print(bmi_sleep_analysis$ScatterPlot)
```

```
## `geom_smooth()` using formula = 'y ~ x'
```

Scatter Plot with Regression Line for SleepHrsNight vs BMI

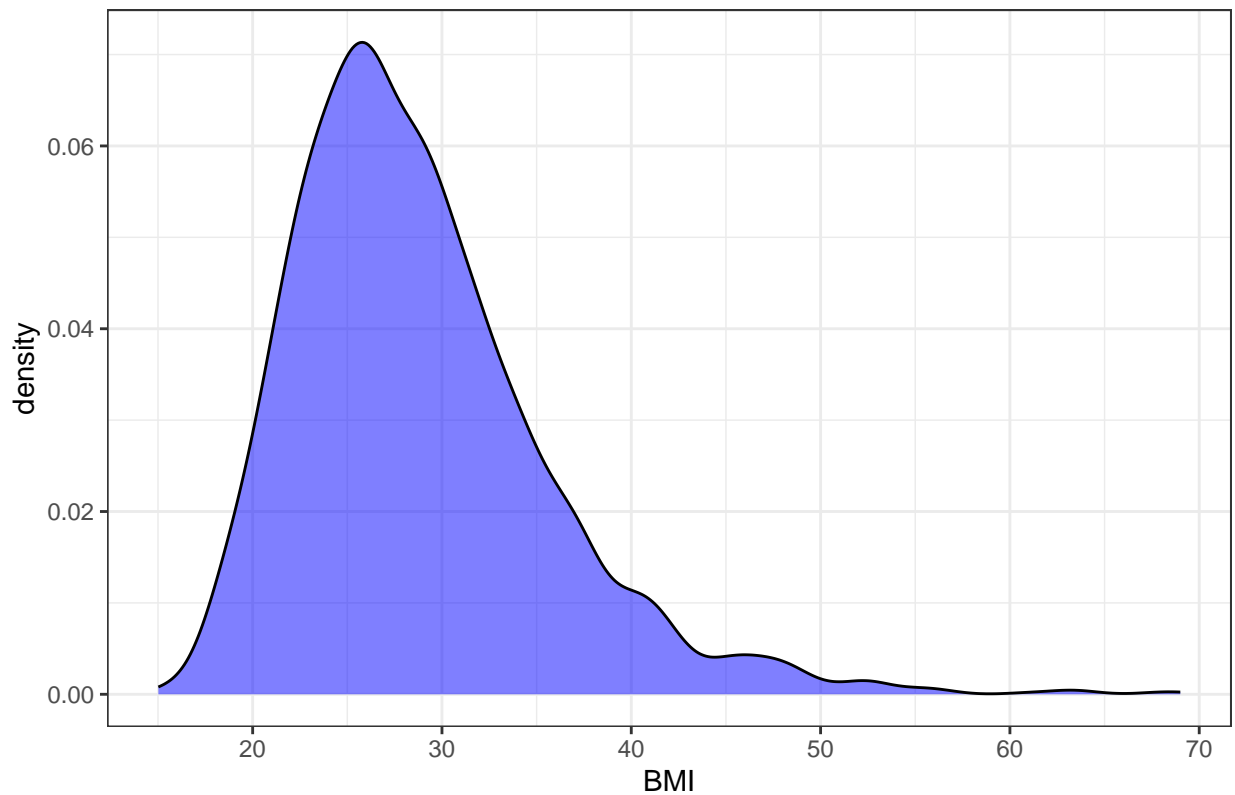


```
print(bmi_sleep_analysis$Boxplot)
```



```
print(bmi_sleep_analysis$DensityPlot)
```

Density Plot for BMI



```
#basic characteristics
# Assuming 'df3' is your dataframe.

# Load necessary library
library(dplyr)

# Function to get basic characteristics of a given column
get_basic_characteristics <- function(data, column) {
  # Ensure the column is numeric
  if(!is.numeric(data[[column]])) {
    return(data.frame(Variable = column, Mean = NA, Median = NA, SD = NA, Min = NA, Max = NA, Q1 = NA, Q3 = NA))
  }

  # Calculate basic characteristics
  characteristics <- data %>%
    summarise(
      Mean = mean(.data[[column]], na.rm = TRUE),
      Median = median(.data[[column]], na.rm = TRUE),
      SD = sd(.data[[column]], na.rm = TRUE),
      Min = min(.data[[column]], na.rm = TRUE),
      Max = max(.data[[column]], na.rm = TRUE),
      Q1 = quantile(.data[[column]], 0.25, na.rm = TRUE),
      Q3 = quantile(.data[[column]], 0.75, na.rm = TRUE)
    ) %>%
    mutate(Variable = column) %>%
    select(Variable, everything())
}
```

```

# Return the results
return(characteristics)
}

# List of columns to analyze
columns_to_analyze <- c("SleepHrsNight", "BMI", "DirectChol", "Age", "Gender", "Race1", "TotChol", "BPDiaAve", "BPSysAve", "AlcoholYear")

# Apply the function to each column and combine results
combined_characteristics <- lapply(columns_to_analyze, function(col) get_basic_characteristics(df3, col))
combined_characteristics <- do.call(bind_rows(), combined_characteristics)

# Display the combined basic characteristics
print(combined_characteristics)

```

```

## # A tibble: 21 x 8
##   Variable      Mean Median    SD   Min   Max    Q1    Q3
##   <chr>      <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1 SleepHrsNight 6.80    7    1.31    2    12     6     8
## 2 BMI          28.8   27.6  6.72  15.0   69    24.0   32
## 3 DirectChol    NA     NA    NA     NA    NA     NA     NA
## 4 Age          39.1   39   11.4   20    59    29    49
## 5 Gender        0.466   0    0.499   0     1     0     1
## 6 Race1         3.43    4    1.16    1     5     3     4
## 7 TotChol       5.08   4.99  1.06   1.53  13.6   4.33   5.70
## 8 BPDiaAve     71.2   71   11.8    0   116    64    78
## 9 BPSysAve    118.   116  14.6   78   226   108   125
## 10 AlcoholYear  70.4   24   94.4    0   364     4   104
## # i 11 more rows

```

## (2) Baseline characteristics

```

Hmisc::describe(df3)

```

```

## df3
##
## 16 Variables      2247 Observations
## -----
## SleepHrsNight
##      n missing distinct    Info    Mean      Gmd      .05      .10
##    2247      0      11    0.939    6.795    1.411      4      5
##      .25      .50      .75      .90      .95
##        6        7        8        8        9
##
## lowest :  2  3  4  5  6, highest:  8  9 10 11 12
##
## Value      2      3      4      5      6      7      8      9     10     11     12
## Frequency    3     22    104    174    567    670    583    96     21      3      4
## Proportion 0.001 0.010 0.046 0.077 0.252 0.298 0.259 0.043 0.009 0.001 0.002
## -----
## BMI
##      n missing distinct    Info    Mean      Gmd      .05      .10
##    2247      0    1097      1    28.75    7.194    20.19    21.50

```

```

##      .25      .50      .75      .90      .95
##    24.01    27.65    32.00    37.33    41.08
##
## lowest : 15.02 15.80 15.98 16.38 16.51, highest: 62.80 63.30 63.91 67.83 69.00
## -----
## Age
##      n missing distinct      Info      Mean      Gmd      .05      .10
##    2247      0      40    0.999    39.12    13.16      21      23
##      .25      .50      .75      .90      .95
##      29      39      49      55      57
##
## lowest : 20 21 22 23 24, highest: 55 56 57 58 59
## -----
## Gender
##      n missing distinct      Info      Sum      Mean      Gmd
##    2247      0      2    0.747    1048    0.4664    0.498
##
## -----
## Race1
##      n missing distinct      Info      Mean      Gmd
##    2247      0      5    0.769    3.425    1.128
##
## lowest : 1 2 3 4 5, highest: 1 2 3 4 5
##
## Value      1      2      3      4      5
## Frequency   301   155   250  1370   171
## Proportion 0.134 0.069 0.111 0.610 0.076
## -----
## TotChol
##      n missing distinct      Info      Mean      Gmd      .05      .10
##    2247      0      211      1    5.076    1.157    3.570    3.850
##      .25      .50      .75      .90      .95
##    4.330    4.990    5.705    6.360    6.871
##
## lowest : 1.53 2.69 2.74 2.79 2.82, highest: 9.31 9.34 9.90 12.28 13.65
## -----
## BPDiaAve
##      n missing distinct      Info      Mean      Gmd      .05      .10
##    2247      0      84    0.999    71.24    12.75      53      57
##      .25      .50      .75      .90      .95
##      64      71      78      85      89
##
## lowest : 0 20 21 22 25, highest: 108 109 110 114 116
## -----
## BPSysAve
##      n missing distinct      Info      Mean      Gmd      .05      .10
##    2247      0      100    0.999    117.6    15.63      97     101
##      .25      .50      .75      .90      .95
##     108     116     125     135     142
##
## lowest : 78 83 84 85 86, highest: 184 191 202 209 226
## -----
## AlcoholYear
##      n missing distinct      Info      Mean      Gmd      .05      .10

```



```

##      2247      0      56      0.993      70.43      91.9      0      0
##      .25      .50      .75      .90      .95
##      4      24      104      208      288
##
## lowest :    0    1    2    3    4, highest: 260 300 312 360 364
## -----
## Poverty
##      n missing distinct      Info      Mean      Gmd      .05      .10
##      2247      0      398      0.988      2.813      1.934      0.330      0.656
##      .25      .50      .75      .90      .95
##      1.240      2.750      4.770      5.000      5.000
##
## lowest : 0.00 0.02 0.03 0.04 0.05, highest: 4.95 4.96 4.97 4.99 5.00
## -----
## DaysMentHlthBad
##      n missing distinct      Info      Mean      Gmd      .05      .10
##      2247      0      28      0.844      4.448      6.862      0      0
##      .25      .50      .75      .90      .95
##      0      0      5      15      30
##
## lowest :    0    1    2    3    4, highest: 25 26 27 29 30
## -----
## UrineFlow1
##      n missing distinct      Info      Mean      Gmd      .05      .10
##      2247      0      1373      1      1.076      0.9099      0.1953      0.2826
##      .25      .50      .75      .90      .95
##      0.4585      0.8080      1.3615      2.1988      2.8201
##
## lowest :    0.000    0.005    0.006    0.011    0.014, highest: 7.325 7.826 8.730 9.410 10.143
## -----
## PhysActive
##      n missing distinct
##      2247      0      2
##
## Value      No  Yes
## Frequency  943 1304
## Proportion 0.42 0.58
## -----
## DaysPhysHlthBad
##      n missing distinct      Info      Mean      Gmd      .05      .10
##      2247      0      24      0.706      3.169      5.329      0      0
##      .25      .50      .75      .90      .95
##      0      0      2      10      24
##
## lowest :    0    1    2    3    4, highest: 24 25 26 28 30
## -----
## Smoke100
##      n missing distinct
##      2247      0      2
##
## Value      No  Yes
## Frequency 1215 1032
## Proportion 0.541 0.459
## -----

```

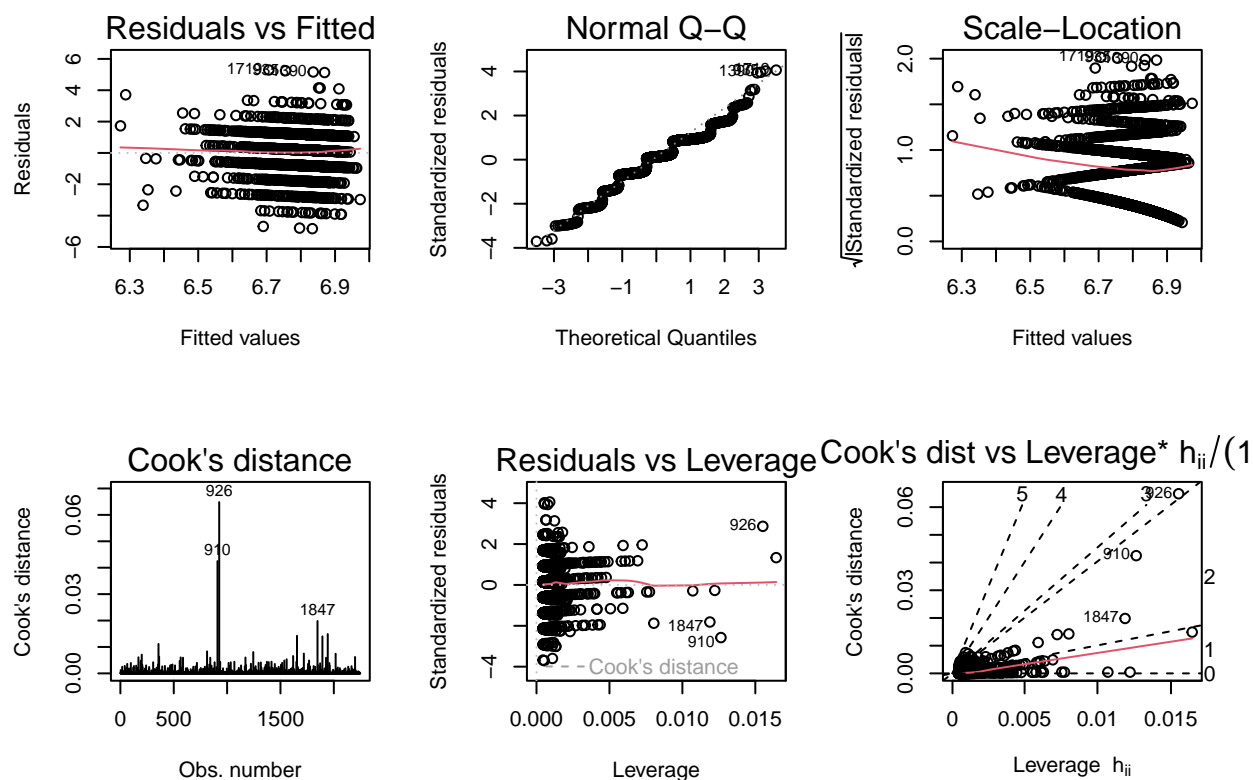
```
## HealthGen
##      n missing distinct
##    2247      0        5
##
## lowest : Excellent Vgood      Good      Fair      Poor
## highest: Excellent Vgood      Good      Fair      Poor
##
## Value      Excellent      Vgood      Good      Fair      Poor
## Frequency      252      725      885      335      50
## Proportion      0.112      0.323      0.394      0.149      0.022
## -----
```

### (3) linear regression model

```
##simple linear regression##
model1 = lm(df3$SleepHrsNight ~ df3$BMI, data = df3)
summary(model1)

##
## Call:
## lm(formula = df3$SleepHrsNight ~ df3$BMI, data = df3)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -4.8336 -0.8129  0.1627  1.1392  5.2936
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  7.168497   0.120957  59.265 < 2e-16 ***
## df3$BMI      -0.012981   0.004097  -3.169  0.00155 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.304 on 2245 degrees of freedom
## Multiple R-squared:  0.004452,    Adjusted R-squared:  0.004009
## F-statistic: 10.04 on 1 and 2245 DF,  p-value: 0.001552

par(mfrow = c(2, 3)) #read more from ?plot.lm
plot(model1, which = 1)
plot(model1, which = 2)
plot(model1, which = 3)
plot(model1, which = 4)
plot(model1, which = 5)
plot(model1, which = 6)
```



```
par(mfrow = c(1, 1)) # reset

dummy_b = 1 * (df3$Race1 == "Black")
dummy_h = 1 * (df3$Race1 == "Hispanic")
dummy_m = 1 * (df3$Race1 == "Mexican")
dummy_w = 1 * (df3$Race1 == "White")
dummy_o = 1 * (df3$Race1 == "Other")

age_quant = quantile(df3$Age)
df3$AgeC = 0
df3$AgeC[df3$Age > age_quant[2] & df3$Age <= age_quant[3]] = 1
df3$AgeC[df3$Age > age_quant[3] & df3$Age <= age_quant[4]] = 2
df3$AgeC[df3$Age > age_quant[4]] = 3

### multiple linear regression###
# model_1 add demographic
m_1 = lm(BMI ~ SleepHrsNight + Age + Gender + factor(Race1), df3)
summary(m_1)
```

```
##
## Call:
## lm(formula = BMI ~ SleepHrsNight + Age + Gender + factor(Race1),
##     data = df3)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
```

```

## -14.194 -4.552 -1.204 3.181 40.301
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  30.83046   0.95742  32.202 < 2e-16 ***
## SleepHrsNight -0.27310   0.10779  -2.534 0.011356 *
## Age          0.04657   0.01241   3.754 0.000179 ***
## Gender       0.15322   0.28184   0.544 0.586739
## factor(Race1)2 -2.17537   0.65505  -3.321 0.000912 ***
## factor(Race1)3 -1.17186   0.57024  -2.055 0.039991 *
## factor(Race1)4 -2.53995   0.42385  -5.993 2.40e-09 ***
## factor(Race1)5 -3.79120   0.63552  -5.966 2.83e-09 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 6.618 on 2239 degrees of freedom
## Multiple R-squared:  0.03235,    Adjusted R-squared:  0.02933
## F-statistic: 10.69 on 7 and 2239 DF,  p-value: 2.617e-13
## model_2 add known risk factors
m_2 = lm(
  BMI ~ SleepHrsNight + Age + Gender + Race1 + TotChol + BPDiaAve + BPSysAve + AlcoholYear + Smoke100 +
  DaysPhysHlthBad + PhysActive,
  df3
)
summary(m_2)

##
## Call:
## lm(formula = BMI ~ SleepHrsNight + Age + Gender + Race1 + TotChol +
##      BPDiaAve + BPSysAve + AlcoholYear + Smoke100 + DaysPhysHlthBad +
##      PhysActive, data = df3)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -14.663  -4.238  -0.859   3.172  37.902
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  21.345325   1.564968  13.639 < 2e-16 ***
## SleepHrsNight -0.195278   0.105023  -1.859 0.063105 .
## Age          0.008611   0.013111   0.657 0.511388
## Gender       0.412838   0.284075   1.453 0.146289
## Race1       -0.609481   0.119116  -5.117 3.37e-07 ***
## TotChol      0.060618   0.135190   0.448 0.653912
## BPDiaAve     0.058753   0.013744   4.275 1.99e-05 ***
## BPSysAve     0.060987   0.011475   5.315 1.18e-07 ***
## AlcoholYear  -0.009292   0.001488  -6.243 5.14e-10 ***
## Smoke100Yes  -0.556721   0.281266  -1.979 0.047900 *
## DaysPhysHlthBad 0.071694   0.019304   3.714 0.000209 ***
## PhysActiveYes -1.193772   0.285877  -4.176 3.08e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 6.391 on 2235 degrees of freedom

```

```
## Multiple R-squared:  0.09913,    Adjusted R-squared:  0.0947
## F-statistic: 22.36 on 11 and 2235 DF,  p-value: < 2.2e-16
```

```
#LINE
```

```
#influential observations
```

```
#multicollinearity
```

```
vif(m_1)
```

```
##              GVIF Df GVIF^(1/(2*Df))
## SleepHrsNight 1.017530 1      1.008727
## Age           1.025201 1      1.012522
## Gender        1.014147 1      1.007049
## factor(Race1) 1.038987 4      1.004792
```

```
vif(m_2)
```

```
##      SleepHrsNight      Age      Gender      Race1      TotChol
##      1.035713      1.227842      1.104720      1.044481      1.121877
##      BPDiaAve      BPSysAve      AlcoholYear      Smoke100 DaysPhysHlthBad
##      1.434880      1.535950      1.085843      1.080676      1.062228
##      PhysActive
##      1.094846
```

```
## model_3 add additional risk factors
```

```
m_3 = lm(
  BMI ~ SleepHrsNight + Age + Gender + Race1 + Poverty + TotChol + BPDiaAve + BPSysAve + AlcoholYear +
  DaysPhysHlthBad + HealthGen + PhysActive,
  df3
)
summary(m_3)
```

```
##
## Call:
## lm(formula = BMI ~ SleepHrsNight + Age + Gender + Race1 + Poverty +
##      TotChol + BPDiaAve + BPSysAve + AlcoholYear + Smoke100 +
##      UrineFlow1 + DaysMentHlthBad + DaysPhysHlthBad + HealthGen +
##      PhysActive, data = df3)
##
```

```
## Residuals:
##      Min       1Q   Median       3Q      Max
## -16.595  -4.058  -0.669   3.272  36.072
##
```

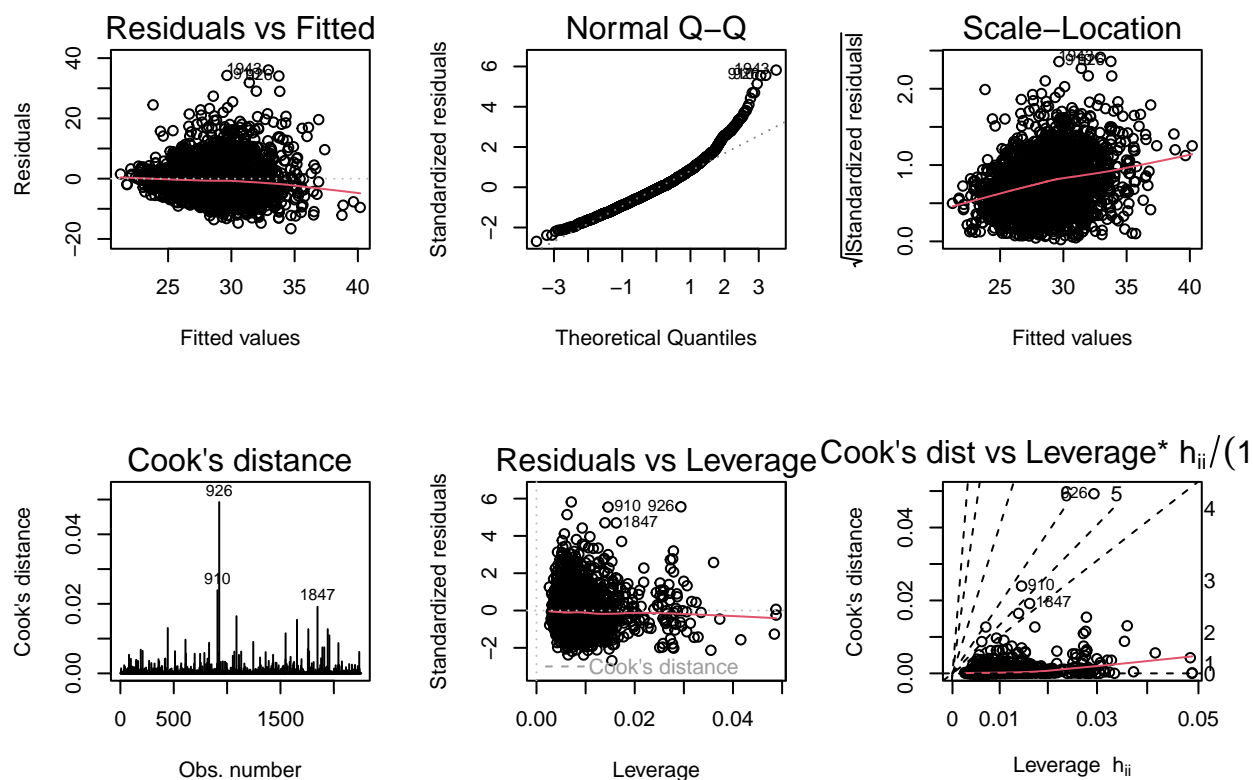
```
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  18.864211   1.572842  11.994 < 2e-16 ***
## SleepHrsNight -0.114991   0.103673  -1.109  0.26748
## Age           0.006283   0.013306   0.472  0.63682
## Gender        0.462007   0.279148   1.655  0.09805 .
## Race1        -0.489946   0.118576  -4.132 3.73e-05 ***
## Poverty       0.075062   0.088009   0.853  0.39381
## TotChol       0.010016   0.131806   0.076  0.93943
## BPDiaAve      0.062052   0.013404   4.629 3.88e-06 ***
```

```
## BPSysAve      0.048739    0.011246    4.334 1.53e-05 ***
## AlcoholYear   -0.007813    0.001469   -5.320 1.14e-07 ***
## Smoke100Yes   -0.859729    0.280020   -3.070 0.00216 **
## UrineFlow1    -0.091612    0.138427   -0.662 0.50816
## DaysMentHlthBad -0.034930    0.017452   -2.001 0.04546 *
## DaysPhysHlthBad 0.020052    0.020347    0.985 0.32450
## HealthGenVgood 1.968141    0.457489    4.302 1.77e-05 ***
## HealthGenGood  3.664152    0.454975    8.054 1.30e-15 ***
## HealthGenFair  5.229406    0.554851    9.425 < 2e-16 ***
## HealthGenPoor  8.128338    1.045166    7.777 1.13e-14 ***
## PhysActiveYes  -0.747015    0.286383   -2.608 0.00916 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 6.22 on 2228 degrees of freedom
## Multiple R-squared:  0.1494, Adjusted R-squared:  0.1425
## F-statistic: 21.74 on 18 and 2228 DF,  p-value: < 2.2e-16
```

```
vif(m_3)
```

```
##              GVIF Df GVIF^(1/(2*Df))
## SleepHrsNight 1.065532 1      1.032246
## Age           1.335211 1      1.155513
## Gender        1.126212 1      1.061231
## Race1         1.092732 1      1.045338
## Poverty       1.290246 1      1.135890
## TotChol       1.125879 1      1.061074
## BPDiaAve      1.440912 1      1.200380
## BPSysAve      1.557504 1      1.248000
## AlcoholYear   1.116165 1      1.056487
## Smoke100      1.130850 1      1.063414
## UrineFlow1    1.042860 1      1.021205
## DaysMentHlthBad 1.132451 1      1.064167
## DaysPhysHlthBad 1.245939 1      1.116216
## HealthGen     1.428819 4      1.045616
## PhysActive    1.159992 1      1.077029
```

```
par(mfrow = c(2, 3)) #read more from ?plot.lm
plot(m_3, which = 1)
plot(m_3, which = 2)
plot(m_3, which = 3)
plot(m_3, which = 4)
plot(m_3, which = 5)
plot(m_3, which = 6)
```



```
par(mfrow = c(1, 1)) # reset

# model_4 add additional risk factors
m_full = lm(
  BMI ~ SleepHrsNight + Age + Gender + Race1 + Poverty + TotChol + BPDiaAve + BPSysAve + AlcoholYear +
    DaysPhysHlthBad + HealthGen + PhysActive + SleepHrsNight * Age + SleepHrsNight *
    Gender,
  df3
)
summary(m_full)
```

```
##
## Call:
## lm(formula = BMI ~ SleepHrsNight + Age + Gender + Race1 + Poverty +
##     TotChol + BPDiaAve + BPSysAve + AlcoholYear + Smoke100 +
##     UrineFlow1 + DaysMentHlthBad + DaysPhysHlthBad + HealthGen +
##     PhysActive + SleepHrsNight * Age + SleepHrsNight * Gender,
##     data = df3)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -16.764  -4.057  -0.642   3.245  36.491
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    21.498108   2.900449   7.412 1.76e-13 ***
```

```
## SleepHrsNight      -0.500058    0.368580   -1.357    0.17501
## Age                 -0.104332    0.060904   -1.713    0.08684 .
## Gender              3.847769    1.400785    2.747    0.00607 **
## Race1              -0.488068    0.118385   -4.123    3.88e-05 ***
## Poverty             0.074412    0.088021    0.845    0.39799
## TotChol            -0.003453    0.131675   -0.026    0.97908
## BPDiaAve           0.062234    0.013382    4.651    3.50e-06 ***
## BPSysAve           0.049402    0.011230    4.399    1.14e-05 ***
## AlcoholYear        -0.007872    0.001467   -5.366    8.87e-08 ***
## Smoke100Yes        -0.862278    0.279596   -3.084    0.00207 **
## UrineFlow1         -0.087512    0.138264   -0.633    0.52684
## DaysMentHlthBad    -0.034557    0.017432   -1.982    0.04756 *
## DaysPhysHlthBad     0.020582    0.020320    1.013    0.31121
## HealthGenVgood      1.970712    0.456778    4.314    1.67e-05 ***
## HealthGenGood       3.642205    0.454274    8.018    1.72e-15 ***
## HealthGenFair       5.230583    0.554558    9.432    < 2e-16 ***
## HealthGenPoor       8.156997    1.043723    7.815    8.39e-15 ***
## PhysActiveYes       -0.762638    0.286844   -2.659    0.00790 **
## SleepHrsNight:Age   0.016297    0.008736    1.865    0.06226 .
## SleepHrsNight:Gender -0.498190    0.201735   -2.470    0.01360 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 6.21 on 2226 degrees of freedom
## Multiple R-squared:  0.153, Adjusted R-squared:  0.1454
## F-statistic: 20.1 on 20 and 2226 DF, p-value: < 2.2e-16
```

```
vif(m_full)
```

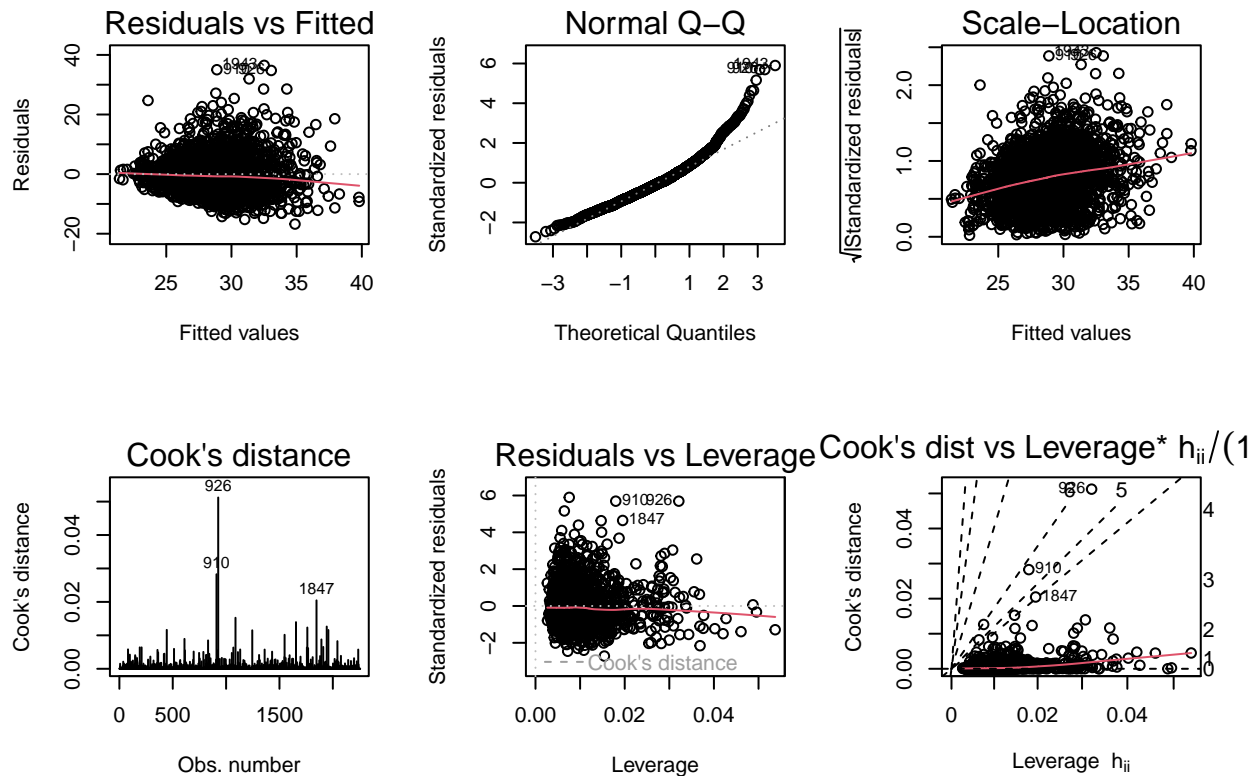
```
## there are higher-order terms (interactions) in this model
## consider setting type = 'predictor'; see ?vif
```

```
##              GVIF Df GVIF^(1/(2*Df))
## SleepHrsNight    13.512753  1      3.675970
## Age              28.066271  1      5.297761
## Gender           28.453824  1      5.334213
## Race1            1.092851  1      1.045395
## Poverty          1.294913  1      1.137942
## TotChol          1.127398  1      1.061790
## BPDiaAve         1.440942  1      1.200392
## BPSysAve         1.558228  1      1.248290
## AlcoholYear      1.117233  1      1.056993
## Smoke100         1.131190  1      1.063574
## UrineFlow1       1.043878  1      1.021703
## DaysMentHlthBad  1.133562  1      1.064689
## DaysPhysHlthBad  1.246696  1      1.116555
## HealthGen        1.438380  4      1.046488
## PhysActive       1.167611  1      1.080560
## SleepHrsNight:Age 37.226127  1      6.101322
## SleepHrsNight:Gender 30.003860  1      5.477578
```

```
par(mfrow = c(2, 3)) #read more from ?plot.lm
plot(m_full, which = 1)
plot(m_full, which = 2)
plot(m_full, which = 3)
plot(m_full, which = 4)
```



```
plot(m_full, which = 5)
plot(m_full, which = 6)
```



```
par(mfrow = c(1, 1)) # reset
```

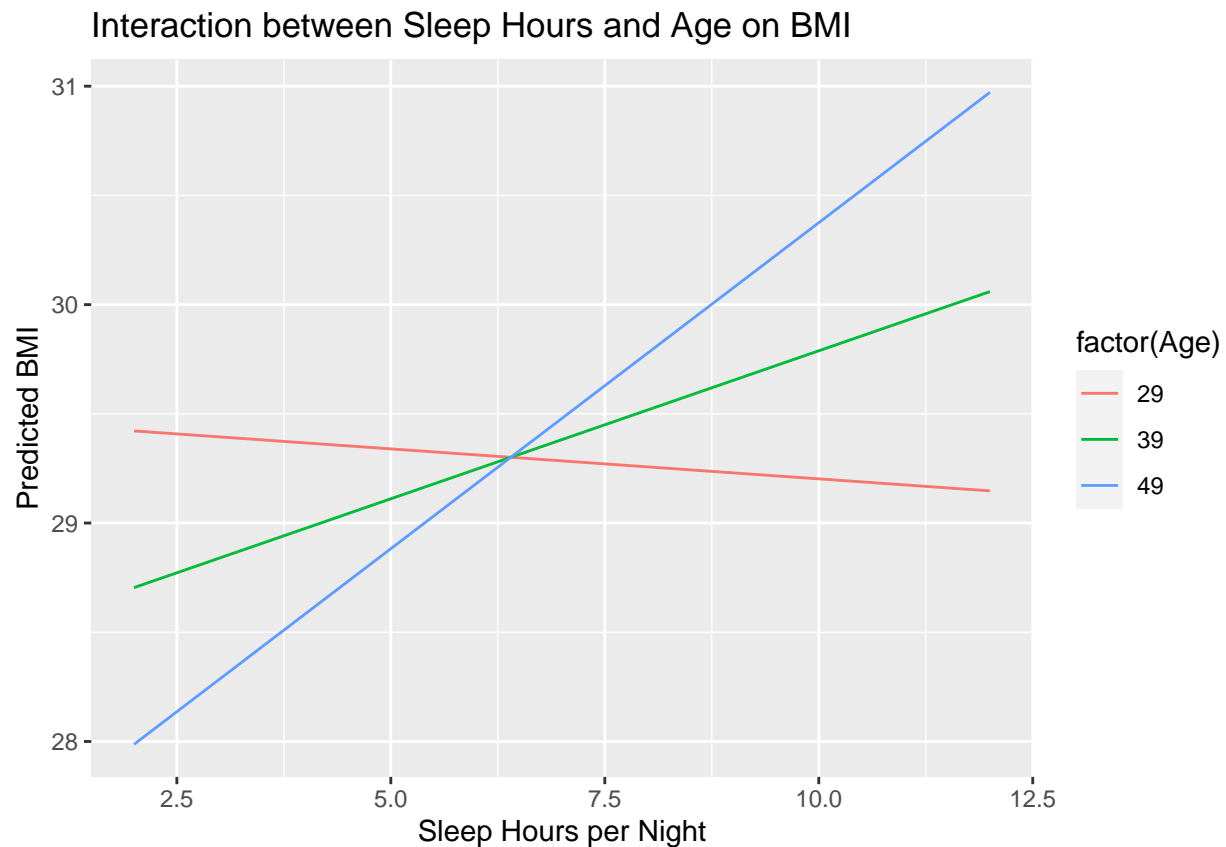
```
getMode <- function(v) {
  univq <- unique(v)
  univq[which.max(tabulate(match(v, univq)))]
}
```

```
new_data <- expand.grid(SleepHrsNight = seq(min(df3$SleepHrsNight), max(df3$SleepHrsNight), length.out = 100),
  Age = quantile(df3$Age, probs = c(0.25, 0.5, 0.75)),
  Gender = median(df3$Gender, na.rm = TRUE),
  Race1 = median(df3$Race1, na.rm = TRUE),
  Poverty = median(df3$Poverty, na.rm = TRUE),
  TotChol = median(df3$TotChol, na.rm = TRUE),
  BPDiaAve = median(df3$BPDiaAve, na.rm = TRUE),
  BPSysAve = median(df3$BPSysAve, na.rm = TRUE),
  AlcoholYear = median(df3$AlcoholYear, na.rm = TRUE),
  Smoke100 = getMode(df3$Smoke100),
  UrineFlow1 = median(df3$UrineFlow1, na.rm = TRUE),
  DaysMentHlthBad = median(df3$DaysMentHlthBad, na.rm = TRUE),
  DaysPhysHlthBad = median(df3$DaysPhysHlthBad, na.rm = TRUE),
  HealthGen = getMode(df3$HealthGen),
  PhysActive = getMode(df3$PhysActive)
)
```

```

# predict
new_data$predicted_BMI <- predict(m_full, newdata = new_data)
# interaction
library(ggplot2)
ggplot(new_data, aes(x = SleepHrsNight, y = predicted_BMI, group = factor(Age))) +
  geom_line(aes(color = factor(Age))) +
  labs(title = "Interaction between Sleep Hours and Age on BMI",
       x = "Sleep Hours per Night",
       y = "Predicted BMI")

```



#### (4) Diagnosis: 10-fold CV

```

library(caret)

## Loading required package: lattice
splitIndex <-
  createDataPartition(df3$SleepHrsNight, p = 0.7, list = FALSE)
trainData <- df3[splitIndex, ]
testData <- df3[-splitIndex, ]
predictions <- predict(m_full, newdata = testData)
mse <- mean((testData$SleepHrsNight - predictions) ^ 2)
control <-
  trainControl(method = "cv", number = 10) # 10-fold cross-validation

```

```

cv_model <-
  train(
    SleepHrsNight ~ .,
    data = df3,
    method = "lm",
    trControl = control
  )
cv_model

## Linear Regression
##
## 2247 samples
## 16 predictor
##
## No pre-processing
## Resampling: Cross-Validated (10 fold)
## Summary of sample sizes: 2023, 2022, 2022, 2021, 2023, 2023, ...
## Resampling results:
##
##   RMSE      Rsquared   MAE
## 1.275969  0.04783007  0.991811
##
## Tuning parameter 'intercept' was held constant at a value of TRUE
(cv_results <- cv_model$results)

##   intercept      RMSE  Rsquared      MAE   RMSESD RsquaredSD   MAESD
## 1         TRUE 1.275969 0.04783007 0.991811 0.08216468 0.01871131 0.04949381

```

## (4) Diagnosis: Normality Assumption

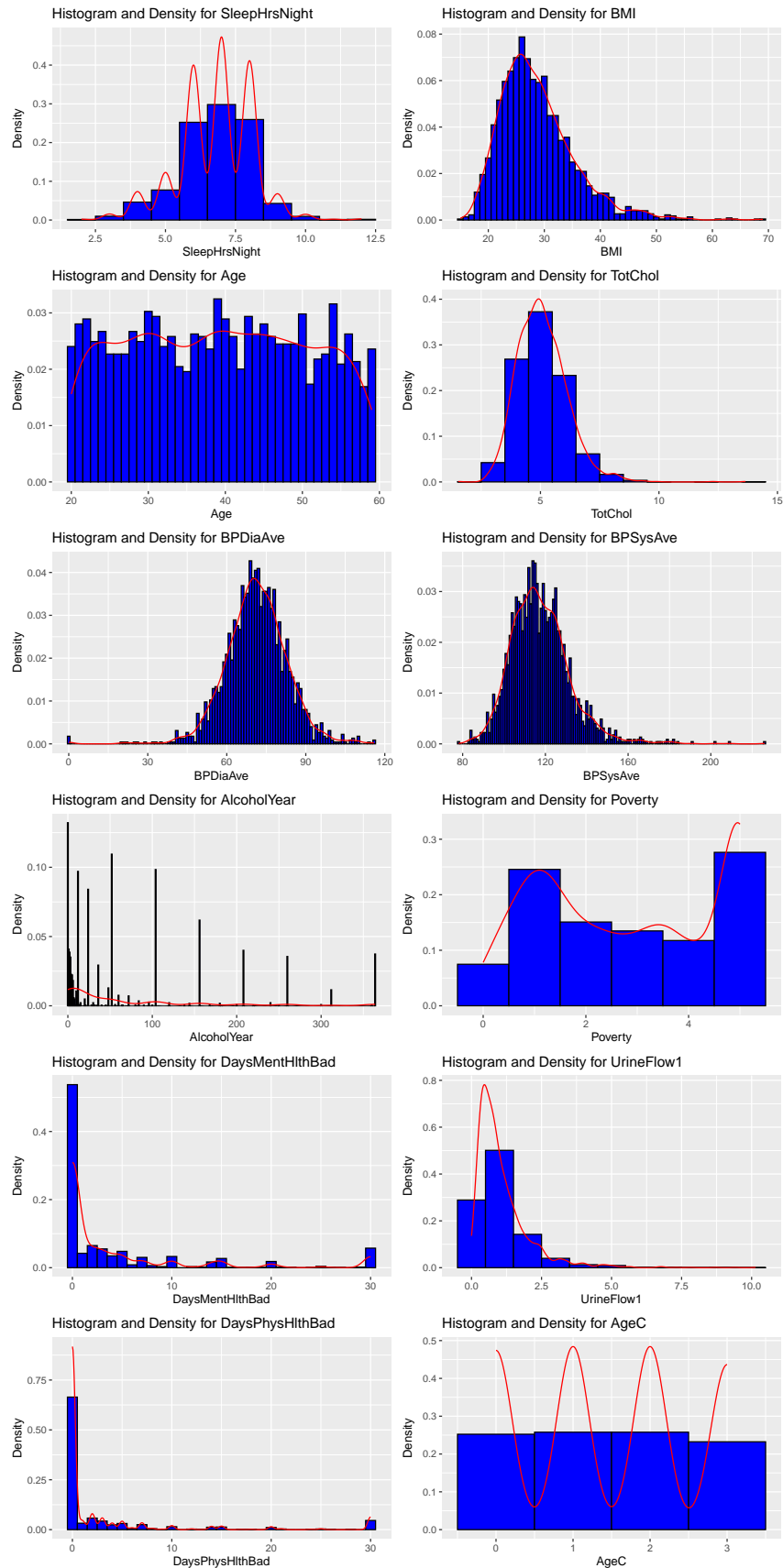
```

library(ggplot2)
library(patchwork)
# Initializes an empty patchwork object
plot_list <- list()

# Draw a histogram for each numeric variable (except Race1 and Gender) and add it to the list
for (var in names(df3)) {
  if (is.numeric(df3[[var]]) && !(var %in% c("Race1", "Gender"))) {
    p <- ggplot(df3, aes(x = .data[[var]])) +
      geom_histogram(
        aes(y = after_stat(density)),
        binwidth = 1,
        fill = "blue",
        color = "black"
      ) +
      geom_density(col = "red") +
      ggtitle(paste("Histogram and Density for", var)) +
      xlab(var) +
      ylab("Density")
    plot_list[[length(plot_list) + 1]] <- p
  }
}

```

```
}  
  
# Use patchwork to put all the charts together  
combined_plot <- wrap_plots(plot_list, ncol = 2)  
print(combined_plot)
```



```

df3 <- data.frame(df3)
library(dplyr)
# Shapiro-Wilk normality test is performed for each numerical variable in df3
results <- sapply(df3, function(x) {
  if (is.numeric(x)) {
    shapiro_test <- shapiro.test(x)
    return(c(shapiro_test$statistic, shapiro_test$p.value))
  } else {
    return(c(NA, NA))
  }
})
# Convert the result to a data box and name the column
results_df <- as.data.frame(t(results))
names(results_df) <- c("W", "p.value")
# Add a variable name as a new column
results_df$Variable <- rownames(results_df)
# Rearrange the order of columns
results_df <- results_df[, c("Variable", "W", "p.value")]
# Calculate the corrected P-value (for example, using Bonferroni correction)
results_df$p.adjusted <-
  p.adjust(results_df$p.value, method = "bonferroni")
print(results_df)

```

```

##           Variable      W      p.value  p.adjusted
## SleepHrsNight SleepHrsNight 0.9338622 1.778905e-30 2.490467e-29
## BMI           BMI          0.9282826 1.612730e-31 2.257822e-30
## Age           Age          0.9560746 1.722452e-25 2.411432e-24
## Gender        Gender       0.6349727 2.212481e-56 3.097473e-55
## Race1         Race1        0.7417356 1.804321e-50 2.526049e-49
## TotChol       TotChol      0.9644072 4.128738e-23 5.780233e-22
## BPDiaAve      BPDiaAve     0.9724617 2.239823e-20 3.135753e-19
## BPSysAve      BPSysAve     0.9467229 8.775437e-28 1.228561e-26
## AlcoholYear   AlcoholYear  0.7431971 2.241076e-50 3.137506e-49
## Poverty       Poverty      0.8945201 9.727860e-37 1.361900e-35
## DaysMentHlthBad DaysMentHlthBad 0.6093542 1.400760e-57 1.961064e-56
## UrineFlow1    UrineFlow1   0.7578721 2.095427e-49 2.933597e-48
## PhysActive     PhysActive    NA           NA           NA
## DaysPhysHlthBad DaysPhysHlthBad 0.4970302 3.684373e-62 5.158122e-61
## Smoke100       Smoke100     NA           NA           NA
## HealthGen      HealthGen     NA           NA           NA
## AgeC           AgeC         0.8597608 7.335056e-41 1.026908e-39

```

## Standardized residuals, Studentized residuals

```

# Regular residuals
residual_1 <- m_full$residuals

# Standardized residuals
residual_2 <- rstandard(m_full)

# Studentized residuals
residual_3 <- rstudent(m_full)

```

```

# Externally studentized residuals
# Note: Externally studentized residuals are the same as studentized residuals in most cases
residual_4 <- rstudent(m_full)

# Creating a data frame to summarize these residuals
residual_summary <- data.frame(
  Residuals = c("Regular", "Standardized", "Studentized", "Externally Studentized"),
  Mean = c(mean(residual_1), mean(residual_2), mean(residual_3), mean(residual_4)),
  SD = c(sd(residual_1), sd(residual_2), sd(residual_3), sd(residual_4)),
  Min = c(min(residual_1), min(residual_2), min(residual_3), min(residual_4)),
  Max = c(max(residual_1), max(residual_2), max(residual_3), max(residual_4))
)

# Display the summary
print(residual_summary)

```

	Residuals	Mean	SD	Min	Max
## 1	Regular	-1.005375e-16	6.182265	-16.764148	36.491300
## 2	Standardized	-1.169070e-05	1.000896	-2.720637	5.898602
## 3	Studentized	2.295298e-04	1.001991	-2.724559	5.943913
## 4	Externally Studentized	2.295298e-04	1.001991	-2.724559	5.943913

```

# Load necessary library
library(ggplot2)

# Assuming m_full is your linear model
# m_full <- lm(SleepMinNight ~ ., data = df3)

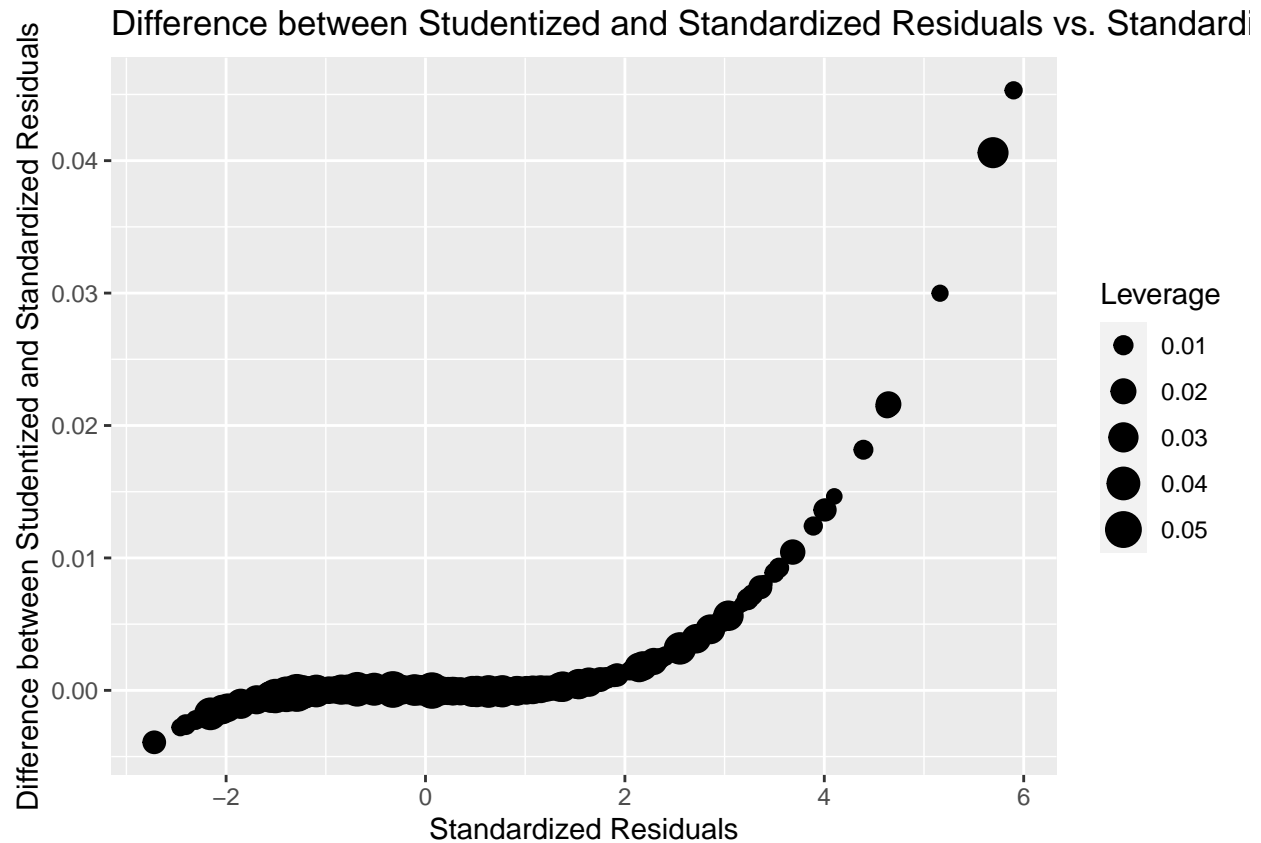
# Calculate standardized and studentized residuals
residual_2 <- rstandard(m_full)
residual_3 <- rstudent(m_full)

# Calculate leverage values
leverage_values <- hatvalues(m_full)

# Create a data frame for plotting
plot_data <- data.frame(
  Standardized_Residuals = residual_2,
  Difference = residual_3 - residual_2,
  Leverage = leverage_values
)

# Create the plot
ggplot(plot_data, aes(x = Standardized_Residuals, y = Difference)) +
  geom_point(aes(size = Leverage)) +
  ggtitle("Difference between Studentized and Standardized Residuals vs. Standardized Residuals") +
  xlab("Standardized Residuals") +
  ylab("Difference between Studentized and Standardized Residuals")

```



```
# Display the plot
print(ggplot)
```

```
## function (data = NULL, mapping = aes(), ..., environment = parent.frame())
## {
##   UseMethod("ggplot")
## }
## <bytecode: 0x21358a8>
## <environment: namespace:ggplot2>
```

```
# Load necessary library
library(ggplot2)
```

```
# Assuming m_full is your linear model
# m_full <- lm(SleepMinNight ~ ., data = df3)
```

```
# Calculate studentized and externally studentized residuals
```

```
residual_3 <- rstudent(m_full)
```

```
residual_4 <- rstudent(m_full) # Externally studentized residuals are typically the same as studentized
```

```
# Regular residuals
```

```
residual_1 <- m_full$residuals
```

```
# Create a data frame for plotting
```

```
plot_data <- data.frame(
  Studentized_Residuals = residual_3,
  Difference = residual_4 - residual_3,
```

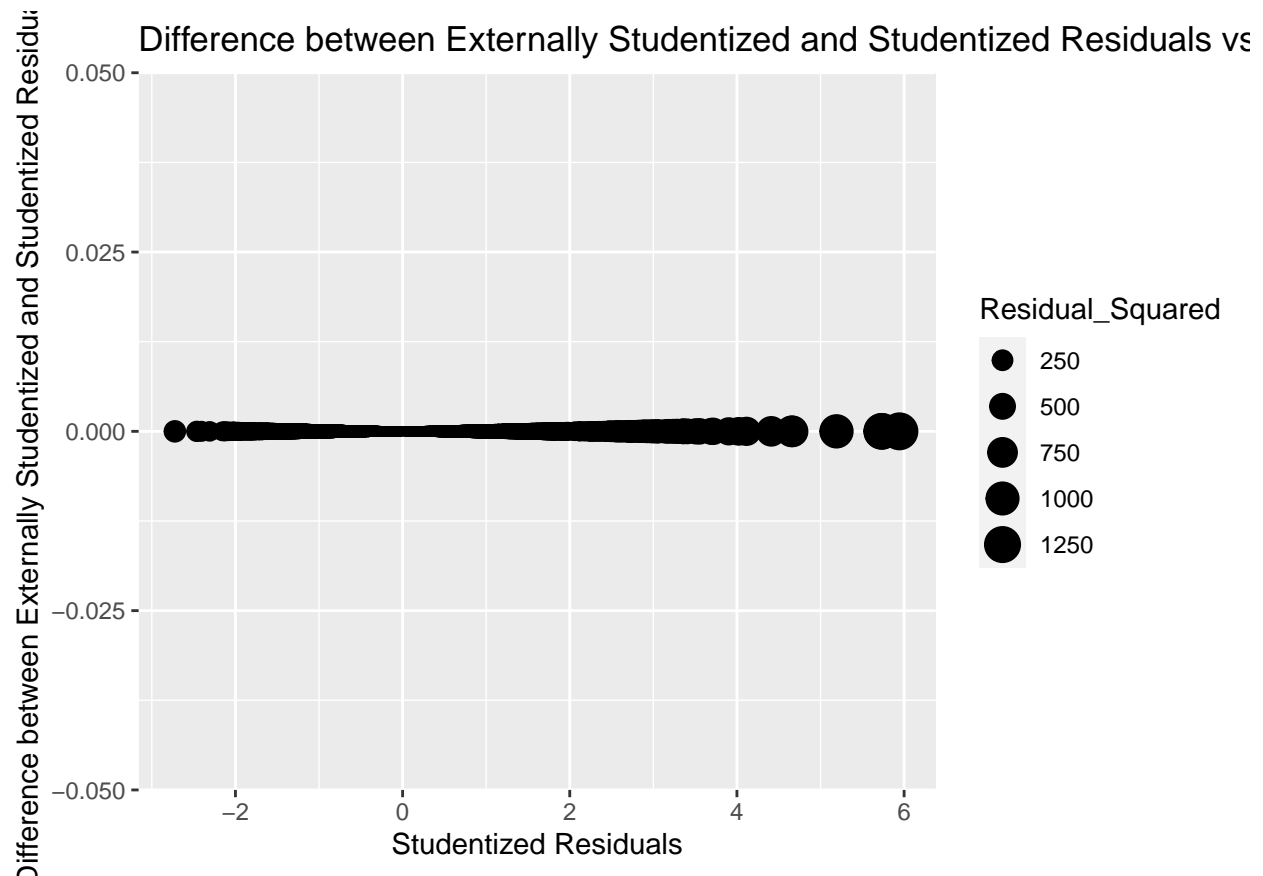


```

Residual_Squared = residual_1^2
)

# Create the plot
ggplot(plot_data, aes(x = Studentized_Residuals, y = Difference)) +
  geom_point(aes(size = Residual_Squared)) +
  ggtitle("Difference between Externally Studentized and Studentized Residuals vs. Studentized Residuals") +
  xlab("Studentized Residuals") +
  ylab("Difference between Externally Studentized and Studentized Residuals")

```



```

# Display the plot
print(ggplot)

```

```

## function (data = NULL, mapping = aes(), ..., environment = parent.frame())
## {
##   UseMethod("ggplot")
## }
## <bytecode: 0x21358a8>
## <environment: namespace:ggplot2>

```

```

# Load necessary library
library(ggplot2)

# Assuming m_full is your linear model
# m_full <- lm(SleepMinNight ~ ., data = df3)

# Calculate regular residuals

```

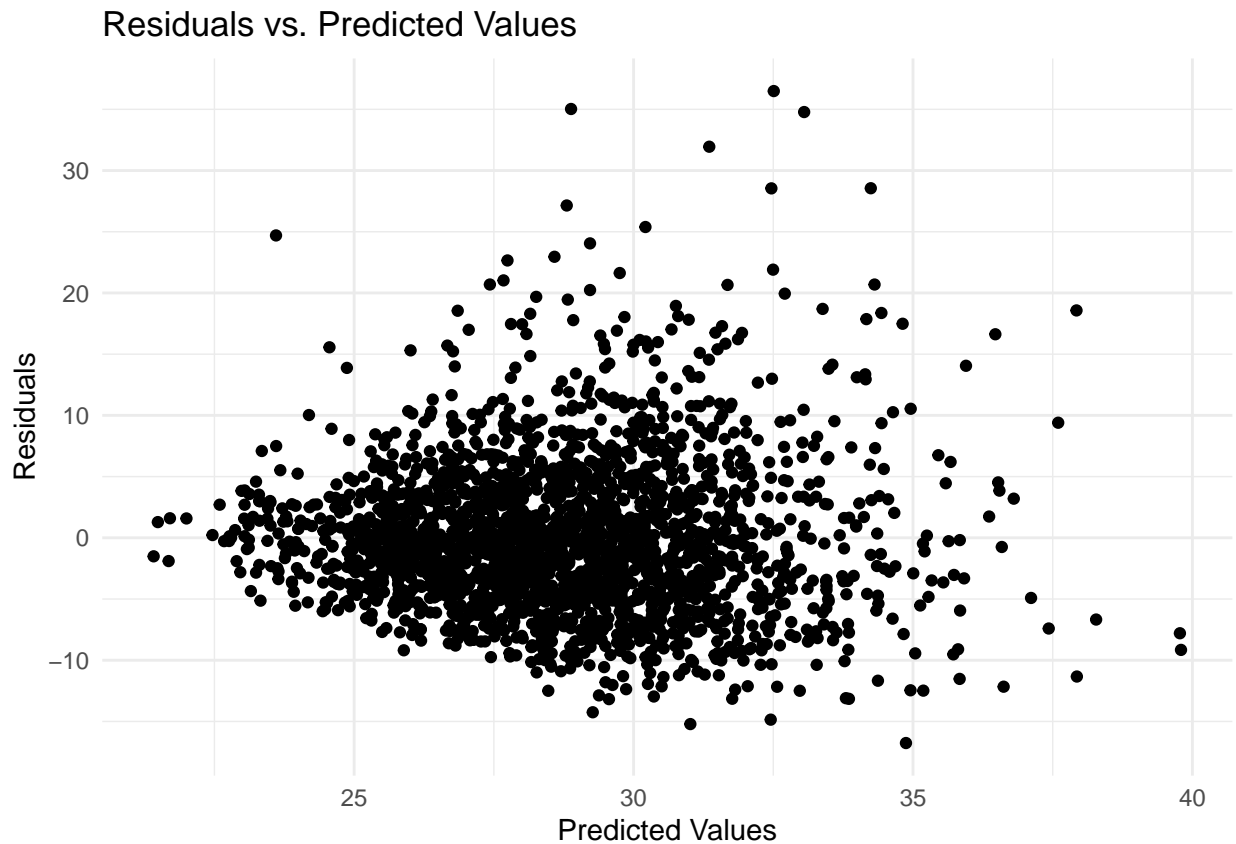
```

residual_1 <- m_full$residuals

# Get predicted values from the model
predicted_values <- predict(m_full)

# Create the plot
ggplot() +
  geom_point(aes(x = predicted_values, y = residual_1)) +
  ggtitle("Residuals vs. Predicted Values") +
  xlab("Predicted Values") +
  ylab("Residuals") +
  theme_minimal()

```



```

# Display the plot
print(ggplot)

## function (data = NULL, mapping = aes(), ..., environment = parent.frame())
## {
##   UseMethod("ggplot")
## }
## <bytecode: 0x21358a8>
## <environment: namespace:ggplot2>

# Load necessary library
library(ggplot2)

# Assuming m_full is your linear model

```

```

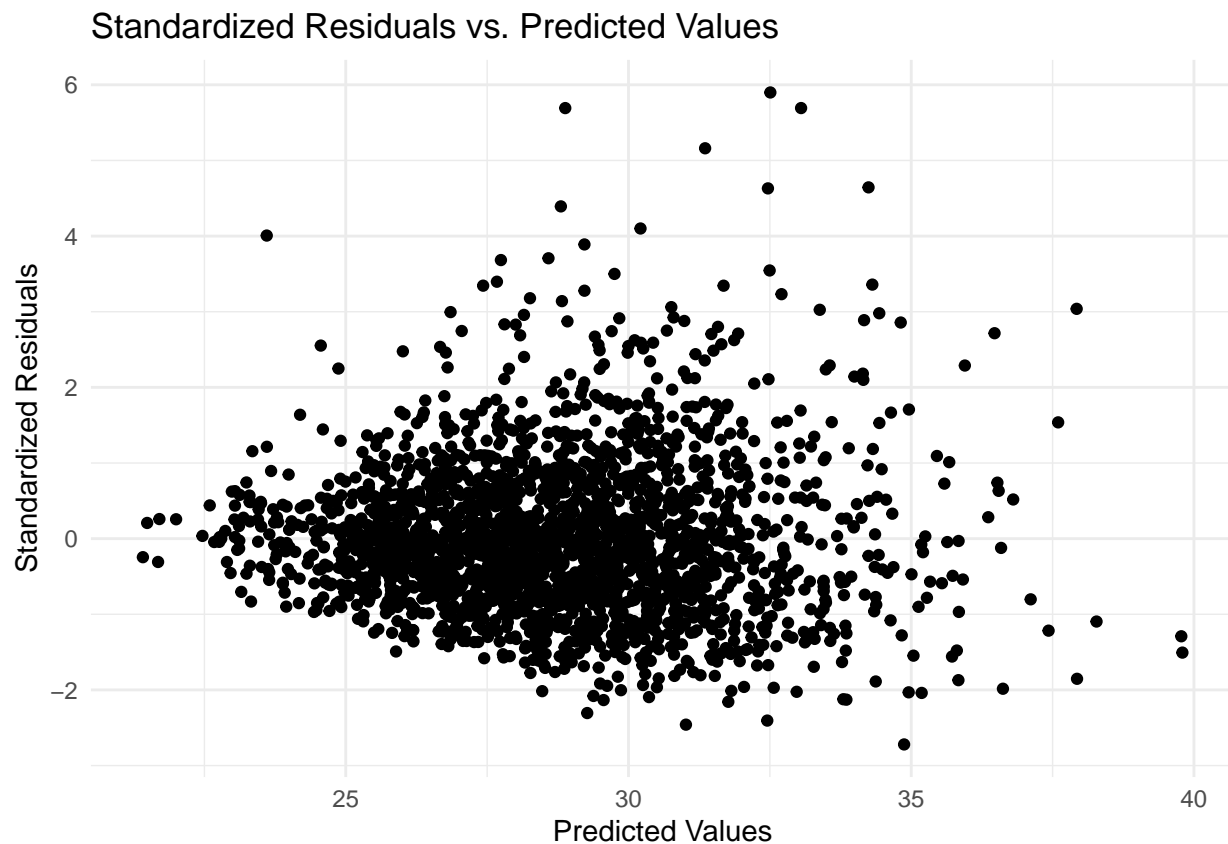
# m_full <- lm(SleepMinNight ~ ., data = df3)

# Calculate different types of residuals
residual_2 <- rstandard(m_full)
residual_3 <- rstudent(m_full)
residual_4 <- rstudent(m_full) # Externally studentized residuals

# Get predicted values from the model
predicted_values <- predict(m_full)

# Plot for Standardized Residuals
ggplot() +
  geom_point(aes(x = predicted_values, y = residual_2)) +
  ggtitle("Standardized Residuals vs. Predicted Values") +
  xlab("Predicted Values") +
  ylab("Standardized Residuals") +
  theme_minimal()

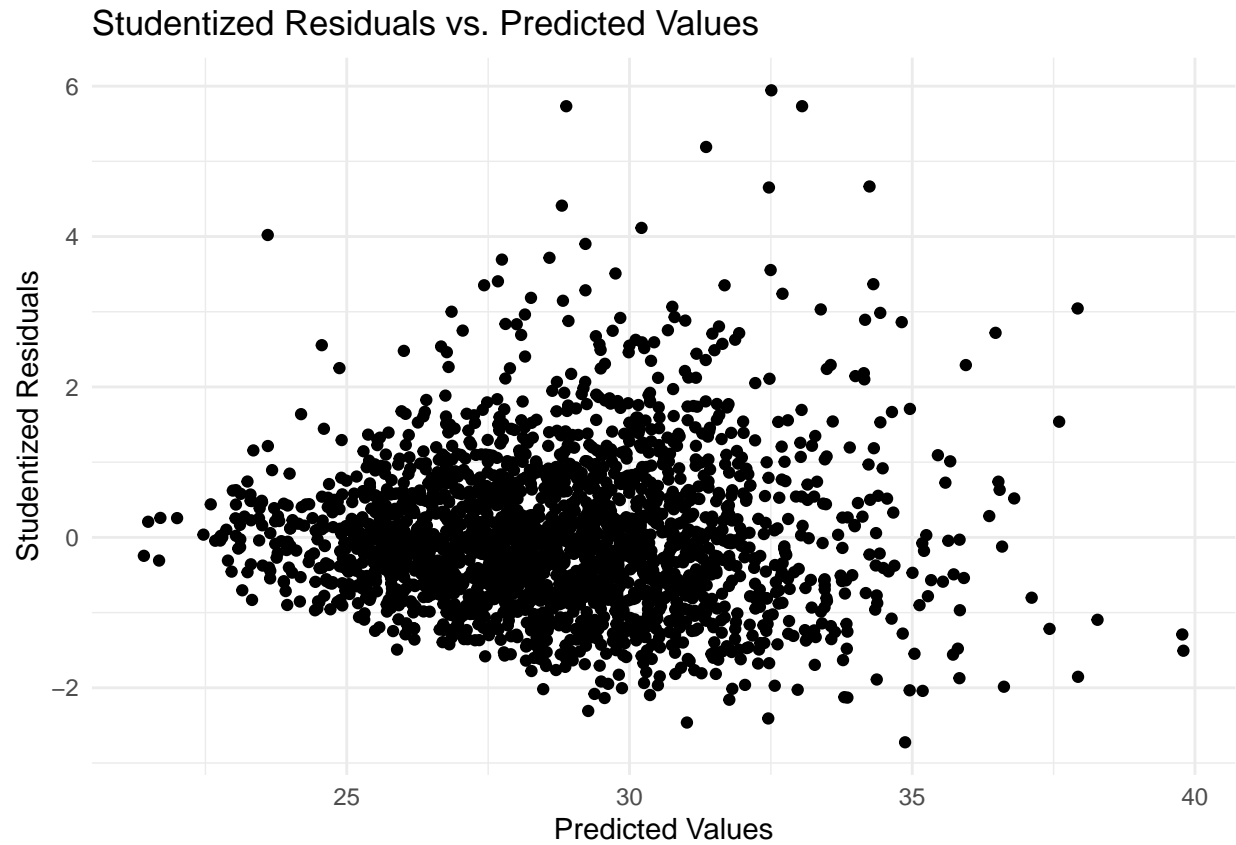
```



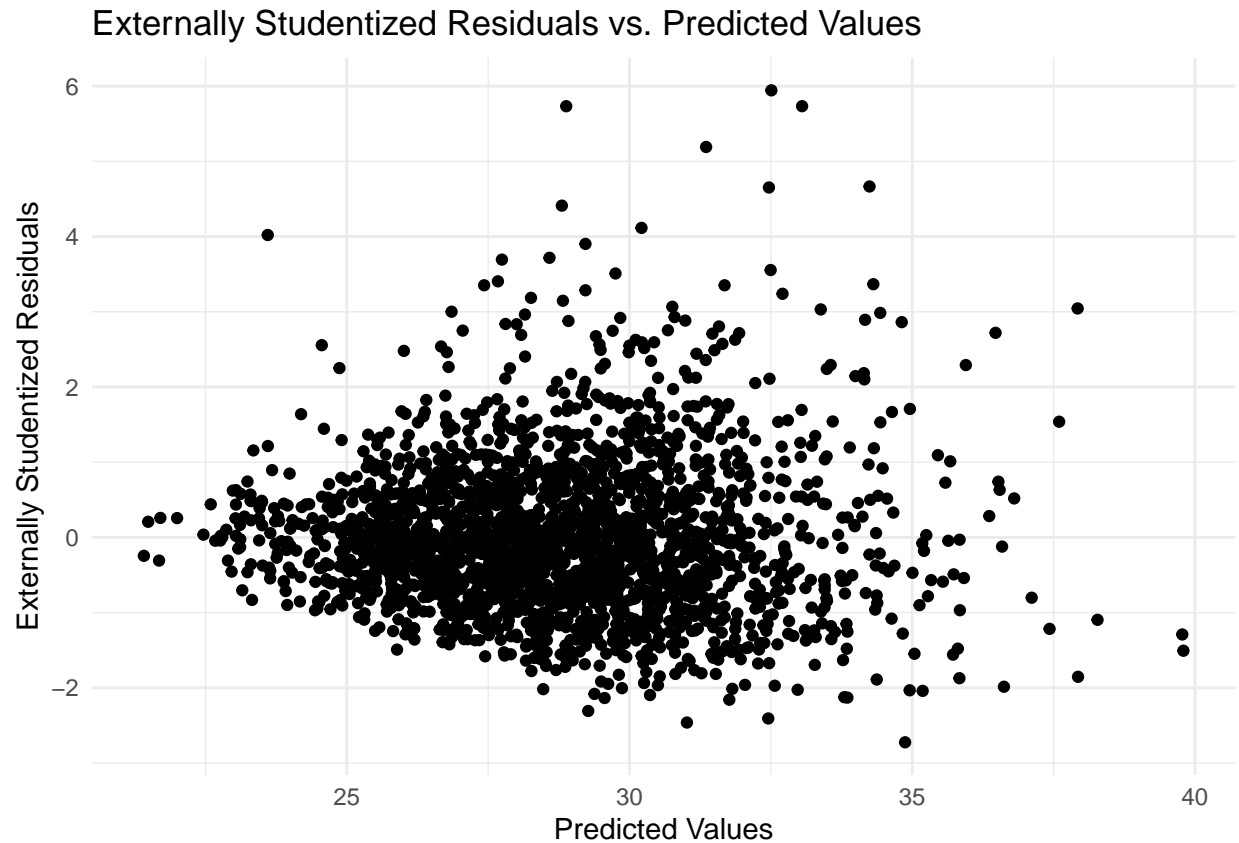
```

# Plot for Studentized Residuals
ggplot() +
  geom_point(aes(x = predicted_values, y = residual_3)) +
  ggtitle("Studentized Residuals vs. Predicted Values") +
  xlab("Predicted Values") +
  ylab("Studentized Residuals") +
  theme_minimal()

```



```
# Plot for Externally Studentized Residuals
ggplot() +
  geom_point(aes(x = predicted_values, y = residual_4)) +
  ggtitle("Externally Studentized Residuals vs. Predicted Values") +
  xlab("Predicted Values") +
  ylab("Externally Studentized Residuals") +
  theme_minimal()
```



## (5) Model Selection

```
step(m_full)
```

```
## Start:  AIC=8227.65
## BMI ~ SleepHrsNight + Age + Gender + Race1 + Poverty + TotChol +
##       BPDiaAve + BPSysAve + AlcoholYear + Smoke100 + UrineFlow1 +
##       DaysMentHlthBad + DaysPhysHlthBad + HealthGen + PhysActive +
##       SleepHrsNight * Age + SleepHrsNight * Gender
##
##              Df Sum of Sq  RSS   AIC
## - TotChol      1      0.0 85843 8225.7
## - UrineFlow1    1     15.4 85858 8226.1
## - Poverty       1     27.6 85871 8226.4
## - DaysPhysHlthBad 1     39.6 85883 8226.7
## <none>                  85843 8227.7
## - SleepHrsNight:Age 1    134.2 85977 8229.2
## - DaysMentHlthBad   1    151.6 85995 8229.6
## - SleepHrsNight:Gender 1   235.2 86078 8231.8
## - PhysActive        1   272.6 86116 8232.8
## - Smoke100          1   366.8 86210 8235.2
## - Race1             1   655.5 86498 8242.7
## - BPSysAve          1   746.3 86589 8245.1
## - BPDiaAve          1   834.1 86677 8247.4
```

```

## - AlcoholYear          1    1110.5 86954 8254.5
## - HealthGen            4    4944.8 90788 8345.5
##
## Step: AIC=8225.65
## BMI ~ SleepHrsNight + Age + Gender + Race1 + Poverty + BPDiaAve +
##       BPSysAve + AlcoholYear + Smoke100 + UrineFlow1 + DaysMentHlthBad +
##       DaysPhysHlthBad + HealthGen + PhysActive + SleepHrsNight:Age +
##       SleepHrsNight:Gender
##
##              Df Sum of Sq  RSS    AIC
## - UrineFlow1    1      15.5 85858 8224.1
## - Poverty        1      27.7 85871 8224.4
## - DaysPhysHlthBad 1      39.6 85883 8224.7
## <none>                                85843 8225.7
## - SleepHrsNight:Age 1     134.2 85977 8227.2
## - DaysMentHlthBad   1     151.5 85995 8227.6
## - SleepHrsNight:Gender 1    235.2 86078 8229.8
## - PhysActive        1     272.6 86116 8230.8
## - Smoke100          1     367.0 86210 8233.2
## - Race1             1     657.2 86500 8240.8
## - BPSysAve          1     746.5 86590 8243.1
## - BPDiaAve          1     841.8 86685 8245.6
## - AlcoholYear       1    1113.5 86957 8252.6
## - HealthGen         4    4948.2 90791 8343.6
##
## Step: AIC=8224.06
## BMI ~ SleepHrsNight + Age + Gender + Race1 + Poverty + BPDiaAve +
##       BPSysAve + AlcoholYear + Smoke100 + DaysMentHlthBad + DaysPhysHlthBad +
##       HealthGen + PhysActive + SleepHrsNight:Age + SleepHrsNight:Gender
##
##              Df Sum of Sq  RSS    AIC
## - Poverty        1      25.0 85883 8222.7
## - DaysPhysHlthBad 1      39.6 85898 8223.1
## <none>                                85858 8224.1
## - SleepHrsNight:Age 1     137.0 85996 8225.6
## - DaysMentHlthBad   1     153.8 86012 8226.1
## - SleepHrsNight:Gender 1    234.0 86092 8228.2
## - PhysActive        1     280.2 86139 8229.4
## - Smoke100          1     368.8 86227 8231.7
## - Race1             1     681.7 86540 8239.8
## - BPSysAve          1     743.9 86602 8241.4
## - BPDiaAve          1     843.0 86701 8244.0
## - AlcoholYear       1    1134.1 86993 8251.5
## - HealthGen         4    4962.7 90821 8342.3
##
## Step: AIC=8222.71
## BMI ~ SleepHrsNight + Age + Gender + Race1 + BPDiaAve + BPSysAve +
##       AlcoholYear + Smoke100 + DaysMentHlthBad + DaysPhysHlthBad +
##       HealthGen + PhysActive + SleepHrsNight:Age + SleepHrsNight:Gender
##
##              Df Sum of Sq  RSS    AIC
## - DaysPhysHlthBad   1      38.8 85922 8221.7
## <none>                                85883 8222.7
## - SleepHrsNight:Age 1     142.8 86026 8224.4

```

```

## - DaysMentHlthBad      1      159.0 86042 8224.9
## - SleepHrsNight:Gender 1      229.1 86113 8226.7
## - PhysActive           1      262.8 86146 8227.6
## - Smoke100             1      411.9 86295 8231.5
## - Race1                1      659.8 86543 8237.9
## - BPSysAve             1      732.1 86616 8239.8
## - BPDiaAve             1      850.4 86734 8242.9
## - AlcoholYear          1     1110.7 86994 8249.6
## - HealthGen            4     5020.1 90904 8342.4
##
## Step: AIC=8221.72
## BMI ~ SleepHrsNight + Age + Gender + Race1 + BPDiaAve + BPSysAve +
##       AlcoholYear + Smoke100 + DaysMentHlthBad + HealthGen + PhysActive +
##       SleepHrsNight:Age + SleepHrsNight:Gender
##
##              Df Sum of Sq  RSS   AIC
## <none>                        85922 8221.7
## - DaysMentHlthBad      1      137.3 86060 8223.3
## - SleepHrsNight:Age    1      139.2 86061 8223.4
## - SleepHrsNight:Gender 1      230.5 86153 8225.7
## - PhysActive           1      276.0 86198 8226.9
## - Smoke100             1      401.5 86324 8230.2
## - Race1                1      658.7 86581 8236.9
## - BPSysAve             1      738.0 86660 8238.9
## - BPDiaAve             1      833.2 86755 8241.4
## - AlcoholYear          1     1126.8 87049 8249.0
## - HealthGen            4     5578.5 91501 8355.1
##
## Call:
## lm(formula = BMI ~ SleepHrsNight + Age + Gender + Race1 + BPDiaAve +
##       BPSysAve + AlcoholYear + Smoke100 + DaysMentHlthBad + HealthGen +
##       PhysActive + SleepHrsNight:Age + SleepHrsNight:Gender, data = df3)
##
## Coefficients:
##              (Intercept)          SleepHrsNight              Age
##              21.681859             -0.515830             -0.102502
##              Gender              Race1              BPDiaAve
##              3.824307             -0.482813              0.061771
##              BPSysAve          AlcoholYear          Smoke100Yes
##              0.049041             -0.007851             -0.888609
##              DaysMentHlthBad    HealthGenVgood    HealthGenGood
##              -0.032375              1.953213              3.630407
##              HealthGenFair    HealthGenPoor    PhysActiveYes
##              5.233284              8.345291             -0.757817
##              SleepHrsNight:Age SleepHrsNight:Gender
##              0.016559             -0.492786

```

```
library(olsrr)
```

```

##
## Attaching package: 'olsrr'
##
## The following object is masked from 'package:datasets':
##
##       rivers

```

```
ols_step_forward_p(m_full, penter = 0.1, details = F)
```

```
##
##                               Selection Summary
## -----
##      Variable                Adj.
## Step      Entered      R-Square  R-Square      C(p)      AIC      RMSE
## -----
##   1  HealthGen           0.0851   0.0834   161.4477   14747.6355   6.4310
##   2  BPDiaAve            0.1087   0.1067   101.4337   14690.9219   6.3490
##   3  AlcoholYear         0.1232   0.1208    65.3495   14656.0890   6.2985
##   4  Race1               0.1327   0.1300    42.2855   14633.5149   6.2656
##   5  BPSysAve            0.1395   0.1365    26.3217   14617.7354   6.2422
##   6  Smoke100            0.1429   0.1395    19.3686   14610.8213   6.2313
##   7  PhysActive          0.1457   0.1418    14.2291   14605.6875   6.2228
##   8  DaysMentHlthBad     0.1467   0.1425    13.4727   14604.9273   6.2203
##   9  Gender              0.1478   0.1432    12.5457   14603.9924   6.2177
##  10  SleepHrsNight:Gender 0.1503   0.1453     8.1002   14599.5162   6.2101
##  11  Poverty             0.1507   0.1454     8.9990   14600.4079   6.2100
##  12  TotChol             0.1507   0.1450    10.9712   14602.3799   6.2113
##  13  UrineFlow1         0.1509   0.1448    12.5565   14603.9624   6.2121
##  14  DaysPhysHlthBad     0.1513   0.1448    13.5233   14604.9217   6.2121
##  15  Age                 0.1513   0.1445    15.3130   14606.7098   6.2132
##  16  SleepHrsNight       0.1516   0.1444    16.4798   14607.8703   6.2134
##  17  SleepHrsNight:Age   0.1530   0.1454    15.0000   14606.3604   6.2100
## -----
```

```
ols_step_forward_p(m_full, penter = 0.05, details = F)
```

```
##
##                               Selection Summary
## -----
##      Variable                Adj.
## Step      Entered      R-Square  R-Square      C(p)      AIC      RMSE
## -----
##   1  HealthGen           0.0851   0.0834   161.4477   14747.6355   6.4310
##   2  BPDiaAve            0.1087   0.1067   101.4337   14690.9219   6.3490
##   3  AlcoholYear         0.1232   0.1208    65.3495   14656.0890   6.2985
##   4  Race1               0.1327   0.1300    42.2855   14633.5149   6.2656
##   5  BPSysAve            0.1395   0.1365    26.3217   14617.7354   6.2422
##   6  Smoke100            0.1429   0.1395    19.3686   14610.8213   6.2313
##   7  PhysActive          0.1457   0.1418    14.2291   14605.6875   6.2228
## -----
```

```
ols_mallows_cp(model = m_3, fullmodel = m_full) # Mallows' Cp
```

```
## [1] 20.43401
```

```
#general hypothesis test
```

```
# Load the required libraries
```

```
library(dplyr)
```

```
library(car)
```

```
library(emmeans)
```

```
# Assuming your dataframe is df3
```



```

# Categorizing Age
df3 <- df3 %>%
  mutate(
    Age_Category = case_when(
      Age >= 18 & Age < 30 ~ "18-29",
      Age >= 30 & Age < 40 ~ "30-39",
      Age >= 40 & Age < 50 ~ "40-49",
      Age >= 50 & Age < 60 ~ "50-59",
      TRUE ~ NA_character_ # For cases not in the 18 to 60 age range
    ),
    Gender = as.factor(Gender), # Ensure Gender is a factor type
    Race1 = as.factor(Race1)    # Ensure Race1 is a factor type
  )

# Update the model using categorical variables
m_full_updated <- lm(SleepHrsNight ~ Age_Category + Gender + Race1, data = df3)

# Overall hypothesis test
anova_results_updated <- Anova(m_full_updated, type="III")

```

```

## Warning in printHypothesis(L, rhs, names(b)): one or more coefficients in the hypothesis include
##      arithmetic operators in their names;
##      the printed representation of the hypothesis will be omitted

```

```
summary(anova_results_updated)
```

```

##      Sum Sq      Df    F value    Pr(>F)
## Min.   : 17.33  Min.   :  1.0  Min.   :  3.866  Min.   :0.0000000
## 1st Qu.: 19.51  1st Qu.:  1.0  1st Qu.:  5.077  1st Qu.:0.0001630
## Median : 36.88  Median :  3.0  Median :  7.890  Median :0.0007829
## Mean   :2468.70  Mean   :449.4  Mean   :1268.683  Mean   :0.0026434
## 3rd Qu.:3765.17  3rd Qu.:  4.0  3rd Qu.:1271.497  3rd Qu.:0.0032633
## Max.   :8504.59  Max.   :2238.0  Max.   :5055.085  Max.   :0.0090077
##                                     NA's   :1      NA's   :1

```

```
# Post-hoc comparisons using emmeans
```

```
emmeans_results_updated <- emmeans(m_full_updated, specs = pairwise ~ Age_Category + Gender + Race1)
summary(emmeans_results_updated)
```

```
## $emmeans
```

```

## Age_Category Gender Race1 emmean    SE    df lower.CL upper.CL
## 18-29         0       1      6.55 0.0921 2238     6.37     6.73
## 30-39         0       1      6.44 0.0929 2238     6.26     6.62
## 40-49         0       1      6.32 0.0933 2238     6.13     6.50
## 50-59         0       1      6.33 0.0938 2238     6.15     6.51
## 18-29         1       1      6.73 0.0912 2238     6.55     6.90
## 30-39         1       1      6.62 0.0918 2238     6.44     6.80
## 40-49         1       1      6.49 0.0930 2238     6.31     6.68
## 50-59         1       1      6.51 0.0947 2238     6.32     6.69
## 18-29         0       2      6.75 0.1157 2238     6.52     6.98
## 30-39         0       2      6.64 0.1172 2238     6.41     6.87
## 40-49         0       2      6.52 0.1173 2238     6.29     6.75
## 50-59         0       2      6.53 0.1196 2238     6.30     6.77
## 18-29         1       2      6.93 0.1163 2238     6.70     7.16
## 30-39         1       2      6.82 0.1177 2238     6.59     7.05

```

```

## 40-49      1      2      6.69 0.1183 2238      6.46      6.93
## 50-59      1      2      6.71 0.1216 2238      6.47      6.95
## 18-29      0      3      6.97 0.0953 2238      6.78      7.15
## 30-39      0      3      6.86 0.0959 2238      6.67      7.05
## 40-49      0      3      6.73 0.0960 2238      6.55      6.92
## 50-59      0      3      6.75 0.1009 2238      6.55      6.95
## 18-29      1      3      7.14 0.0995 2238      6.95      7.34
## 30-39      1      3      7.04 0.1001 2238      6.84      7.23
## 40-49      1      3      6.91 0.1008 2238      6.71      7.11
## 50-59      1      3      6.92 0.1065 2238      6.72      7.13
## 18-29      0      4      6.91 0.0667 2238      6.78      7.04
## 30-39      0      4      6.80 0.0651 2238      6.67      6.93
## 40-49      0      4      6.68 0.0636 2238      6.55      6.80
## 50-59      0      4      6.69 0.0643 2238      6.56      6.82
## 18-29      1      4      7.09 0.0667 2238      6.96      7.22
## 30-39      1      4      6.98 0.0648 2238      6.85      7.11
## 40-49      1      4      6.85 0.0644 2238      6.73      6.98
## 50-59      1      4      6.87 0.0667 2238      6.74      7.00
## 18-29      0      5      6.84 0.1107 2238      6.62      7.06
## 30-39      0      5      6.73 0.1110 2238      6.52      6.95
## 40-49      0      5      6.61 0.1134 2238      6.39      6.83
## 50-59      0      5      6.62 0.1156 2238      6.40      6.85
## 18-29      1      5      7.02 0.1125 2238      6.80      7.24
## 30-39      1      5      6.91 0.1128 2238      6.69      7.13
## 40-49      1      5      6.79 0.1156 2238      6.56      7.01
## 50-59      1      5      6.80 0.1188 2238      6.57      7.03
##
## Confidence level used: 0.95
##
## $contrasts
## contrast      estimate      SE      df t.ratio
## (18-29 Gender0 Race11) - (30-39 Gender0 Race11) 0.107323 0.0767 2238 1.399
## (18-29 Gender0 Race11) - (40-49 Gender0 Race11) 0.232162 0.0769 2238 3.018
## (18-29 Gender0 Race11) - (50-59 Gender0 Race11) 0.218216 0.0794 2238 2.747
## (18-29 Gender0 Race11) - (18-29 Gender1 Race11) -0.176950 0.0551 2238 -3.209
## (18-29 Gender0 Race11) - (30-39 Gender1 Race11) -0.069627 0.0944 2238 -0.738
## (18-29 Gender0 Race11) - (40-49 Gender1 Race11) 0.055212 0.0952 2238 0.580
## (18-29 Gender0 Race11) - (50-59 Gender1 Race11) 0.041266 0.0984 2238 0.419
## (18-29 Gender0 Race11) - (18-29 Gender0 Race12) -0.201636 0.1283 2238 -1.571
## (18-29 Gender0 Race11) - (30-39 Gender0 Race12) -0.094313 0.1502 2238 -0.628
## (18-29 Gender0 Race11) - (40-49 Gender0 Race12) 0.030526 0.1501 2238 0.203
## (18-29 Gender0 Race11) - (50-59 Gender0 Race12) 0.016580 0.1529 2238 0.108
## (18-29 Gender0 Race11) - (18-29 Gender1 Race12) -0.378586 0.1407 2238 -2.690
## (18-29 Gender0 Race11) - (30-39 Gender1 Race12) -0.271263 0.1609 2238 -1.686
## (18-29 Gender0 Race11) - (40-49 Gender1 Race12) -0.146424 0.1612 2238 -0.909
## (18-29 Gender0 Race11) - (50-59 Gender1 Race12) -0.160370 0.1645 2238 -0.975
## (18-29 Gender0 Race11) - (18-29 Gender0 Race13) -0.416992 0.1115 2238 -3.739
## (18-29 Gender0 Race11) - (30-39 Gender0 Race13) -0.309669 0.1353 2238 -2.288
## (18-29 Gender0 Race11) - (40-49 Gender0 Race13) -0.184830 0.1351 2238 -1.368
## (18-29 Gender0 Race11) - (50-59 Gender0 Race13) -0.198776 0.1397 2238 -1.423
## (18-29 Gender0 Race11) - (18-29 Gender1 Race13) -0.593942 0.1283 2238 -4.628
## (18-29 Gender0 Race11) - (30-39 Gender1 Race13) -0.486619 0.1494 2238 -3.257
## (18-29 Gender0 Race11) - (40-49 Gender1 Race13) -0.361780 0.1497 2238 -2.417
## (18-29 Gender0 Race11) - (50-59 Gender1 Race13) -0.375726 0.1546 2238 -2.431

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##	(18-29 Gender0 Race11)	-	(18-29 Gender0 Race14)	-0.360527	0.0827	2238	-4.358
##	(18-29 Gender0 Race11)	-	(30-39 Gender0 Race14)	-0.253204	0.1112	2238	-2.277
##	(18-29 Gender0 Race11)	-	(40-49 Gender0 Race14)	-0.128364	0.1101	2238	-1.166
##	(18-29 Gender0 Race11)	-	(50-59 Gender0 Race14)	-0.142311	0.1118	2238	-1.273
##	(18-29 Gender0 Race11)	-	(18-29 Gender1 Race14)	-0.537476	0.1002	2238	-5.365
##	(18-29 Gender0 Race11)	-	(30-39 Gender1 Race14)	-0.430154	0.1247	2238	-3.450
##	(18-29 Gender0 Race11)	-	(40-49 Gender1 Race14)	-0.305314	0.1242	2238	-2.458
##	(18-29 Gender0 Race11)	-	(50-59 Gender1 Race14)	-0.319261	0.1266	2238	-2.522
##	(18-29 Gender0 Race11)	-	(18-29 Gender0 Race15)	-0.293513	0.1245	2238	-2.358
##	(18-29 Gender0 Race11)	-	(30-39 Gender0 Race15)	-0.186190	0.1460	2238	-1.275
##	(18-29 Gender0 Race11)	-	(40-49 Gender0 Race15)	-0.061351	0.1476	2238	-0.416
##	(18-29 Gender0 Race11)	-	(50-59 Gender0 Race15)	-0.075297	0.1503	2238	-0.501
##	(18-29 Gender0 Race11)	-	(18-29 Gender1 Race15)	-0.470463	0.1382	2238	-3.403
##	(18-29 Gender0 Race11)	-	(30-39 Gender1 Race15)	-0.363140	0.1578	2238	-2.301
##	(18-29 Gender0 Race11)	-	(40-49 Gender1 Race15)	-0.238301	0.1597	2238	-1.492
##	(18-29 Gender0 Race11)	-	(50-59 Gender1 Race15)	-0.252247	0.1629	2238	-1.548
##	(30-39 Gender0 Race11)	-	(40-49 Gender0 Race11)	0.124839	0.0763	2238	1.636
##	(30-39 Gender0 Race11)	-	(50-59 Gender0 Race11)	0.110893	0.0787	2238	1.409
##	(30-39 Gender0 Race11)	-	(18-29 Gender1 Race11)	-0.284273	0.0946	2238	-3.006
##	(30-39 Gender0 Race11)	-	(30-39 Gender1 Race11)	-0.176950	0.0551	2238	-3.209
##	(30-39 Gender0 Race11)	-	(40-49 Gender1 Race11)	-0.052111	0.0948	2238	-0.549
##	(30-39 Gender0 Race11)	-	(50-59 Gender1 Race11)	-0.066057	0.0979	2238	-0.675
##	(30-39 Gender0 Race11)	-	(18-29 Gender0 Race12)	-0.308959	0.1488	2238	-2.076
##	(30-39 Gender0 Race11)	-	(30-39 Gender0 Race12)	-0.201636	0.1283	2238	-1.571
##	(30-39 Gender0 Race11)	-	(40-49 Gender0 Race12)	-0.076797	0.1491	2238	-0.515
##	(30-39 Gender0 Race11)	-	(50-59 Gender0 Race12)	-0.090743	0.1518	2238	-0.598
##	(30-39 Gender0 Race11)	-	(18-29 Gender1 Race12)	-0.485909	0.1597	2238	-3.043
##	(30-39 Gender0 Race11)	-	(30-39 Gender1 Race12)	-0.378586	0.1407	2238	-2.690
##	(30-39 Gender0 Race11)	-	(40-49 Gender1 Race12)	-0.253747	0.1603	2238	-1.583
##	(30-39 Gender0 Race11)	-	(50-59 Gender1 Race12)	-0.267693	0.1635	2238	-1.637
##	(30-39 Gender0 Race11)	-	(18-29 Gender0 Race13)	-0.524315	0.1354	2238	-3.873
##	(30-39 Gender0 Race11)	-	(30-39 Gender0 Race13)	-0.416992	0.1115	2238	-3.739
##	(30-39 Gender0 Race11)	-	(40-49 Gender0 Race13)	-0.292153	0.1348	2238	-2.167
##	(30-39 Gender0 Race11)	-	(50-59 Gender0 Race13)	-0.306099	0.1393	2238	-2.197
##	(30-39 Gender0 Race11)	-	(18-29 Gender1 Race13)	-0.701264	0.1496	2238	-4.687
##	(30-39 Gender0 Race11)	-	(30-39 Gender1 Race13)	-0.593942	0.1283	2238	-4.628
##	(30-39 Gender0 Race11)	-	(40-49 Gender1 Race13)	-0.469102	0.1495	2238	-3.138
##	(30-39 Gender0 Race11)	-	(50-59 Gender1 Race13)	-0.483049	0.1543	2238	-3.131
##	(30-39 Gender0 Race11)	-	(18-29 Gender0 Race14)	-0.467849	0.1144	2238	-4.089
##	(30-39 Gender0 Race11)	-	(30-39 Gender0 Race14)	-0.360527	0.0827	2238	-4.358
##	(30-39 Gender0 Race11)	-	(40-49 Gender0 Race14)	-0.235687	0.1113	2238	-2.117
##	(30-39 Gender0 Race11)	-	(50-59 Gender0 Race14)	-0.249634	0.1129	2238	-2.211
##	(30-39 Gender0 Race11)	-	(18-29 Gender1 Race14)	-0.644799	0.1277	2238	-5.050
##	(30-39 Gender0 Race11)	-	(30-39 Gender1 Race14)	-0.537476	0.1002	2238	-5.365
##	(30-39 Gender0 Race11)	-	(40-49 Gender1 Race14)	-0.412637	0.1254	2238	-3.292
##	(30-39 Gender0 Race11)	-	(50-59 Gender1 Race14)	-0.426584	0.1277	2238	-3.342
##	(30-39 Gender0 Race11)	-	(18-29 Gender0 Race15)	-0.400836	0.1464	2238	-2.738
##	(30-39 Gender0 Race11)	-	(30-39 Gender0 Race15)	-0.293513	0.1245	2238	-2.358
##	(30-39 Gender0 Race11)	-	(40-49 Gender0 Race15)	-0.168674	0.1475	2238	-1.144
##	(30-39 Gender0 Race11)	-	(50-59 Gender0 Race15)	-0.182620	0.1501	2238	-1.216
##	(30-39 Gender0 Race11)	-	(18-29 Gender1 Race15)	-0.577786	0.1584	2238	-3.649
##	(30-39 Gender0 Race11)	-	(30-39 Gender1 Race15)	-0.470463	0.1382	2238	-3.403
##	(30-39 Gender0 Race11)	-	(40-49 Gender1 Race15)	-0.345624	0.1597	2238	-2.164
##	(30-39 Gender0 Race11)	-	(50-59 Gender1 Race15)	-0.359570	0.1628	2238	-2.208

##	(40-49 Gender0 Race11)	-	(50-59 Gender0 Race11)	-0.013946	0.0785	2238	-0.178
##	(40-49 Gender0 Race11)	-	(18-29 Gender1 Race11)	-0.409112	0.0941	2238	-4.350
##	(40-49 Gender0 Race11)	-	(30-39 Gender1 Race11)	-0.301789	0.0935	2238	-3.229
##	(40-49 Gender0 Race11)	-	(40-49 Gender1 Race11)	-0.176950	0.0551	2238	-3.209
##	(40-49 Gender0 Race11)	-	(50-59 Gender1 Race11)	-0.190896	0.0971	2238	-1.967
##	(40-49 Gender0 Race11)	-	(18-29 Gender0 Race12)	-0.433798	0.1491	2238	-2.909
##	(40-49 Gender0 Race11)	-	(30-39 Gender0 Race12)	-0.326475	0.1495	2238	-2.183
##	(40-49 Gender0 Race11)	-	(40-49 Gender0 Race12)	-0.201636	0.1283	2238	-1.571
##	(40-49 Gender0 Race11)	-	(50-59 Gender0 Race12)	-0.215582	0.1519	2238	-1.419
##	(40-49 Gender0 Race11)	-	(18-29 Gender1 Race12)	-0.610748	0.1596	2238	-3.826
##	(40-49 Gender0 Race11)	-	(30-39 Gender1 Race12)	-0.503425	0.1599	2238	-3.148
##	(40-49 Gender0 Race11)	-	(40-49 Gender1 Race12)	-0.378586	0.1407	2238	-2.690
##	(40-49 Gender0 Race11)	-	(50-59 Gender1 Race12)	-0.392532	0.1633	2238	-2.404
##	(40-49 Gender0 Race11)	-	(18-29 Gender0 Race13)	-0.649154	0.1358	2238	-4.780
##	(40-49 Gender0 Race11)	-	(30-39 Gender0 Race13)	-0.541831	0.1354	2238	-4.000
##	(40-49 Gender0 Race11)	-	(40-49 Gender0 Race13)	-0.416992	0.1115	2238	-3.739
##	(40-49 Gender0 Race11)	-	(50-59 Gender0 Race13)	-0.430938	0.1395	2238	-3.089
##	(40-49 Gender0 Race11)	-	(18-29 Gender1 Race13)	-0.826104	0.1496	2238	-5.524
##	(40-49 Gender0 Race11)	-	(30-39 Gender1 Race13)	-0.718781	0.1492	2238	-4.819
##	(40-49 Gender0 Race11)	-	(40-49 Gender1 Race13)	-0.593942	0.1283	2238	-4.628
##	(40-49 Gender0 Race11)	-	(50-59 Gender1 Race13)	-0.607888	0.1540	2238	-3.947
##	(40-49 Gender0 Race11)	-	(18-29 Gender0 Race14)	-0.592688	0.1157	2238	-5.121
##	(40-49 Gender0 Race11)	-	(30-39 Gender0 Race14)	-0.485366	0.1138	2238	-4.266
##	(40-49 Gender0 Race11)	-	(40-49 Gender0 Race14)	-0.360527	0.0827	2238	-4.358
##	(40-49 Gender0 Race11)	-	(50-59 Gender0 Race14)	-0.374473	0.1140	2238	-3.285
##	(40-49 Gender0 Race11)	-	(18-29 Gender1 Race14)	-0.769638	0.1284	2238	-5.995
##	(40-49 Gender0 Race11)	-	(30-39 Gender1 Race14)	-0.662315	0.1265	2238	-5.234
##	(40-49 Gender0 Race11)	-	(40-49 Gender1 Race14)	-0.537476	0.1002	2238	-5.365
##	(40-49 Gender0 Race11)	-	(50-59 Gender1 Race14)	-0.551423	0.1281	2238	-4.305
##	(40-49 Gender0 Race11)	-	(18-29 Gender0 Race15)	-0.525675	0.1450	2238	-3.625
##	(40-49 Gender0 Race11)	-	(30-39 Gender0 Race15)	-0.418352	0.1445	2238	-2.895
##	(40-49 Gender0 Race11)	-	(40-49 Gender0 Race15)	-0.293513	0.1245	2238	-2.358
##	(40-49 Gender0 Race11)	-	(50-59 Gender0 Race15)	-0.307459	0.1485	2238	-2.070
##	(40-49 Gender0 Race11)	-	(18-29 Gender1 Race15)	-0.702625	0.1566	2238	-4.485
##	(40-49 Gender0 Race11)	-	(30-39 Gender1 Race15)	-0.595302	0.1561	2238	-3.814
##	(40-49 Gender0 Race11)	-	(40-49 Gender1 Race15)	-0.470463	0.1382	2238	-3.403
##	(40-49 Gender0 Race11)	-	(50-59 Gender1 Race15)	-0.484409	0.1610	2238	-3.010
##	(50-59 Gender0 Race11)	-	(18-29 Gender1 Race11)	-0.395166	0.0950	2238	-4.161
##	(50-59 Gender0 Race11)	-	(30-39 Gender1 Race11)	-0.287843	0.0943	2238	-3.054
##	(50-59 Gender0 Race11)	-	(40-49 Gender1 Race11)	-0.163004	0.0948	2238	-1.720
##	(50-59 Gender0 Race11)	-	(50-59 Gender1 Race11)	-0.176950	0.0551	2238	-3.209
##	(50-59 Gender0 Race11)	-	(18-29 Gender0 Race12)	-0.419852	0.1489	2238	-2.819
##	(50-59 Gender0 Race11)	-	(30-39 Gender0 Race12)	-0.312529	0.1492	2238	-2.094
##	(50-59 Gender0 Race11)	-	(40-49 Gender0 Race12)	-0.187690	0.1489	2238	-1.261
##	(50-59 Gender0 Race11)	-	(50-59 Gender0 Race12)	-0.201636	0.1283	2238	-1.571
##	(50-59 Gender0 Race11)	-	(18-29 Gender1 Race12)	-0.596801	0.1587	2238	-3.760
##	(50-59 Gender0 Race11)	-	(30-39 Gender1 Race12)	-0.489479	0.1589	2238	-3.080
##	(50-59 Gender0 Race11)	-	(40-49 Gender1 Race12)	-0.364640	0.1590	2238	-2.293
##	(50-59 Gender0 Race11)	-	(50-59 Gender1 Race12)	-0.378586	0.1407	2238	-2.690
##	(50-59 Gender0 Race11)	-	(18-29 Gender0 Race13)	-0.635207	0.1341	2238	-4.738
##	(50-59 Gender0 Race11)	-	(30-39 Gender0 Race13)	-0.527885	0.1336	2238	-3.951
##	(50-59 Gender0 Race11)	-	(40-49 Gender0 Race13)	-0.403046	0.1331	2238	-3.027
##	(50-59 Gender0 Race11)	-	(50-59 Gender0 Race13)	-0.416992	0.1115	2238	-3.739
##	(50-59 Gender0 Race11)	-	(18-29 Gender1 Race13)	-0.812157	0.1472	2238	-5.516

##	(50-59 Gender0 Race11)	-	(30-39 Gender1 Race13)	-0.704835	0.1467	2238	-4.803
##	(50-59 Gender0 Race11)	-	(40-49 Gender1 Race13)	-0.579995	0.1468	2238	-3.952
##	(50-59 Gender0 Race11)	-	(50-59 Gender1 Race13)	-0.593942	0.1283	2238	-4.628
##	(50-59 Gender0 Race11)	-	(18-29 Gender0 Race14)	-0.578742	0.1175	2238	-4.926
##	(50-59 Gender0 Race11)	-	(30-39 Gender0 Race14)	-0.471419	0.1154	2238	-4.084
##	(50-59 Gender0 Race11)	-	(40-49 Gender0 Race14)	-0.346580	0.1141	2238	-3.038
##	(50-59 Gender0 Race11)	-	(50-59 Gender0 Race14)	-0.360527	0.0827	2238	-4.358
##	(50-59 Gender0 Race11)	-	(18-29 Gender1 Race14)	-0.755692	0.1291	2238	-5.854
##	(50-59 Gender0 Race11)	-	(30-39 Gender1 Race14)	-0.648369	0.1272	2238	-5.098
##	(50-59 Gender0 Race11)	-	(40-49 Gender1 Race14)	-0.523530	0.1264	2238	-4.141
##	(50-59 Gender0 Race11)	-	(50-59 Gender1 Race14)	-0.537476	0.1002	2238	-5.365
##	(50-59 Gender0 Race11)	-	(18-29 Gender0 Race15)	-0.511729	0.1449	2238	-3.531
##	(50-59 Gender0 Race11)	-	(30-39 Gender0 Race15)	-0.404406	0.1443	2238	-2.802
##	(50-59 Gender0 Race11)	-	(40-49 Gender0 Race15)	-0.279566	0.1457	2238	-1.919
##	(50-59 Gender0 Race11)	-	(50-59 Gender0 Race15)	-0.293513	0.1245	2238	-2.358
##	(50-59 Gender0 Race11)	-	(18-29 Gender1 Race15)	-0.688678	0.1559	2238	-4.418
##	(50-59 Gender0 Race11)	-	(30-39 Gender1 Race15)	-0.581356	0.1552	2238	-3.745
##	(50-59 Gender0 Race11)	-	(40-49 Gender1 Race15)	-0.456516	0.1569	2238	-2.909
##	(50-59 Gender0 Race11)	-	(50-59 Gender1 Race15)	-0.470463	0.1382	2238	-3.403
##	(18-29 Gender1 Race11)	-	(30-39 Gender1 Race11)	0.107323	0.0767	2238	1.399
##	(18-29 Gender1 Race11)	-	(40-49 Gender1 Race11)	0.232162	0.0769	2238	3.018
##	(18-29 Gender1 Race11)	-	(50-59 Gender1 Race11)	0.218216	0.0794	2238	2.747
##	(18-29 Gender1 Race11)	-	(18-29 Gender0 Race12)	-0.024686	0.1386	2238	-0.178
##	(18-29 Gender1 Race11)	-	(30-39 Gender0 Race12)	0.082637	0.1591	2238	0.519
##	(18-29 Gender1 Race11)	-	(40-49 Gender0 Race12)	0.207476	0.1586	2238	1.308
##	(18-29 Gender1 Race11)	-	(50-59 Gender0 Race12)	0.193530	0.1606	2238	1.205
##	(18-29 Gender1 Race11)	-	(18-29 Gender1 Race12)	-0.201636	0.1283	2238	-1.571
##	(18-29 Gender1 Race11)	-	(30-39 Gender1 Race12)	-0.094313	0.1502	2238	-0.628
##	(18-29 Gender1 Race11)	-	(40-49 Gender1 Race12)	0.030526	0.1501	2238	0.203
##	(18-29 Gender1 Race11)	-	(50-59 Gender1 Race12)	0.016580	0.1529	2238	0.108
##	(18-29 Gender1 Race11)	-	(18-29 Gender0 Race13)	-0.240042	0.1203	2238	-1.995
##	(18-29 Gender1 Race11)	-	(30-39 Gender0 Race13)	-0.132719	0.1427	2238	-0.930
##	(18-29 Gender1 Race11)	-	(40-49 Gender0 Race13)	-0.007880	0.1421	2238	-0.055
##	(18-29 Gender1 Race11)	-	(50-59 Gender0 Race13)	-0.021826	0.1457	2238	-0.150
##	(18-29 Gender1 Race11)	-	(18-29 Gender1 Race13)	-0.416992	0.1115	2238	-3.739
##	(18-29 Gender1 Race11)	-	(30-39 Gender1 Race13)	-0.309669	0.1353	2238	-2.288
##	(18-29 Gender1 Race11)	-	(40-49 Gender1 Race13)	-0.184830	0.1351	2238	-1.368
##	(18-29 Gender1 Race11)	-	(50-59 Gender1 Race13)	-0.198776	0.1397	2238	-1.423
##	(18-29 Gender1 Race11)	-	(18-29 Gender0 Race14)	-0.183577	0.0986	2238	-1.861
##	(18-29 Gender1 Race11)	-	(30-39 Gender0 Race14)	-0.076254	0.1236	2238	-0.617
##	(18-29 Gender1 Race11)	-	(40-49 Gender0 Race14)	0.048585	0.1220	2238	0.398
##	(18-29 Gender1 Race11)	-	(50-59 Gender0 Race14)	0.034639	0.1227	2238	0.282
##	(18-29 Gender1 Race11)	-	(18-29 Gender1 Race14)	-0.360527	0.0827	2238	-4.358
##	(18-29 Gender1 Race11)	-	(30-39 Gender1 Race14)	-0.253204	0.1112	2238	-2.277
##	(18-29 Gender1 Race11)	-	(40-49 Gender1 Race14)	-0.128364	0.1101	2238	-1.166
##	(18-29 Gender1 Race11)	-	(50-59 Gender1 Race14)	-0.142311	0.1118	2238	-1.273
##	(18-29 Gender1 Race11)	-	(18-29 Gender0 Race15)	-0.116563	0.1340	2238	-0.870
##	(18-29 Gender1 Race11)	-	(30-39 Gender0 Race15)	-0.009240	0.1542	2238	-0.060
##	(18-29 Gender1 Race11)	-	(40-49 Gender0 Race15)	0.115599	0.1553	2238	0.744
##	(18-29 Gender1 Race11)	-	(50-59 Gender0 Race15)	0.101653	0.1572	2238	0.647
##	(18-29 Gender1 Race11)	-	(18-29 Gender1 Race15)	-0.293513	0.1245	2238	-2.358
##	(18-29 Gender1 Race11)	-	(30-39 Gender1 Race15)	-0.186190	0.1460	2238	-1.275
##	(18-29 Gender1 Race11)	-	(40-49 Gender1 Race15)	-0.061351	0.1476	2238	-0.416
##	(18-29 Gender1 Race11)	-	(50-59 Gender1 Race15)	-0.075297	0.1503	2238	-0.501

##	(30-39 Gender1 Race11)	-	(40-49 Gender1 Race11)	0.124839	0.0763	2238	1.636
##	(30-39 Gender1 Race11)	-	(50-59 Gender1 Race11)	0.110893	0.0787	2238	1.409
##	(30-39 Gender1 Race11)	-	(18-29 Gender0 Race12)	-0.132009	0.1577	2238	-0.837
##	(30-39 Gender1 Race11)	-	(30-39 Gender0 Race12)	-0.024686	0.1386	2238	-0.178
##	(30-39 Gender1 Race11)	-	(40-49 Gender0 Race12)	0.100153	0.1576	2238	0.636
##	(30-39 Gender1 Race11)	-	(50-59 Gender0 Race12)	0.086207	0.1595	2238	0.540
##	(30-39 Gender1 Race11)	-	(18-29 Gender1 Race12)	-0.308959	0.1488	2238	-2.076
##	(30-39 Gender1 Race11)	-	(30-39 Gender1 Race12)	-0.201636	0.1283	2238	-1.571
##	(30-39 Gender1 Race11)	-	(40-49 Gender1 Race12)	-0.076797	0.1491	2238	-0.515
##	(30-39 Gender1 Race11)	-	(50-59 Gender1 Race12)	-0.090743	0.1518	2238	-0.598
##	(30-39 Gender1 Race11)	-	(18-29 Gender0 Race13)	-0.347365	0.1427	2238	-2.435
##	(30-39 Gender1 Race11)	-	(30-39 Gender0 Race13)	-0.240042	0.1203	2238	-1.995
##	(30-39 Gender1 Race11)	-	(40-49 Gender0 Race13)	-0.115203	0.1417	2238	-0.813
##	(30-39 Gender1 Race11)	-	(50-59 Gender0 Race13)	-0.129149	0.1453	2238	-0.889
##	(30-39 Gender1 Race11)	-	(18-29 Gender1 Race13)	-0.524315	0.1354	2238	-3.873
##	(30-39 Gender1 Race11)	-	(30-39 Gender1 Race13)	-0.416992	0.1115	2238	-3.739
##	(30-39 Gender1 Race11)	-	(40-49 Gender1 Race13)	-0.292153	0.1348	2238	-2.167
##	(30-39 Gender1 Race11)	-	(50-59 Gender1 Race13)	-0.306099	0.1393	2238	-2.197
##	(30-39 Gender1 Race11)	-	(18-29 Gender0 Race14)	-0.290899	0.1263	2238	-2.303
##	(30-39 Gender1 Race11)	-	(30-39 Gender0 Race14)	-0.183577	0.0986	2238	-1.861
##	(30-39 Gender1 Race11)	-	(40-49 Gender0 Race14)	-0.058737	0.1231	2238	-0.477
##	(30-39 Gender1 Race11)	-	(50-59 Gender0 Race14)	-0.072684	0.1236	2238	-0.588
##	(30-39 Gender1 Race11)	-	(18-29 Gender1 Race14)	-0.467849	0.1144	2238	-4.089
##	(30-39 Gender1 Race11)	-	(30-39 Gender1 Race14)	-0.360527	0.0827	2238	-4.358
##	(30-39 Gender1 Race11)	-	(40-49 Gender1 Race14)	-0.235687	0.1113	2238	-2.117
##	(30-39 Gender1 Race11)	-	(50-59 Gender1 Race14)	-0.249634	0.1129	2238	-2.211
##	(30-39 Gender1 Race11)	-	(18-29 Gender0 Race15)	-0.223886	0.1545	2238	-1.449
##	(30-39 Gender1 Race11)	-	(30-39 Gender0 Race15)	-0.116563	0.1340	2238	-0.870
##	(30-39 Gender1 Race11)	-	(40-49 Gender0 Race15)	0.008276	0.1552	2238	0.053
##	(30-39 Gender1 Race11)	-	(50-59 Gender0 Race15)	-0.005670	0.1570	2238	-0.036
##	(30-39 Gender1 Race11)	-	(18-29 Gender1 Race15)	-0.400836	0.1464	2238	-2.738
##	(30-39 Gender1 Race11)	-	(30-39 Gender1 Race15)	-0.293513	0.1245	2238	-2.358
##	(30-39 Gender1 Race11)	-	(40-49 Gender1 Race15)	-0.168674	0.1475	2238	-1.144
##	(30-39 Gender1 Race11)	-	(50-59 Gender1 Race15)	-0.182620	0.1501	2238	-1.216
##	(40-49 Gender1 Race11)	-	(50-59 Gender1 Race11)	-0.013946	0.0785	2238	-0.178
##	(40-49 Gender1 Race11)	-	(18-29 Gender0 Race12)	-0.256848	0.1584	2238	-1.621
##	(40-49 Gender1 Race11)	-	(30-39 Gender0 Race12)	-0.149525	0.1588	2238	-0.941
##	(40-49 Gender1 Race11)	-	(40-49 Gender0 Race12)	-0.024686	0.1386	2238	-0.178
##	(40-49 Gender1 Race11)	-	(50-59 Gender0 Race12)	-0.038632	0.1600	2238	-0.241
##	(40-49 Gender1 Race11)	-	(18-29 Gender1 Race12)	-0.433798	0.1491	2238	-2.909
##	(40-49 Gender1 Race11)	-	(30-39 Gender1 Race12)	-0.326475	0.1495	2238	-2.183
##	(40-49 Gender1 Race11)	-	(40-49 Gender1 Race12)	-0.201636	0.1283	2238	-1.571
##	(40-49 Gender1 Race11)	-	(50-59 Gender1 Race12)	-0.215582	0.1519	2238	-1.419
##	(40-49 Gender1 Race11)	-	(18-29 Gender0 Race13)	-0.472204	0.1435	2238	-3.290
##	(40-49 Gender1 Race11)	-	(30-39 Gender0 Race13)	-0.364881	0.1432	2238	-2.547
##	(40-49 Gender1 Race11)	-	(40-49 Gender0 Race13)	-0.240042	0.1203	2238	-1.995
##	(40-49 Gender1 Race11)	-	(50-59 Gender0 Race13)	-0.253988	0.1459	2238	-1.741
##	(40-49 Gender1 Race11)	-	(18-29 Gender1 Race13)	-0.649154	0.1358	2238	-4.780
##	(40-49 Gender1 Race11)	-	(30-39 Gender1 Race13)	-0.541831	0.1354	2238	-4.000
##	(40-49 Gender1 Race11)	-	(40-49 Gender1 Race13)	-0.416992	0.1115	2238	-3.739
##	(40-49 Gender1 Race11)	-	(50-59 Gender1 Race13)	-0.430938	0.1395	2238	-3.089
##	(40-49 Gender1 Race11)	-	(18-29 Gender0 Race14)	-0.415739	0.1280	2238	-3.247
##	(40-49 Gender1 Race11)	-	(30-39 Gender0 Race14)	-0.308416	0.1263	2238	-2.441
##	(40-49 Gender1 Race11)	-	(40-49 Gender0 Race14)	-0.183577	0.0986	2238	-1.861

##	(40-49 Gender1 Race11)	-	(50-59 Gender0 Race14)	-0.197523	0.1251	2238	-1.579
##	(40-49 Gender1 Race11)	-	(18-29 Gender1 Race14)	-0.592688	0.1157	2238	-5.121
##	(40-49 Gender1 Race11)	-	(30-39 Gender1 Race14)	-0.485366	0.1138	2238	-4.266
##	(40-49 Gender1 Race11)	-	(40-49 Gender1 Race14)	-0.360527	0.0827	2238	-4.358
##	(40-49 Gender1 Race11)	-	(50-59 Gender1 Race14)	-0.374473	0.1140	2238	-3.285
##	(40-49 Gender1 Race11)	-	(18-29 Gender0 Race15)	-0.348725	0.1536	2238	-2.270
##	(40-49 Gender1 Race11)	-	(30-39 Gender0 Race15)	-0.241402	0.1532	2238	-1.576
##	(40-49 Gender1 Race11)	-	(40-49 Gender0 Race15)	-0.116563	0.1340	2238	-0.870
##	(40-49 Gender1 Race11)	-	(50-59 Gender0 Race15)	-0.130509	0.1559	2238	-0.837
##	(40-49 Gender1 Race11)	-	(18-29 Gender1 Race15)	-0.525675	0.1450	2238	-3.625
##	(40-49 Gender1 Race11)	-	(30-39 Gender1 Race15)	-0.418352	0.1445	2238	-2.895
##	(40-49 Gender1 Race11)	-	(40-49 Gender1 Race15)	-0.293513	0.1245	2238	-2.358
##	(40-49 Gender1 Race11)	-	(50-59 Gender1 Race15)	-0.307459	0.1485	2238	-2.070
##	(50-59 Gender1 Race11)	-	(18-29 Gender0 Race12)	-0.242902	0.1589	2238	-1.529
##	(50-59 Gender1 Race11)	-	(30-39 Gender0 Race12)	-0.135579	0.1592	2238	-0.851
##	(50-59 Gender1 Race11)	-	(40-49 Gender0 Race12)	-0.010740	0.1585	2238	-0.068
##	(50-59 Gender1 Race11)	-	(50-59 Gender0 Race12)	-0.024686	0.1386	2238	-0.178
##	(50-59 Gender1 Race11)	-	(18-29 Gender1 Race12)	-0.419852	0.1489	2238	-2.819
##	(50-59 Gender1 Race11)	-	(30-39 Gender1 Race12)	-0.312529	0.1492	2238	-2.094
##	(50-59 Gender1 Race11)	-	(40-49 Gender1 Race12)	-0.187690	0.1489	2238	-1.261
##	(50-59 Gender1 Race11)	-	(50-59 Gender1 Race12)	-0.201636	0.1283	2238	-1.571
##	(50-59 Gender1 Race11)	-	(18-29 Gender0 Race13)	-0.458257	0.1426	2238	-3.213
##	(50-59 Gender1 Race11)	-	(30-39 Gender0 Race13)	-0.350935	0.1423	2238	-2.467
##	(50-59 Gender1 Race11)	-	(40-49 Gender0 Race13)	-0.226096	0.1414	2238	-1.599
##	(50-59 Gender1 Race11)	-	(50-59 Gender0 Race13)	-0.240042	0.1203	2238	-1.995
##	(50-59 Gender1 Race11)	-	(18-29 Gender1 Race13)	-0.635207	0.1341	2238	-4.738
##	(50-59 Gender1 Race11)	-	(30-39 Gender1 Race13)	-0.527885	0.1336	2238	-3.951
##	(50-59 Gender1 Race11)	-	(40-49 Gender1 Race13)	-0.403046	0.1331	2238	-3.027
##	(50-59 Gender1 Race11)	-	(50-59 Gender1 Race13)	-0.416992	0.1115	2238	-3.739
##	(50-59 Gender1 Race11)	-	(18-29 Gender0 Race14)	-0.401792	0.1304	2238	-3.080
##	(50-59 Gender1 Race11)	-	(30-39 Gender0 Race14)	-0.294469	0.1287	2238	-2.288
##	(50-59 Gender1 Race11)	-	(40-49 Gender0 Race14)	-0.169630	0.1270	2238	-1.336
##	(50-59 Gender1 Race11)	-	(50-59 Gender0 Race14)	-0.183577	0.0986	2238	-1.861
##	(50-59 Gender1 Race11)	-	(18-29 Gender1 Race14)	-0.578742	0.1175	2238	-4.926
##	(50-59 Gender1 Race11)	-	(30-39 Gender1 Race14)	-0.471419	0.1154	2238	-4.084
##	(50-59 Gender1 Race11)	-	(40-49 Gender1 Race14)	-0.346580	0.1141	2238	-3.038
##	(50-59 Gender1 Race11)	-	(50-59 Gender1 Race14)	-0.360527	0.0827	2238	-4.358
##	(50-59 Gender1 Race11)	-	(18-29 Gender0 Race15)	-0.334779	0.1543	2238	-2.170
##	(50-59 Gender1 Race11)	-	(30-39 Gender0 Race15)	-0.227456	0.1537	2238	-1.479
##	(50-59 Gender1 Race11)	-	(40-49 Gender0 Race15)	-0.102617	0.1546	2238	-0.664
##	(50-59 Gender1 Race11)	-	(50-59 Gender0 Race15)	-0.116563	0.1340	2238	-0.870
##	(50-59 Gender1 Race11)	-	(18-29 Gender1 Race15)	-0.511729	0.1449	2238	-3.531
##	(50-59 Gender1 Race11)	-	(30-39 Gender1 Race15)	-0.404406	0.1443	2238	-2.802
##	(50-59 Gender1 Race11)	-	(40-49 Gender1 Race15)	-0.279566	0.1457	2238	-1.919
##	(50-59 Gender1 Race11)	-	(50-59 Gender1 Race15)	-0.293513	0.1245	2238	-2.358
##	(18-29 Gender0 Race12)	-	(30-39 Gender0 Race12)	0.107323	0.0767	2238	1.399
##	(18-29 Gender0 Race12)	-	(40-49 Gender0 Race12)	0.232162	0.0769	2238	3.018
##	(18-29 Gender0 Race12)	-	(50-59 Gender0 Race12)	0.218216	0.0794	2238	2.747
##	(18-29 Gender0 Race12)	-	(18-29 Gender1 Race12)	-0.176950	0.0551	2238	-3.209
##	(18-29 Gender0 Race12)	-	(30-39 Gender1 Race12)	-0.069627	0.0944	2238	-0.738
##	(18-29 Gender0 Race12)	-	(40-49 Gender1 Race12)	0.055212	0.0952	2238	0.580
##	(18-29 Gender0 Race12)	-	(50-59 Gender1 Race12)	0.041266	0.0984	2238	0.419
##	(18-29 Gender0 Race12)	-	(18-29 Gender0 Race13)	-0.215356	0.1328	2238	-1.622
##	(18-29 Gender0 Race12)	-	(30-39 Gender0 Race13)	-0.108033	0.1526	2238	-0.708

##	(18-29 Gender0 Race12)	-	(40-49 Gender0 Race13)	0.016806	0.1527	2238	0.110
##	(18-29 Gender0 Race12)	-	(50-59 Gender0 Race13)	0.002860	0.1553	2238	0.018
##	(18-29 Gender0 Race12)	-	(18-29 Gender1 Race13)	-0.392306	0.1462	2238	-2.684
##	(18-29 Gender0 Race12)	-	(30-39 Gender1 Race13)	-0.284983	0.1644	2238	-1.734
##	(18-29 Gender0 Race12)	-	(40-49 Gender1 Race13)	-0.160144	0.1648	2238	-0.972
##	(18-29 Gender0 Race12)	-	(50-59 Gender1 Race13)	-0.174090	0.1679	2238	-1.037
##	(18-29 Gender0 Race12)	-	(18-29 Gender0 Race14)	-0.158891	0.1102	2238	-1.442
##	(18-29 Gender0 Race12)	-	(30-39 Gender0 Race14)	-0.051568	0.1322	2238	-0.390
##	(18-29 Gender0 Race12)	-	(40-49 Gender0 Race14)	0.073271	0.1315	2238	0.557
##	(18-29 Gender0 Race12)	-	(50-59 Gender0 Race14)	0.059325	0.1312	2238	0.452
##	(18-29 Gender0 Race12)	-	(18-29 Gender1 Race14)	-0.335840	0.1226	2238	-2.738
##	(18-29 Gender0 Race12)	-	(30-39 Gender1 Race14)	-0.228518	0.1426	2238	-1.602
##	(18-29 Gender0 Race12)	-	(40-49 Gender1 Race14)	-0.103679	0.1424	2238	-0.728
##	(18-29 Gender0 Race12)	-	(50-59 Gender1 Race14)	-0.117625	0.1429	2238	-0.823
##	(18-29 Gender0 Race12)	-	(18-29 Gender0 Race15)	-0.091877	0.1439	2238	-0.638
##	(18-29 Gender0 Race12)	-	(30-39 Gender0 Race15)	0.015446	0.1623	2238	0.095
##	(18-29 Gender0 Race12)	-	(40-49 Gender0 Race15)	0.140285	0.1639	2238	0.856
##	(18-29 Gender0 Race12)	-	(50-59 Gender0 Race15)	0.126339	0.1650	2238	0.766
##	(18-29 Gender0 Race12)	-	(18-29 Gender1 Race15)	-0.268827	0.1550	2238	-1.734
##	(18-29 Gender0 Race12)	-	(30-39 Gender1 Race15)	-0.161504	0.1721	2238	-0.938
##	(18-29 Gender0 Race12)	-	(40-49 Gender1 Race15)	-0.036665	0.1741	2238	-0.211
##	(18-29 Gender0 Race12)	-	(50-59 Gender1 Race15)	-0.050611	0.1757	2238	-0.288
##	(30-39 Gender0 Race12)	-	(40-49 Gender0 Race12)	0.124839	0.0763	2238	1.636
##	(30-39 Gender0 Race12)	-	(50-59 Gender0 Race12)	0.110893	0.0787	2238	1.409
##	(30-39 Gender0 Race12)	-	(18-29 Gender1 Race12)	-0.284273	0.0946	2238	-3.006
##	(30-39 Gender0 Race12)	-	(30-39 Gender1 Race12)	-0.176950	0.0551	2238	-3.209
##	(30-39 Gender0 Race12)	-	(40-49 Gender1 Race12)	-0.052111	0.0948	2238	-0.549
##	(30-39 Gender0 Race12)	-	(50-59 Gender1 Race12)	-0.066057	0.0979	2238	-0.675
##	(30-39 Gender0 Race12)	-	(18-29 Gender0 Race13)	-0.322679	0.1541	2238	-2.095
##	(30-39 Gender0 Race12)	-	(30-39 Gender0 Race13)	-0.215356	0.1328	2238	-1.622
##	(30-39 Gender0 Race12)	-	(40-49 Gender0 Race13)	-0.090517	0.1531	2238	-0.591
##	(30-39 Gender0 Race12)	-	(50-59 Gender0 Race13)	-0.104463	0.1556	2238	-0.671
##	(30-39 Gender0 Race12)	-	(18-29 Gender1 Race13)	-0.499629	0.1658	2238	-3.014
##	(30-39 Gender0 Race12)	-	(30-39 Gender1 Race13)	-0.392306	0.1462	2238	-2.684
##	(30-39 Gender0 Race12)	-	(40-49 Gender1 Race13)	-0.267467	0.1652	2238	-1.619
##	(30-39 Gender0 Race12)	-	(50-59 Gender1 Race13)	-0.281413	0.1682	2238	-1.673
##	(30-39 Gender0 Race12)	-	(18-29 Gender0 Race14)	-0.266213	0.1364	2238	-1.952
##	(30-39 Gender0 Race12)	-	(30-39 Gender0 Race14)	-0.158891	0.1102	2238	-1.442
##	(30-39 Gender0 Race12)	-	(40-49 Gender0 Race14)	-0.034051	0.1333	2238	-0.255
##	(30-39 Gender0 Race12)	-	(50-59 Gender0 Race14)	-0.047998	0.1329	2238	-0.361
##	(30-39 Gender0 Race12)	-	(18-29 Gender1 Race14)	-0.443163	0.1467	2238	-3.021
##	(30-39 Gender0 Race12)	-	(30-39 Gender1 Race14)	-0.335840	0.1226	2238	-2.738
##	(30-39 Gender0 Race12)	-	(40-49 Gender1 Race14)	-0.211001	0.1442	2238	-1.463
##	(30-39 Gender0 Race12)	-	(50-59 Gender1 Race14)	-0.224948	0.1446	2238	-1.556
##	(30-39 Gender0 Race12)	-	(18-29 Gender0 Race15)	-0.199200	0.1639	2238	-1.215
##	(30-39 Gender0 Race12)	-	(30-39 Gender0 Race15)	-0.091877	0.1439	2238	-0.638
##	(30-39 Gender0 Race12)	-	(40-49 Gender0 Race15)	0.032962	0.1645	2238	0.200
##	(30-39 Gender0 Race12)	-	(50-59 Gender0 Race15)	0.019016	0.1654	2238	0.115
##	(30-39 Gender0 Race12)	-	(18-29 Gender1 Race15)	-0.376150	0.1738	2238	-2.164
##	(30-39 Gender0 Race12)	-	(30-39 Gender1 Race15)	-0.268827	0.1550	2238	-1.734
##	(30-39 Gender0 Race12)	-	(40-49 Gender1 Race15)	-0.143988	0.1746	2238	-0.825
##	(30-39 Gender0 Race12)	-	(50-59 Gender1 Race15)	-0.157934	0.1762	2238	-0.896
##	(40-49 Gender0 Race12)	-	(50-59 Gender0 Race12)	-0.013946	0.0785	2238	-0.178
##	(40-49 Gender0 Race12)	-	(18-29 Gender1 Race12)	-0.409112	0.0941	2238	-4.350



##	(40-49 Gender0 Race12)	-	(30-39 Gender1 Race12)	-0.301789	0.0935	2238	-3.229
##	(40-49 Gender0 Race12)	-	(40-49 Gender1 Race12)	-0.176950	0.0551	2238	-3.209
##	(40-49 Gender0 Race12)	-	(50-59 Gender1 Race12)	-0.190896	0.0971	2238	-1.967
##	(40-49 Gender0 Race12)	-	(18-29 Gender0 Race13)	-0.447518	0.1542	2238	-2.902
##	(40-49 Gender0 Race12)	-	(30-39 Gender0 Race13)	-0.340195	0.1532	2238	-2.221
##	(40-49 Gender0 Race12)	-	(40-49 Gender0 Race13)	-0.215356	0.1328	2238	-1.622
##	(40-49 Gender0 Race12)	-	(50-59 Gender0 Race13)	-0.229302	0.1555	2238	-1.474
##	(40-49 Gender0 Race12)	-	(18-29 Gender1 Race13)	-0.624468	0.1655	2238	-3.773
##	(40-49 Gender0 Race12)	-	(30-39 Gender1 Race13)	-0.517145	0.1645	2238	-3.143
##	(40-49 Gender0 Race12)	-	(40-49 Gender1 Race13)	-0.392306	0.1462	2238	-2.684
##	(40-49 Gender0 Race12)	-	(50-59 Gender1 Race13)	-0.406252	0.1678	2238	-2.421
##	(40-49 Gender0 Race12)	-	(18-29 Gender0 Race14)	-0.391053	0.1373	2238	-2.849
##	(40-49 Gender0 Race12)	-	(30-39 Gender0 Race14)	-0.283730	0.1348	2238	-2.104
##	(40-49 Gender0 Race12)	-	(40-49 Gender0 Race14)	-0.158891	0.1102	2238	-1.442
##	(40-49 Gender0 Race12)	-	(50-59 Gender0 Race14)	-0.172837	0.1335	2238	-1.294
##	(40-49 Gender0 Race12)	-	(18-29 Gender1 Race14)	-0.568002	0.1470	2238	-3.863
##	(40-49 Gender0 Race12)	-	(30-39 Gender1 Race14)	-0.460680	0.1447	2238	-3.183
##	(40-49 Gender0 Race12)	-	(40-49 Gender1 Race14)	-0.335840	0.1226	2238	-2.738
##	(40-49 Gender0 Race12)	-	(50-59 Gender1 Race14)	-0.349787	0.1447	2238	-2.417
##	(40-49 Gender0 Race12)	-	(18-29 Gender0 Race15)	-0.324039	0.1624	2238	-1.995
##	(40-49 Gender0 Race12)	-	(30-39 Gender0 Race15)	-0.216716	0.1613	2238	-1.343
##	(40-49 Gender0 Race12)	-	(40-49 Gender0 Race15)	-0.091877	0.1439	2238	-0.638
##	(40-49 Gender0 Race12)	-	(50-59 Gender0 Race15)	-0.105823	0.1638	2238	-0.646
##	(40-49 Gender0 Race12)	-	(18-29 Gender1 Race15)	-0.500989	0.1720	2238	-2.912
##	(40-49 Gender0 Race12)	-	(30-39 Gender1 Race15)	-0.393666	0.1709	2238	-2.303
##	(40-49 Gender0 Race12)	-	(40-49 Gender1 Race15)	-0.268827	0.1550	2238	-1.734
##	(40-49 Gender0 Race12)	-	(50-59 Gender1 Race15)	-0.282773	0.1742	2238	-1.623
##	(50-59 Gender0 Race12)	-	(18-29 Gender1 Race12)	-0.395166	0.0950	2238	-4.161
##	(50-59 Gender0 Race12)	-	(30-39 Gender1 Race12)	-0.287843	0.0943	2238	-3.054
##	(50-59 Gender0 Race12)	-	(40-49 Gender1 Race12)	-0.163004	0.0948	2238	-1.720
##	(50-59 Gender0 Race12)	-	(50-59 Gender1 Race12)	-0.176950	0.0551	2238	-3.209
##	(50-59 Gender0 Race12)	-	(18-29 Gender0 Race13)	-0.433571	0.1542	2238	-2.812
##	(50-59 Gender0 Race12)	-	(30-39 Gender0 Race13)	-0.326249	0.1531	2238	-2.131
##	(50-59 Gender0 Race12)	-	(40-49 Gender0 Race13)	-0.201409	0.1529	2238	-1.317
##	(50-59 Gender0 Race12)	-	(50-59 Gender0 Race13)	-0.215356	0.1328	2238	-1.622
##	(50-59 Gender0 Race12)	-	(18-29 Gender1 Race13)	-0.610521	0.1648	2238	-3.704
##	(50-59 Gender0 Race12)	-	(30-39 Gender1 Race13)	-0.503199	0.1638	2238	-3.073
##	(50-59 Gender0 Race12)	-	(40-49 Gender1 Race13)	-0.378359	0.1640	2238	-2.307
##	(50-59 Gender0 Race12)	-	(50-59 Gender1 Race13)	-0.392306	0.1462	2238	-2.684
##	(50-59 Gender0 Race12)	-	(18-29 Gender0 Race14)	-0.377106	0.1404	2238	-2.686
##	(50-59 Gender0 Race12)	-	(30-39 Gender0 Race14)	-0.269783	0.1379	2238	-1.956
##	(50-59 Gender0 Race12)	-	(40-49 Gender0 Race14)	-0.144944	0.1370	2238	-1.058
##	(50-59 Gender0 Race12)	-	(50-59 Gender0 Race14)	-0.158891	0.1102	2238	-1.442
##	(50-59 Gender0 Race12)	-	(18-29 Gender1 Race14)	-0.554056	0.1492	2238	-3.713
##	(50-59 Gender0 Race12)	-	(30-39 Gender1 Race14)	-0.446733	0.1469	2238	-3.042
##	(50-59 Gender0 Race12)	-	(40-49 Gender1 Race14)	-0.321894	0.1465	2238	-2.198
##	(50-59 Gender0 Race12)	-	(50-59 Gender1 Race14)	-0.335840	0.1226	2238	-2.738
##	(50-59 Gender0 Race12)	-	(18-29 Gender0 Race15)	-0.310093	0.1638	2238	-1.893
##	(50-59 Gender0 Race12)	-	(30-39 Gender0 Race15)	-0.202770	0.1626	2238	-1.247
##	(50-59 Gender0 Race12)	-	(40-49 Gender0 Race15)	-0.077931	0.1641	2238	-0.475
##	(50-59 Gender0 Race12)	-	(50-59 Gender0 Race15)	-0.091877	0.1439	2238	-0.638
##	(50-59 Gender0 Race12)	-	(18-29 Gender1 Race15)	-0.487042	0.1727	2238	-2.821
##	(50-59 Gender0 Race12)	-	(30-39 Gender1 Race15)	-0.379720	0.1715	2238	-2.214
##	(50-59 Gender0 Race12)	-	(40-49 Gender1 Race15)	-0.254881	0.1732	2238	-1.471

##	(50-59 Gender0 Race12)	-	(50-59 Gender1 Race15)	-0.268827	0.1550	2238	-1.734
##	(18-29 Gender1 Race12)	-	(30-39 Gender1 Race12)	0.107323	0.0767	2238	1.399
##	(18-29 Gender1 Race12)	-	(40-49 Gender1 Race12)	0.232162	0.0769	2238	3.018
##	(18-29 Gender1 Race12)	-	(50-59 Gender1 Race12)	0.218216	0.0794	2238	2.747
##	(18-29 Gender1 Race12)	-	(18-29 Gender0 Race13)	-0.038406	0.1413	2238	-0.272
##	(18-29 Gender1 Race12)	-	(30-39 Gender0 Race13)	0.068917	0.1602	2238	0.430
##	(18-29 Gender1 Race12)	-	(40-49 Gender0 Race13)	0.193756	0.1599	2238	1.212
##	(18-29 Gender1 Race12)	-	(50-59 Gender0 Race13)	0.179810	0.1617	2238	1.112
##	(18-29 Gender1 Race12)	-	(18-29 Gender1 Race13)	-0.215356	0.1328	2238	-1.622
##	(18-29 Gender1 Race12)	-	(30-39 Gender1 Race13)	-0.108033	0.1526	2238	-0.708
##	(18-29 Gender1 Race12)	-	(40-49 Gender1 Race13)	0.016806	0.1527	2238	0.110
##	(18-29 Gender1 Race12)	-	(50-59 Gender1 Race13)	0.002860	0.1553	2238	0.018
##	(18-29 Gender1 Race12)	-	(18-29 Gender0 Race14)	0.018059	0.1238	2238	0.146
##	(18-29 Gender1 Race12)	-	(30-39 Gender0 Race14)	0.125382	0.1438	2238	0.872
##	(18-29 Gender1 Race12)	-	(40-49 Gender0 Race14)	0.250221	0.1427	2238	1.753
##	(18-29 Gender1 Race12)	-	(50-59 Gender0 Race14)	0.236275	0.1416	2238	1.668
##	(18-29 Gender1 Race12)	-	(18-29 Gender1 Race14)	-0.158891	0.1102	2238	-1.442
##	(18-29 Gender1 Race12)	-	(30-39 Gender1 Race14)	-0.051568	0.1322	2238	-0.390
##	(18-29 Gender1 Race12)	-	(40-49 Gender1 Race14)	0.073271	0.1315	2238	0.557
##	(18-29 Gender1 Race12)	-	(50-59 Gender1 Race14)	0.059325	0.1312	2238	0.452
##	(18-29 Gender1 Race12)	-	(18-29 Gender0 Race15)	0.085073	0.1532	2238	0.555
##	(18-29 Gender1 Race12)	-	(30-39 Gender0 Race15)	0.192396	0.1706	2238	1.128
##	(18-29 Gender1 Race12)	-	(40-49 Gender0 Race15)	0.317235	0.1718	2238	1.846
##	(18-29 Gender1 Race12)	-	(50-59 Gender0 Race15)	0.303289	0.1722	2238	1.761
##	(18-29 Gender1 Race12)	-	(18-29 Gender1 Race15)	-0.091877	0.1439	2238	-0.638
##	(18-29 Gender1 Race12)	-	(30-39 Gender1 Race15)	0.015446	0.1623	2238	0.095
##	(18-29 Gender1 Race12)	-	(40-49 Gender1 Race15)	0.140285	0.1639	2238	0.856
##	(18-29 Gender1 Race12)	-	(50-59 Gender1 Race15)	0.126339	0.1650	2238	0.766
##	(30-39 Gender1 Race12)	-	(40-49 Gender1 Race12)	0.124839	0.0763	2238	1.636
##	(30-39 Gender1 Race12)	-	(50-59 Gender1 Race12)	0.110893	0.0787	2238	1.409
##	(30-39 Gender1 Race12)	-	(18-29 Gender0 Race13)	-0.145729	0.1614	2238	-0.903
##	(30-39 Gender1 Race12)	-	(30-39 Gender0 Race13)	-0.038406	0.1413	2238	-0.272
##	(30-39 Gender1 Race12)	-	(40-49 Gender0 Race13)	0.086433	0.1602	2238	0.540
##	(30-39 Gender1 Race12)	-	(50-59 Gender0 Race13)	0.072487	0.1619	2238	0.448
##	(30-39 Gender1 Race12)	-	(18-29 Gender1 Race13)	-0.322679	0.1541	2238	-2.095
##	(30-39 Gender1 Race12)	-	(30-39 Gender1 Race13)	-0.215356	0.1328	2238	-1.622
##	(30-39 Gender1 Race12)	-	(40-49 Gender1 Race13)	-0.090517	0.1531	2238	-0.591
##	(30-39 Gender1 Race12)	-	(50-59 Gender1 Race13)	-0.104463	0.1556	2238	-0.671
##	(30-39 Gender1 Race12)	-	(18-29 Gender0 Race14)	-0.089264	0.1475	2238	-0.605
##	(30-39 Gender1 Race12)	-	(30-39 Gender0 Race14)	0.018059	0.1238	2238	0.146
##	(30-39 Gender1 Race12)	-	(40-49 Gender0 Race14)	0.142898	0.1443	2238	0.990
##	(30-39 Gender1 Race12)	-	(50-59 Gender0 Race14)	0.128952	0.1432	2238	0.901
##	(30-39 Gender1 Race12)	-	(18-29 Gender1 Race14)	-0.266213	0.1364	2238	-1.952
##	(30-39 Gender1 Race12)	-	(30-39 Gender1 Race14)	-0.158891	0.1102	2238	-1.442
##	(30-39 Gender1 Race12)	-	(40-49 Gender1 Race14)	-0.034051	0.1333	2238	-0.255
##	(30-39 Gender1 Race12)	-	(50-59 Gender1 Race14)	-0.047998	0.1329	2238	-0.361
##	(30-39 Gender1 Race12)	-	(18-29 Gender0 Race15)	-0.022250	0.1721	2238	-0.129
##	(30-39 Gender1 Race12)	-	(30-39 Gender0 Race15)	0.085073	0.1532	2238	0.555
##	(30-39 Gender1 Race12)	-	(40-49 Gender0 Race15)	0.209912	0.1723	2238	1.218
##	(30-39 Gender1 Race12)	-	(50-59 Gender0 Race15)	0.195966	0.1726	2238	1.135
##	(30-39 Gender1 Race12)	-	(18-29 Gender1 Race15)	-0.199200	0.1639	2238	-1.215
##	(30-39 Gender1 Race12)	-	(30-39 Gender1 Race15)	-0.091877	0.1439	2238	-0.638
##	(30-39 Gender1 Race12)	-	(40-49 Gender1 Race15)	0.032962	0.1645	2238	0.200
##	(30-39 Gender1 Race12)	-	(50-59 Gender1 Race15)	0.019016	0.1654	2238	0.115

##	(40-49 Gender1 Race12)	-	(50-59 Gender1 Race12)	-0.013946	0.0785	2238	-0.178
##	(40-49 Gender1 Race12)	-	(18-29 Gender0 Race13)	-0.270568	0.1620	2238	-1.671
##	(40-49 Gender1 Race12)	-	(30-39 Gender0 Race13)	-0.163245	0.1611	2238	-1.013
##	(40-49 Gender1 Race12)	-	(40-49 Gender0 Race13)	-0.038406	0.1413	2238	-0.272
##	(40-49 Gender1 Race12)	-	(50-59 Gender0 Race13)	-0.052352	0.1622	2238	-0.323
##	(40-49 Gender1 Race12)	-	(18-29 Gender1 Race13)	-0.447518	0.1542	2238	-2.902
##	(40-49 Gender1 Race12)	-	(30-39 Gender1 Race13)	-0.340195	0.1532	2238	-2.221
##	(40-49 Gender1 Race12)	-	(40-49 Gender1 Race13)	-0.215356	0.1328	2238	-1.622
##	(40-49 Gender1 Race12)	-	(50-59 Gender1 Race13)	-0.229302	0.1555	2238	-1.474
##	(40-49 Gender1 Race12)	-	(18-29 Gender0 Race14)	-0.214103	0.1488	2238	-1.439
##	(40-49 Gender1 Race12)	-	(30-39 Gender0 Race14)	-0.106780	0.1466	2238	-0.728
##	(40-49 Gender1 Race12)	-	(40-49 Gender0 Race14)	0.018059	0.1238	2238	0.146
##	(40-49 Gender1 Race12)	-	(50-59 Gender0 Race14)	0.004113	0.1442	2238	0.029
##	(40-49 Gender1 Race12)	-	(18-29 Gender1 Race14)	-0.391053	0.1373	2238	-2.849
##	(40-49 Gender1 Race12)	-	(30-39 Gender1 Race14)	-0.283730	0.1348	2238	-2.104
##	(40-49 Gender1 Race12)	-	(40-49 Gender1 Race14)	-0.158891	0.1102	2238	-1.442
##	(40-49 Gender1 Race12)	-	(50-59 Gender1 Race14)	-0.172837	0.1335	2238	-1.294
##	(40-49 Gender1 Race12)	-	(18-29 Gender0 Race15)	-0.147089	0.1711	2238	-0.860
##	(40-49 Gender1 Race12)	-	(30-39 Gender0 Race15)	-0.039766	0.1701	2238	-0.234
##	(40-49 Gender1 Race12)	-	(40-49 Gender0 Race15)	0.085073	0.1532	2238	0.555
##	(40-49 Gender1 Race12)	-	(50-59 Gender0 Race15)	0.071127	0.1714	2238	0.415
##	(40-49 Gender1 Race12)	-	(18-29 Gender1 Race15)	-0.324039	0.1624	2238	-1.995
##	(40-49 Gender1 Race12)	-	(30-39 Gender1 Race15)	-0.216716	0.1613	2238	-1.343
##	(40-49 Gender1 Race12)	-	(40-49 Gender1 Race15)	-0.091877	0.1439	2238	-0.638
##	(40-49 Gender1 Race12)	-	(50-59 Gender1 Race15)	-0.105823	0.1638	2238	-0.646
##	(50-59 Gender1 Race12)	-	(18-29 Gender0 Race13)	-0.256622	0.1626	2238	-1.578
##	(50-59 Gender1 Race12)	-	(30-39 Gender0 Race13)	-0.149299	0.1617	2238	-0.924
##	(50-59 Gender1 Race12)	-	(40-49 Gender0 Race13)	-0.024460	0.1611	2238	-0.152
##	(50-59 Gender1 Race12)	-	(50-59 Gender0 Race13)	-0.038406	0.1413	2238	-0.272
##	(50-59 Gender1 Race12)	-	(18-29 Gender1 Race13)	-0.433571	0.1542	2238	-2.812
##	(50-59 Gender1 Race12)	-	(30-39 Gender1 Race13)	-0.326249	0.1531	2238	-2.131
##	(50-59 Gender1 Race12)	-	(40-49 Gender1 Race13)	-0.201409	0.1529	2238	-1.317
##	(50-59 Gender1 Race12)	-	(50-59 Gender1 Race13)	-0.215356	0.1328	2238	-1.622
##	(50-59 Gender1 Race12)	-	(18-29 Gender0 Race14)	-0.200156	0.1524	2238	-1.313
##	(50-59 Gender1 Race12)	-	(30-39 Gender0 Race14)	-0.092833	0.1502	2238	-0.618
##	(50-59 Gender1 Race12)	-	(40-49 Gender0 Race14)	0.032006	0.1490	2238	0.215
##	(50-59 Gender1 Race12)	-	(50-59 Gender0 Race14)	0.018059	0.1238	2238	0.146
##	(50-59 Gender1 Race12)	-	(18-29 Gender1 Race14)	-0.377106	0.1404	2238	-2.686
##	(50-59 Gender1 Race12)	-	(30-39 Gender1 Race14)	-0.269783	0.1379	2238	-1.956
##	(50-59 Gender1 Race12)	-	(40-49 Gender1 Race14)	-0.144944	0.1370	2238	-1.058
##	(50-59 Gender1 Race12)	-	(50-59 Gender1 Race14)	-0.158891	0.1102	2238	-1.442
##	(50-59 Gender1 Race12)	-	(18-29 Gender0 Race15)	-0.133143	0.1730	2238	-0.770
##	(50-59 Gender1 Race12)	-	(30-39 Gender0 Race15)	-0.025820	0.1719	2238	-0.150
##	(50-59 Gender1 Race12)	-	(40-49 Gender0 Race15)	0.099019	0.1729	2238	0.573
##	(50-59 Gender1 Race12)	-	(50-59 Gender0 Race15)	0.085073	0.1532	2238	0.555
##	(50-59 Gender1 Race12)	-	(18-29 Gender1 Race15)	-0.310093	0.1638	2238	-1.893
##	(50-59 Gender1 Race12)	-	(30-39 Gender1 Race15)	-0.202770	0.1626	2238	-1.247
##	(50-59 Gender1 Race12)	-	(40-49 Gender1 Race15)	-0.077931	0.1641	2238	-0.475
##	(50-59 Gender1 Race12)	-	(50-59 Gender1 Race15)	-0.091877	0.1439	2238	-0.638
##	(18-29 Gender0 Race13)	-	(30-39 Gender0 Race13)	0.107323	0.0767	2238	1.399
##	(18-29 Gender0 Race13)	-	(40-49 Gender0 Race13)	0.232162	0.0769	2238	3.018
##	(18-29 Gender0 Race13)	-	(50-59 Gender0 Race13)	0.218216	0.0794	2238	2.747
##	(18-29 Gender0 Race13)	-	(18-29 Gender1 Race13)	-0.176950	0.0551	2238	-3.209
##	(18-29 Gender0 Race13)	-	(30-39 Gender1 Race13)	-0.069627	0.0944	2238	-0.738

##	(18-29 Gender0 Race13)	-	(40-49 Gender1 Race13)	0.055212	0.0952	2238	0.580
##	(18-29 Gender0 Race13)	-	(50-59 Gender1 Race13)	0.041266	0.0984	2238	0.419
##	(18-29 Gender0 Race13)	-	(18-29 Gender0 Race14)	0.056465	0.0900	2238	0.628
##	(18-29 Gender0 Race13)	-	(30-39 Gender0 Race14)	0.163788	0.1167	2238	1.403
##	(18-29 Gender0 Race13)	-	(40-49 Gender0 Race14)	0.288627	0.1160	2238	2.487
##	(18-29 Gender0 Race13)	-	(50-59 Gender0 Race14)	0.274681	0.1139	2238	2.411
##	(18-29 Gender0 Race13)	-	(18-29 Gender1 Race14)	-0.120485	0.1015	2238	-1.187
##	(18-29 Gender0 Race13)	-	(30-39 Gender1 Race14)	-0.013162	0.1257	2238	-0.105
##	(18-29 Gender0 Race13)	-	(40-49 Gender1 Race14)	0.111677	0.1256	2238	0.889
##	(18-29 Gender0 Race13)	-	(50-59 Gender1 Race14)	0.097731	0.1246	2238	0.785
##	(18-29 Gender0 Race13)	-	(18-29 Gender0 Race15)	0.123479	0.1288	2238	0.958
##	(18-29 Gender0 Race13)	-	(30-39 Gender0 Race15)	0.230802	0.1498	2238	1.541
##	(18-29 Gender0 Race13)	-	(40-49 Gender0 Race15)	0.355641	0.1516	2238	2.346
##	(18-29 Gender0 Race13)	-	(50-59 Gender0 Race15)	0.341695	0.1514	2238	2.257
##	(18-29 Gender0 Race13)	-	(18-29 Gender1 Race15)	-0.053471	0.1386	2238	-0.386
##	(18-29 Gender0 Race13)	-	(30-39 Gender1 Race15)	0.053852	0.1582	2238	0.340
##	(18-29 Gender0 Race13)	-	(40-49 Gender1 Race15)	0.178691	0.1604	2238	1.114
##	(18-29 Gender0 Race13)	-	(50-59 Gender1 Race15)	0.164745	0.1609	2238	1.024
##	(30-39 Gender0 Race13)	-	(40-49 Gender0 Race13)	0.124839	0.0763	2238	1.636
##	(30-39 Gender0 Race13)	-	(50-59 Gender0 Race13)	0.110893	0.0787	2238	1.409
##	(30-39 Gender0 Race13)	-	(18-29 Gender1 Race13)	-0.284273	0.0946	2238	-3.006
##	(30-39 Gender0 Race13)	-	(30-39 Gender1 Race13)	-0.176950	0.0551	2238	-3.209
##	(30-39 Gender0 Race13)	-	(40-49 Gender1 Race13)	-0.052111	0.0948	2238	-0.549
##	(30-39 Gender0 Race13)	-	(50-59 Gender1 Race13)	-0.066057	0.0979	2238	-0.675
##	(30-39 Gender0 Race13)	-	(18-29 Gender0 Race14)	-0.050858	0.1197	2238	-0.425
##	(30-39 Gender0 Race13)	-	(30-39 Gender0 Race14)	0.056465	0.0900	2238	0.628
##	(30-39 Gender0 Race13)	-	(40-49 Gender0 Race14)	0.181304	0.1172	2238	1.547
##	(30-39 Gender0 Race13)	-	(50-59 Gender0 Race14)	0.167358	0.1150	2238	1.456
##	(30-39 Gender0 Race13)	-	(18-29 Gender1 Race14)	-0.227807	0.1287	2238	-1.771
##	(30-39 Gender0 Race13)	-	(30-39 Gender1 Race14)	-0.120485	0.1015	2238	-1.187
##	(30-39 Gender0 Race13)	-	(40-49 Gender1 Race14)	0.004354	0.1267	2238	0.034
##	(30-39 Gender0 Race13)	-	(50-59 Gender1 Race14)	-0.009592	0.1256	2238	-0.076
##	(30-39 Gender0 Race13)	-	(18-29 Gender0 Race15)	0.016156	0.1501	2238	0.108
##	(30-39 Gender0 Race13)	-	(30-39 Gender0 Race15)	0.123479	0.1288	2238	0.958
##	(30-39 Gender0 Race13)	-	(40-49 Gender0 Race15)	0.248318	0.1515	2238	1.639
##	(30-39 Gender0 Race13)	-	(50-59 Gender0 Race15)	0.234372	0.1512	2238	1.550
##	(30-39 Gender0 Race13)	-	(18-29 Gender1 Race15)	-0.160794	0.1587	2238	-1.013
##	(30-39 Gender0 Race13)	-	(30-39 Gender1 Race15)	-0.053471	0.1386	2238	-0.386
##	(30-39 Gender0 Race13)	-	(40-49 Gender1 Race15)	0.071368	0.1603	2238	0.445
##	(30-39 Gender0 Race13)	-	(50-59 Gender1 Race15)	0.057422	0.1608	2238	0.357
##	(40-49 Gender0 Race13)	-	(50-59 Gender0 Race13)	-0.013946	0.0785	2238	-0.178
##	(40-49 Gender0 Race13)	-	(18-29 Gender1 Race13)	-0.409112	0.0941	2238	-4.350
##	(40-49 Gender0 Race13)	-	(30-39 Gender1 Race13)	-0.301789	0.0935	2238	-3.229
##	(40-49 Gender0 Race13)	-	(40-49 Gender1 Race13)	-0.176950	0.0551	2238	-3.209
##	(40-49 Gender0 Race13)	-	(50-59 Gender1 Race13)	-0.190896	0.0971	2238	-1.967
##	(40-49 Gender0 Race13)	-	(18-29 Gender0 Race14)	-0.175697	0.1207	2238	-1.456
##	(40-49 Gender0 Race13)	-	(30-39 Gender0 Race14)	-0.068374	0.1188	2238	-0.575
##	(40-49 Gender0 Race13)	-	(40-49 Gender0 Race14)	0.056465	0.0900	2238	0.628
##	(40-49 Gender0 Race13)	-	(50-59 Gender0 Race14)	0.042519	0.1157	2238	0.368
##	(40-49 Gender0 Race13)	-	(18-29 Gender1 Race14)	-0.352647	0.1290	2238	-2.733
##	(40-49 Gender0 Race13)	-	(30-39 Gender1 Race14)	-0.245324	0.1272	2238	-1.928
##	(40-49 Gender0 Race13)	-	(40-49 Gender1 Race14)	-0.120485	0.1015	2238	-1.187
##	(40-49 Gender0 Race13)	-	(50-59 Gender1 Race14)	-0.134431	0.1257	2238	-1.069
##	(40-49 Gender0 Race13)	-	(18-29 Gender0 Race15)	-0.108683	0.1485	2238	-0.732

##	(40-49 Gender0 Race13)	-	(30-39 Gender0 Race15)	-0.001360	0.1480	2238	-0.009
##	(40-49 Gender0 Race13)	-	(40-49 Gender0 Race15)	0.123479	0.1288	2238	0.958
##	(40-49 Gender0 Race13)	-	(50-59 Gender0 Race15)	0.109533	0.1494	2238	0.733
##	(40-49 Gender0 Race13)	-	(18-29 Gender1 Race15)	-0.285633	0.1567	2238	-1.823
##	(40-49 Gender0 Race13)	-	(30-39 Gender1 Race15)	-0.178310	0.1562	2238	-1.142
##	(40-49 Gender0 Race13)	-	(40-49 Gender1 Race15)	-0.053471	0.1386	2238	-0.386
##	(40-49 Gender0 Race13)	-	(50-59 Gender1 Race15)	-0.067417	0.1586	2238	-0.425
##	(50-59 Gender0 Race13)	-	(18-29 Gender1 Race13)	-0.395166	0.0950	2238	-4.161
##	(50-59 Gender0 Race13)	-	(30-39 Gender1 Race13)	-0.287843	0.0943	2238	-3.054
##	(50-59 Gender0 Race13)	-	(40-49 Gender1 Race13)	-0.163004	0.0948	2238	-1.720
##	(50-59 Gender0 Race13)	-	(50-59 Gender1 Race13)	-0.176950	0.0551	2238	-3.209
##	(50-59 Gender0 Race13)	-	(18-29 Gender0 Race14)	-0.161750	0.1258	2238	-1.286
##	(50-59 Gender0 Race13)	-	(30-39 Gender0 Race14)	-0.054428	0.1239	2238	-0.439
##	(50-59 Gender0 Race13)	-	(40-49 Gender0 Race14)	0.070412	0.1230	2238	0.572
##	(50-59 Gender0 Race13)	-	(50-59 Gender0 Race14)	0.056465	0.0900	2238	0.628
##	(50-59 Gender0 Race13)	-	(18-29 Gender1 Race14)	-0.338700	0.1330	2238	-2.546
##	(50-59 Gender0 Race13)	-	(30-39 Gender1 Race14)	-0.231378	0.1312	2238	-1.764
##	(50-59 Gender0 Race13)	-	(40-49 Gender1 Race14)	-0.106538	0.1308	2238	-0.814
##	(50-59 Gender0 Race13)	-	(50-59 Gender1 Race14)	-0.120485	0.1015	2238	-1.187
##	(50-59 Gender0 Race13)	-	(18-29 Gender0 Race15)	-0.094737	0.1513	2238	-0.626
##	(50-59 Gender0 Race13)	-	(30-39 Gender0 Race15)	0.012586	0.1507	2238	0.084
##	(50-59 Gender0 Race13)	-	(40-49 Gender0 Race15)	0.137425	0.1523	2238	0.902
##	(50-59 Gender0 Race13)	-	(50-59 Gender0 Race15)	0.123479	0.1288	2238	0.958
##	(50-59 Gender0 Race13)	-	(18-29 Gender1 Race15)	-0.271687	0.1587	2238	-1.712
##	(50-59 Gender0 Race13)	-	(30-39 Gender1 Race15)	-0.164364	0.1581	2238	-1.040
##	(50-59 Gender0 Race13)	-	(40-49 Gender1 Race15)	-0.039525	0.1600	2238	-0.247
##	(50-59 Gender0 Race13)	-	(50-59 Gender1 Race15)	-0.053471	0.1386	2238	-0.386
##	(18-29 Gender1 Race13)	-	(30-39 Gender1 Race13)	0.107323	0.0767	2238	1.399
##	(18-29 Gender1 Race13)	-	(40-49 Gender1 Race13)	0.232162	0.0769	2238	3.018
##	(18-29 Gender1 Race13)	-	(50-59 Gender1 Race13)	0.218216	0.0794	2238	2.747
##	(18-29 Gender1 Race13)	-	(18-29 Gender0 Race14)	0.233415	0.1094	2238	2.133
##	(18-29 Gender1 Race13)	-	(30-39 Gender0 Race14)	0.340738	0.1324	2238	2.574
##	(18-29 Gender1 Race13)	-	(40-49 Gender0 Race14)	0.465577	0.1313	2238	3.546
##	(18-29 Gender1 Race13)	-	(50-59 Gender0 Race14)	0.451631	0.1286	2238	3.513
##	(18-29 Gender1 Race13)	-	(18-29 Gender1 Race14)	0.056465	0.0900	2238	0.628
##	(18-29 Gender1 Race13)	-	(30-39 Gender1 Race14)	0.163788	0.1167	2238	1.403
##	(18-29 Gender1 Race13)	-	(40-49 Gender1 Race14)	0.288627	0.1160	2238	2.487
##	(18-29 Gender1 Race13)	-	(50-59 Gender1 Race14)	0.274681	0.1139	2238	2.411
##	(18-29 Gender1 Race13)	-	(18-29 Gender0 Race15)	0.300429	0.1416	2238	2.122
##	(18-29 Gender1 Race13)	-	(30-39 Gender0 Race15)	0.407752	0.1609	2238	2.534
##	(18-29 Gender1 Race13)	-	(40-49 Gender0 Race15)	0.532591	0.1623	2238	3.282
##	(18-29 Gender1 Race13)	-	(50-59 Gender0 Race15)	0.518644	0.1614	2238	3.213
##	(18-29 Gender1 Race13)	-	(18-29 Gender1 Race15)	0.123479	0.1288	2238	0.958
##	(18-29 Gender1 Race13)	-	(30-39 Gender1 Race15)	0.230802	0.1498	2238	1.541
##	(18-29 Gender1 Race13)	-	(40-49 Gender1 Race15)	0.355641	0.1516	2238	2.346
##	(18-29 Gender1 Race13)	-	(50-59 Gender1 Race15)	0.341695	0.1514	2238	2.257
##	(30-39 Gender1 Race13)	-	(40-49 Gender1 Race13)	0.124839	0.0763	2238	1.636
##	(30-39 Gender1 Race13)	-	(50-59 Gender1 Race13)	0.110893	0.0787	2238	1.409
##	(30-39 Gender1 Race13)	-	(18-29 Gender0 Race14)	0.126092	0.1349	2238	0.935
##	(30-39 Gender1 Race13)	-	(30-39 Gender0 Race14)	0.233415	0.1094	2238	2.133
##	(30-39 Gender1 Race13)	-	(40-49 Gender0 Race14)	0.358254	0.1322	2238	2.710
##	(30-39 Gender1 Race13)	-	(50-59 Gender0 Race14)	0.344308	0.1294	2238	2.660
##	(30-39 Gender1 Race13)	-	(18-29 Gender1 Race14)	-0.050858	0.1197	2238	-0.425
##	(30-39 Gender1 Race13)	-	(30-39 Gender1 Race14)	0.056465	0.0900	2238	0.628

##	(30-39 Gender1 Race13)	-	(40-49 Gender1 Race14)	0.181304	0.1172	2238	1.547
##	(30-39 Gender1 Race13)	-	(50-59 Gender1 Race14)	0.167358	0.1150	2238	1.456
##	(30-39 Gender1 Race13)	-	(18-29 Gender0 Race15)	0.193106	0.1612	2238	1.198
##	(30-39 Gender1 Race13)	-	(30-39 Gender0 Race15)	0.300429	0.1416	2238	2.122
##	(30-39 Gender1 Race13)	-	(40-49 Gender0 Race15)	0.425268	0.1621	2238	2.624
##	(30-39 Gender1 Race13)	-	(50-59 Gender0 Race15)	0.411322	0.1612	2238	2.552
##	(30-39 Gender1 Race13)	-	(18-29 Gender1 Race15)	0.016156	0.1501	2238	0.108
##	(30-39 Gender1 Race13)	-	(30-39 Gender1 Race15)	0.123479	0.1288	2238	0.958
##	(30-39 Gender1 Race13)	-	(40-49 Gender1 Race15)	0.248318	0.1515	2238	1.639
##	(30-39 Gender1 Race13)	-	(50-59 Gender1 Race15)	0.234372	0.1512	2238	1.550
##	(40-49 Gender1 Race13)	-	(50-59 Gender1 Race13)	-0.013946	0.0785	2238	-0.178
##	(40-49 Gender1 Race13)	-	(18-29 Gender0 Race14)	0.001253	0.1362	2238	0.009
##	(40-49 Gender1 Race13)	-	(30-39 Gender0 Race14)	0.108576	0.1346	2238	0.806
##	(40-49 Gender1 Race13)	-	(40-49 Gender0 Race14)	0.233415	0.1094	2238	2.133
##	(40-49 Gender1 Race13)	-	(50-59 Gender0 Race14)	0.219469	0.1305	2238	1.681
##	(40-49 Gender1 Race13)	-	(18-29 Gender1 Race14)	-0.175697	0.1207	2238	-1.456
##	(40-49 Gender1 Race13)	-	(30-39 Gender1 Race14)	-0.068374	0.1188	2238	-0.575
##	(40-49 Gender1 Race13)	-	(40-49 Gender1 Race14)	0.056465	0.0900	2238	0.628
##	(40-49 Gender1 Race13)	-	(50-59 Gender1 Race14)	0.042519	0.1157	2238	0.368
##	(40-49 Gender1 Race13)	-	(18-29 Gender0 Race15)	0.068267	0.1600	2238	0.427
##	(40-49 Gender1 Race13)	-	(30-39 Gender0 Race15)	0.175590	0.1596	2238	1.100
##	(40-49 Gender1 Race13)	-	(40-49 Gender0 Race15)	0.300429	0.1416	2238	2.122
##	(40-49 Gender1 Race13)	-	(50-59 Gender0 Race15)	0.286482	0.1598	2238	1.793
##	(40-49 Gender1 Race13)	-	(18-29 Gender1 Race15)	-0.108683	0.1485	2238	-0.732
##	(40-49 Gender1 Race13)	-	(30-39 Gender1 Race15)	-0.001360	0.1480	2238	-0.009
##	(40-49 Gender1 Race13)	-	(40-49 Gender1 Race15)	0.123479	0.1288	2238	0.958
##	(40-49 Gender1 Race13)	-	(50-59 Gender1 Race15)	0.109533	0.1494	2238	0.733
##	(50-59 Gender1 Race13)	-	(18-29 Gender0 Race14)	0.015199	0.1416	2238	0.107
##	(50-59 Gender1 Race13)	-	(30-39 Gender0 Race14)	0.122522	0.1400	2238	0.875
##	(50-59 Gender1 Race13)	-	(40-49 Gender0 Race14)	0.247361	0.1387	2238	1.784
##	(50-59 Gender1 Race13)	-	(50-59 Gender0 Race14)	0.233415	0.1094	2238	2.133
##	(50-59 Gender1 Race13)	-	(18-29 Gender1 Race14)	-0.161750	0.1258	2238	-1.286
##	(50-59 Gender1 Race13)	-	(30-39 Gender1 Race14)	-0.054428	0.1239	2238	-0.439
##	(50-59 Gender1 Race13)	-	(40-49 Gender1 Race14)	0.070412	0.1230	2238	0.572
##	(50-59 Gender1 Race13)	-	(50-59 Gender1 Race14)	0.056465	0.0900	2238	0.628
##	(50-59 Gender1 Race13)	-	(18-29 Gender0 Race15)	0.082213	0.1633	2238	0.503
##	(50-59 Gender1 Race13)	-	(30-39 Gender0 Race15)	0.189536	0.1629	2238	1.164
##	(50-59 Gender1 Race13)	-	(40-49 Gender0 Race15)	0.314375	0.1640	2238	1.917
##	(50-59 Gender1 Race13)	-	(50-59 Gender0 Race15)	0.300429	0.1416	2238	2.122
##	(50-59 Gender1 Race13)	-	(18-29 Gender1 Race15)	-0.094737	0.1513	2238	-0.626
##	(50-59 Gender1 Race13)	-	(30-39 Gender1 Race15)	0.012586	0.1507	2238	0.084
##	(50-59 Gender1 Race13)	-	(40-49 Gender1 Race15)	0.137425	0.1523	2238	0.902
##	(50-59 Gender1 Race13)	-	(50-59 Gender1 Race15)	0.123479	0.1288	2238	0.958
##	(18-29 Gender0 Race14)	-	(30-39 Gender0 Race14)	0.107323	0.0767	2238	1.399
##	(18-29 Gender0 Race14)	-	(40-49 Gender0 Race14)	0.232162	0.0769	2238	3.018
##	(18-29 Gender0 Race14)	-	(50-59 Gender0 Race14)	0.218216	0.0794	2238	2.747
##	(18-29 Gender0 Race14)	-	(18-29 Gender1 Race14)	-0.176950	0.0551	2238	-3.209
##	(18-29 Gender0 Race14)	-	(30-39 Gender1 Race14)	-0.069627	0.0944	2238	-0.738
##	(18-29 Gender0 Race14)	-	(40-49 Gender1 Race14)	0.055212	0.0952	2238	0.580
##	(18-29 Gender0 Race14)	-	(50-59 Gender1 Race14)	0.041266	0.0984	2238	0.419
##	(18-29 Gender0 Race14)	-	(18-29 Gender0 Race15)	0.067014	0.1057	2238	0.634
##	(18-29 Gender0 Race14)	-	(30-39 Gender0 Race15)	0.174337	0.1318	2238	1.323
##	(18-29 Gender0 Race14)	-	(40-49 Gender0 Race15)	0.299176	0.1346	2238	2.223
##	(18-29 Gender0 Race14)	-	(50-59 Gender0 Race15)	0.285229	0.1376	2238	2.073

##	(18-29 Gender0 Race14)	-	(18-29 Gender1 Race15)	-0.109936	0.1210	2238	-0.908
##	(18-29 Gender0 Race14)	-	(30-39 Gender1 Race15)	-0.002613	0.1443	2238	-0.018
##	(18-29 Gender0 Race14)	-	(40-49 Gender1 Race15)	0.122226	0.1473	2238	0.830
##	(18-29 Gender0 Race14)	-	(50-59 Gender1 Race15)	0.108280	0.1508	2238	0.718
##	(30-39 Gender0 Race14)	-	(40-49 Gender0 Race14)	0.124839	0.0763	2238	1.636
##	(30-39 Gender0 Race14)	-	(50-59 Gender0 Race14)	0.110893	0.0787	2238	1.409
##	(30-39 Gender0 Race14)	-	(18-29 Gender1 Race14)	-0.284273	0.0946	2238	-3.006
##	(30-39 Gender0 Race14)	-	(30-39 Gender1 Race14)	-0.176950	0.0551	2238	-3.209
##	(30-39 Gender0 Race14)	-	(40-49 Gender1 Race14)	-0.052111	0.0948	2238	-0.549
##	(30-39 Gender0 Race14)	-	(50-59 Gender1 Race14)	-0.066057	0.0979	2238	-0.675
##	(30-39 Gender0 Race14)	-	(18-29 Gender0 Race15)	-0.040309	0.1295	2238	-0.311
##	(30-39 Gender0 Race14)	-	(30-39 Gender0 Race15)	0.067014	0.1057	2238	0.634
##	(30-39 Gender0 Race14)	-	(40-49 Gender0 Race15)	0.191853	0.1331	2238	1.441
##	(30-39 Gender0 Race14)	-	(50-59 Gender0 Race15)	0.177906	0.1361	2238	1.307
##	(30-39 Gender0 Race14)	-	(18-29 Gender1 Race15)	-0.217259	0.1423	2238	-1.527
##	(30-39 Gender0 Race14)	-	(30-39 Gender1 Race15)	-0.109936	0.1210	2238	-0.908
##	(30-39 Gender0 Race14)	-	(40-49 Gender1 Race15)	0.014903	0.1460	2238	0.102
##	(30-39 Gender0 Race14)	-	(50-59 Gender1 Race15)	0.000957	0.1495	2238	0.006
##	(40-49 Gender0 Race14)	-	(50-59 Gender0 Race14)	-0.013946	0.0785	2238	-0.178
##	(40-49 Gender0 Race14)	-	(18-29 Gender1 Race14)	-0.409112	0.0941	2238	-4.350
##	(40-49 Gender0 Race14)	-	(30-39 Gender1 Race14)	-0.301789	0.0935	2238	-3.229
##	(40-49 Gender0 Race14)	-	(40-49 Gender1 Race14)	-0.176950	0.0551	2238	-3.209
##	(40-49 Gender0 Race14)	-	(50-59 Gender1 Race14)	-0.190896	0.0971	2238	-1.967
##	(40-49 Gender0 Race14)	-	(18-29 Gender0 Race15)	-0.165148	0.1268	2238	-1.302
##	(40-49 Gender0 Race14)	-	(30-39 Gender0 Race15)	-0.057825	0.1276	2238	-0.453
##	(40-49 Gender0 Race14)	-	(40-49 Gender0 Race15)	0.067014	0.1057	2238	0.634
##	(40-49 Gender0 Race14)	-	(50-59 Gender0 Race15)	0.053067	0.1333	2238	0.398
##	(40-49 Gender0 Race14)	-	(18-29 Gender1 Race15)	-0.342098	0.1394	2238	-2.454
##	(40-49 Gender0 Race14)	-	(30-39 Gender1 Race15)	-0.234775	0.1401	2238	-1.676
##	(40-49 Gender0 Race14)	-	(40-49 Gender1 Race15)	-0.109936	0.1210	2238	-0.908
##	(40-49 Gender0 Race14)	-	(50-59 Gender1 Race15)	-0.123883	0.1465	2238	-0.846
##	(50-59 Gender0 Race14)	-	(18-29 Gender1 Race14)	-0.395166	0.0950	2238	-4.161
##	(50-59 Gender0 Race14)	-	(30-39 Gender1 Race14)	-0.287843	0.0943	2238	-3.054
##	(50-59 Gender0 Race14)	-	(40-49 Gender1 Race14)	-0.163004	0.0948	2238	-1.720
##	(50-59 Gender0 Race14)	-	(50-59 Gender1 Race14)	-0.176950	0.0551	2238	-3.209
##	(50-59 Gender0 Race14)	-	(18-29 Gender0 Race15)	-0.151202	0.1267	2238	-1.193
##	(50-59 Gender0 Race14)	-	(30-39 Gender0 Race15)	-0.043879	0.1274	2238	-0.344
##	(50-59 Gender0 Race14)	-	(40-49 Gender0 Race15)	0.080960	0.1301	2238	0.622
##	(50-59 Gender0 Race14)	-	(50-59 Gender0 Race15)	0.067014	0.1057	2238	0.634
##	(50-59 Gender0 Race14)	-	(18-29 Gender1 Race15)	-0.328152	0.1385	2238	-2.369
##	(50-59 Gender0 Race14)	-	(30-39 Gender1 Race15)	-0.220829	0.1391	2238	-1.588
##	(50-59 Gender0 Race14)	-	(40-49 Gender1 Race15)	-0.095990	0.1420	2238	-0.676
##	(50-59 Gender0 Race14)	-	(50-59 Gender1 Race15)	-0.109936	0.1210	2238	-0.908
##	(18-29 Gender1 Race14)	-	(30-39 Gender1 Race14)	0.107323	0.0767	2238	1.399
##	(18-29 Gender1 Race14)	-	(40-49 Gender1 Race14)	0.232162	0.0769	2238	3.018
##	(18-29 Gender1 Race14)	-	(50-59 Gender1 Race14)	0.218216	0.0794	2238	2.747
##	(18-29 Gender1 Race14)	-	(18-29 Gender0 Race15)	0.243964	0.1175	2238	2.077
##	(18-29 Gender1 Race14)	-	(30-39 Gender0 Race15)	0.351286	0.1414	2238	2.484
##	(18-29 Gender1 Race14)	-	(40-49 Gender0 Race15)	0.476125	0.1436	2238	3.316
##	(18-29 Gender1 Race14)	-	(50-59 Gender0 Race15)	0.462179	0.1457	2238	3.173
##	(18-29 Gender1 Race14)	-	(18-29 Gender1 Race15)	0.067014	0.1057	2238	0.634
##	(18-29 Gender1 Race14)	-	(30-39 Gender1 Race15)	0.174337	0.1318	2238	1.323
##	(18-29 Gender1 Race14)	-	(40-49 Gender1 Race15)	0.299176	0.1346	2238	2.223
##	(18-29 Gender1 Race14)	-	(50-59 Gender1 Race15)	0.285229	0.1376	2238	2.073

##	(30-39 Gender1 Race14)	-	(40-49 Gender1 Race14)	0.124839	0.0763	2238	1.636
##	(30-39 Gender1 Race14)	-	(50-59 Gender1 Race14)	0.110893	0.0787	2238	1.409
##	(30-39 Gender1 Race14)	-	(18-29 Gender0 Race15)	0.136641	0.1392	2238	0.982
##	(30-39 Gender1 Race14)	-	(30-39 Gender0 Race15)	0.243964	0.1175	2238	2.077
##	(30-39 Gender1 Race14)	-	(40-49 Gender0 Race15)	0.368803	0.1422	2238	2.594
##	(30-39 Gender1 Race14)	-	(50-59 Gender0 Race15)	0.354856	0.1442	2238	2.461
##	(30-39 Gender1 Race14)	-	(18-29 Gender1 Race15)	-0.040309	0.1295	2238	-0.311
##	(30-39 Gender1 Race14)	-	(30-39 Gender1 Race15)	0.067014	0.1057	2238	0.634
##	(30-39 Gender1 Race14)	-	(40-49 Gender1 Race15)	0.191853	0.1331	2238	1.441
##	(30-39 Gender1 Race14)	-	(50-59 Gender1 Race15)	0.177906	0.1361	2238	1.307
##	(40-49 Gender1 Race14)	-	(50-59 Gender1 Race14)	-0.013946	0.0785	2238	-0.178
##	(40-49 Gender1 Race14)	-	(18-29 Gender0 Race15)	0.011802	0.1372	2238	0.086
##	(40-49 Gender1 Race14)	-	(30-39 Gender0 Race15)	0.119124	0.1380	2238	0.863
##	(40-49 Gender1 Race14)	-	(40-49 Gender0 Race15)	0.243964	0.1175	2238	2.077
##	(40-49 Gender1 Race14)	-	(50-59 Gender0 Race15)	0.230017	0.1420	2238	1.620
##	(40-49 Gender1 Race14)	-	(18-29 Gender1 Race15)	-0.165148	0.1268	2238	-1.302
##	(40-49 Gender1 Race14)	-	(30-39 Gender1 Race15)	-0.057825	0.1276	2238	-0.453
##	(40-49 Gender1 Race14)	-	(40-49 Gender1 Race15)	0.067014	0.1057	2238	0.634
##	(40-49 Gender1 Race14)	-	(50-59 Gender1 Race15)	0.053067	0.1333	2238	0.398
##	(50-59 Gender1 Race14)	-	(18-29 Gender0 Race15)	0.025748	0.1378	2238	0.187
##	(50-59 Gender1 Race14)	-	(30-39 Gender0 Race15)	0.133071	0.1386	2238	0.960
##	(50-59 Gender1 Race14)	-	(40-49 Gender0 Race15)	0.257910	0.1405	2238	1.835
##	(50-59 Gender1 Race14)	-	(50-59 Gender0 Race15)	0.243964	0.1175	2238	2.077
##	(50-59 Gender1 Race14)	-	(18-29 Gender1 Race15)	-0.151202	0.1267	2238	-1.193
##	(50-59 Gender1 Race14)	-	(30-39 Gender1 Race15)	-0.043879	0.1274	2238	-0.344
##	(50-59 Gender1 Race14)	-	(40-49 Gender1 Race15)	0.080960	0.1301	2238	0.622
##	(50-59 Gender1 Race14)	-	(50-59 Gender1 Race15)	0.067014	0.1057	2238	0.634
##	(18-29 Gender0 Race15)	-	(30-39 Gender0 Race15)	0.107323	0.0767	2238	1.399
##	(18-29 Gender0 Race15)	-	(40-49 Gender0 Race15)	0.232162	0.0769	2238	3.018
##	(18-29 Gender0 Race15)	-	(50-59 Gender0 Race15)	0.218216	0.0794	2238	2.747
##	(18-29 Gender0 Race15)	-	(18-29 Gender1 Race15)	-0.176950	0.0551	2238	-3.209
##	(18-29 Gender0 Race15)	-	(30-39 Gender1 Race15)	-0.069627	0.0944	2238	-0.738
##	(18-29 Gender0 Race15)	-	(40-49 Gender1 Race15)	0.055212	0.0952	2238	0.580
##	(18-29 Gender0 Race15)	-	(50-59 Gender1 Race15)	0.041266	0.0984	2238	0.419
##	(30-39 Gender0 Race15)	-	(40-49 Gender0 Race15)	0.124839	0.0763	2238	1.636
##	(30-39 Gender0 Race15)	-	(50-59 Gender0 Race15)	0.110893	0.0787	2238	1.409
##	(30-39 Gender0 Race15)	-	(18-29 Gender1 Race15)	-0.284273	0.0946	2238	-3.006
##	(30-39 Gender0 Race15)	-	(30-39 Gender1 Race15)	-0.176950	0.0551	2238	-3.209
##	(30-39 Gender0 Race15)	-	(40-49 Gender1 Race15)	-0.052111	0.0948	2238	-0.549
##	(30-39 Gender0 Race15)	-	(50-59 Gender1 Race15)	-0.066057	0.0979	2238	-0.675
##	(40-49 Gender0 Race15)	-	(50-59 Gender0 Race15)	-0.013946	0.0785	2238	-0.178
##	(40-49 Gender0 Race15)	-	(18-29 Gender1 Race15)	-0.409112	0.0941	2238	-4.350
##	(40-49 Gender0 Race15)	-	(30-39 Gender1 Race15)	-0.301789	0.0935	2238	-3.229
##	(40-49 Gender0 Race15)	-	(40-49 Gender1 Race15)	-0.176950	0.0551	2238	-3.209
##	(40-49 Gender0 Race15)	-	(50-59 Gender1 Race15)	-0.190896	0.0971	2238	-1.967
##	(50-59 Gender0 Race15)	-	(18-29 Gender1 Race15)	-0.395166	0.0950	2238	-4.161
##	(50-59 Gender0 Race15)	-	(30-39 Gender1 Race15)	-0.287843	0.0943	2238	-3.054
##	(50-59 Gender0 Race15)	-	(40-49 Gender1 Race15)	-0.163004	0.0948	2238	-1.720
##	(50-59 Gender0 Race15)	-	(50-59 Gender1 Race15)	-0.176950	0.0551	2238	-3.209
##	(18-29 Gender1 Race15)	-	(30-39 Gender1 Race15)	0.107323	0.0767	2238	1.399
##	(18-29 Gender1 Race15)	-	(40-49 Gender1 Race15)	0.232162	0.0769	2238	3.018
##	(18-29 Gender1 Race15)	-	(50-59 Gender1 Race15)	0.218216	0.0794	2238	2.747
##	(30-39 Gender1 Race15)	-	(40-49 Gender1 Race15)	0.124839	0.0763	2238	1.636
##	(30-39 Gender1 Race15)	-	(50-59 Gender1 Race15)	0.110893	0.0787	2238	1.409



```

## (40-49 Gender1 Race15) - (50-59 Gender1 Race15) -0.013946 0.0785 2238 -0.178
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##
## P value adjustment: tukey method for comparing a family of 40 estimates

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