4.2_Exercise2_Torres_Gloria.R

2023-04-09

```
# Assignment: 4.1 Exercise 2
# Name: Torres, Estrada
# Date: 2023-04-08

# We interact with a few datasets in this course, one you are already
familiar with,
# the 2014 American Community Survey and the second is a Housing dataset,
that provides real estate transactions recorded from 1964 to 2016.
# For this exercise, you need to start practicing some data transformation
steps - which will carry into next week, as you learn some additional
methods.
# For this week, using either dataset (or one of your own - although I will
let you know ahead of time that the Housing dataset is used for a later
assignment,
# so not a bad idea for you to get more comfortable with now!), perform the
following data transformations:
# Use the apply function on a variable in your dataset


setwd('C:/Users/glori/OneDrive/Documents/Gloria GIT/Gloria_Torres_DSC_520')

ac_survey <- read.csv("data/acs-14-1yr-s0201.csv")

my_matrix = matrix(ac_survey$RacesReported)

apply(my_matrix, 2, FUN=sum)

## [1] 155638535

# Use the aggregate function on a variable in your dataset

aggregate(HSDegree ~ Geography + BachDegree, ac_survey, mean)

##                                     Geography BachDegree HSDegree
## 1                     Kern County, California       15.4     74.5
## 2                Stanislaus County, California       17.0     78.4
## 3                        Hidalgo County, Texas       17.9     62.2
## 4               San Joaquin County, California       18.3     77.6
## 5            San Bernardino County, California       18.9     78.6
## 6                       Bronx County, New York       19.3     70.5
## 7                   Fresno County, California       19.7     73.6
## 8                         Polk County, Florida       19.7     84.9
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## 9                  Riverside County, California       20.7     80.6
## 10                        El Paso County, Texas       21.1     75.8
## 11                      Wayne County, Michigan        22.1     84.9
## 12                     Volusia County, Florida        22.5     88.9
## 13                        Clark County, Nevada        22.7     84.5
## 14                     Macomb County, Michigan        23.9     89.3
## 15                   Pierce County, Washington        24.6     90.3
## 16             Providence County, Rhode Island        25.2     82.0
## 17               Bristol County, Massachusetts        25.7     82.5
## 18                     Montgomery County, Ohio        25.7     89.7
## 19              Lancaster County, Pennsylvania        26.0     84.9
## 20           Philadelphia County, Pennsylvania        26.0     82.6
## 21                      Duval County, Florida        26.1     89.0
## 22                        Bexar County, Texas        26.3     83.0
## 23                        Lee County, Florida        26.5     86.3
## 24                  Miami-Dade County, Florida       26.6     80.9
## 25                     Brevard County, Florida       27.2     91.6
## 26                    Ocean County, New Jersey       28.6     91.7
## 27                   Passaic County, New Jersey       28.6     83.8
## 28                     Marion County, Indiana        28.8     85.0
## 29                Sacramento County, California      28.9     86.8
## 30                      Dallas County, Texas        29.1     77.6
## 31                Snohomish County, Washington      29.1     92.0
## 32                    Jackson County, Missouri      29.5     90.0
## 33                 Milwaukee County, Wisconsin      29.5     86.9
## 34                    Pinellas County, Florida      29.5     90.1
## 35                        Harris County, Texas      29.7     79.8
## 36                Hillsborough County, Florida      29.8     87.3
## 37                     Queens County, New York      29.8     80.4
## 38                    Shelby County, Tennessee      29.9     87.4
## 39                    Baltimore city, Maryland      30.0     84.4
## 40                      Tarrant County, Texas       30.0     84.9
## 41                    Maricopa County, Arizona      30.2     86.8
## 42              Los Angeles County, California      30.3     77.5
## 43                        Summit County, Ohio       30.3     91.1
## 44                     Broward County, Florida      30.5     88.4
## 45                   Jefferson County, Alabama      30.5     89.1
## 46                   Oklahoma County, Oklahoma      30.6     86.8
## 47                     Sedgwick County, Kansas      30.7     88.8
## 48                      Tulsa County, Oklahoma      30.7     88.6
## 49                       Pima County, Arizona       30.8     88.0
## 50                     Cuyahoga County, Ohio        31.0     88.1
## 51           Prince George's County, Maryland       31.0     85.5
## 52                   Camden County, New Jersey      31.3     88.3
## 53                       Erie County, New York      31.3     90.6
## 54                     Orange County, Florida       31.4     87.9
## 55                  Jefferson County, Kentucky      31.6     88.5
## 56                  Ventura County, California      31.6     83.6
## 57                      Salt Lake County, Utah      31.9     89.5
## 58                     Honolulu County, Hawaii      32.6     91.8
```

```
## 59                       Kane County, Illinois       32.6     82.9
## 60                 Bernalillo County, New Mexico       32.7     88.0
## 61                      Essex County, New Jersey       32.7     85.5
## 62                   Palm Beach County, Florida       33.0     87.7
## 63                     Union County, New Jersey       33.0     86.2
## 64                        Will County, Illinois       33.1     90.7
## 65              Guilford County, North Carolina       33.3     89.0
## 66                        Kent County, Michigan       33.7     89.1
## 67                     Suffolk County, New York       34.0     89.8
## 68                     Montgomery County, Texas       34.1     85.9
## 69                Plymouth County, Massachusetts       34.1     92.2
## 70                       Kings County, New York       34.3     80.0
## 71                 New Haven County, Connecticut       34.5     89.5
## 72              Worcester County, Massachusetts       34.6     90.1
## 73                    Sonoma County, California       34.8     87.6
## 74                     Gwinnett County, Georgia       35.4     88.0
## 75                        Hamilton County, Ohio       35.6     90.5
## 76                   New Castle County, Delaware       35.8     90.1
## 77                       Monroe County, New York       35.9     90.3
## 78                        Cook County, Illinois       36.2     85.5
## 79                Delaware County, Pennsylvania       36.3     91.5
## 80                     Douglas County, Nebraska       36.3     88.2
## 81                     El Paso County, Colorado       36.5     92.8
## 82                  Hartford County, Connecticut       36.8     89.3
## 83                  San Diego County, California       37.1     86.6
## 84                    Baltimore County, Maryland       37.2     90.4
## 85                    Davidson County, Tennessee       37.3     86.7
## 86                             Utah County, Utah       37.5     93.7
## 87                Allegheny County, Pennsylvania       37.7     93.9
## 88                    Bucks County, Pennsylvania       37.7     93.9
## 89                         Franklin County, Ohio       38.0     90.0
## 90                     Orange County, California       38.0     84.6
## 91                     Hudson County, New Jersey       38.2     83.4
## 92                Anne Arundel County, Maryland       38.8     91.9
## 93                   Essex County, Massachusetts       38.9     89.1
## 94              Contra Costa County, California       39.7     88.8
## 95                    Washington County, Oregon       39.7     90.2
## 96                    Arapahoe County, Colorado       40.9     91.9
## 97                     Ramsey County, Minnesota       40.9     89.9
## 98                  Middlesex County, New Jersey       41.0     89.1
## 99                         Denton County, Texas       41.5     91.9
## 100                   Multnomah County, Oregon       41.6     91.1
## 101                     DeKalb County, Georgia       41.7     88.4
## 102                  Jefferson County, Colorado       42.0     94.1
## 103               Suffolk County, Massachusetts       42.3     83.9
## 104                  Alameda County, California       42.8     86.9
## 105                  St. Louis County, Missouri       42.8     93.2
## 106         Mecklenburg County, North Carolina       43.0     89.5
## 107                    Nassau County, New York       43.2     90.7
## 108                       Cobb County, Georgia       43.7     90.3
```

```
## 109                 Monmouth County, New Jersey       43.7     93.1
## 110                       Lake County, Illinois       44.0     90.3
## 111                   Fort Bend County, Texas         44.1     88.6
## 112                   Denver County, Colorado         44.3     85.5
## 113                  Oakland County, Michigan         44.8     93.6
## 114                      Travis County, Texas         45.6     88.6
## 115                  Bergen County, New Jersey        46.2     91.5
## 116              Fairfield County, Connecticut        46.7     89.8
## 117               Westchester County, New York        47.1     87.4
## 118                 Hennepin County, Minnesota       47.3     93.2
## 119            Montgomery County, Pennsylvania       47.3     93.7
## 120               San Mateo County, California       47.5     88.1
## 121                    DuPage County, Illinois       48.0     92.3
## 122             Santa Clara County, California       48.4     87.4
## 123                    King County, Washington       48.6     92.3
## 124                   Fulton County, Georgia         49.2     91.3
## 125                Wake County, North Carolina       49.2     92.4
## 126               Chester County, Pennsylvania       49.3     92.3
## 127                    Dane County, Wisconsin        49.8     94.9
## 128                     Collin County, Texas         50.0     93.7
## 129              Norfolk County, Massachusetts       51.9     94.1
## 130            Middlesex County, Massachusetts       52.3     92.3
## 131                    Johnson County, Kansas        52.8     95.5
## 132           San Francisco County, California       54.2     88.1
## 133 District of Columbia, District of Columbia       55.0     90.2
## 134                Montgomery County, Maryland       58.5     90.9
## 135                  New York County, New York       59.9     86.8
## 136                   Fairfax County, Virginia       60.3     91.5
```

```
# Use the plyr function on a variable in your dataset - more specifically, I
want to see you split some data, perform a modification to the data, and then
bring it back together
library(plyr)
modified_ac_survey <- ac_survey[ac_survey$HSDegree >= 90,] # Split Data
(HSDegree >= 90)

modified_ac_survey2 <- ac_survey[ac_survey$HSDegree <= 70,] # Split Data
(HSDegree <= 70,)

library(dplyr)

##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:plyr':
##
##     arrange, count, desc, failwith, id, mutate, rename, summarise,
##     summarize
```

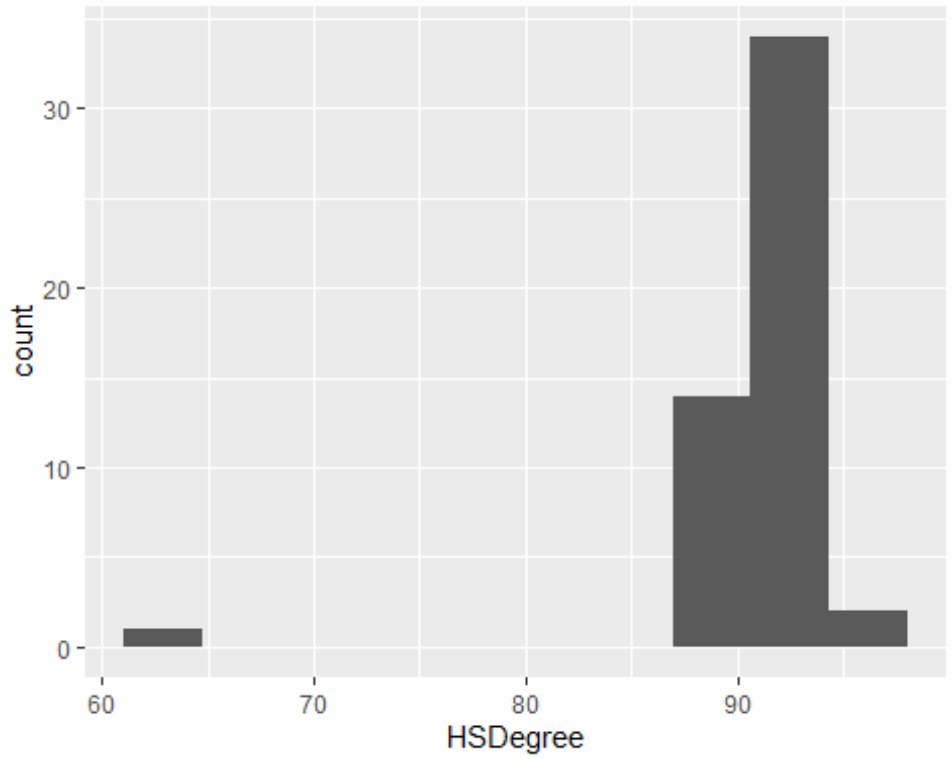
```
## The following objects are masked from 'package:stats':
##
##     filter, lag

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

update_PopGroupID <- modified_ac_survey %>% mutate(PopGroupID =
replace(PopGroupID, PopGroupID ==1, 1.1)) # Modify data 1: Update group id
for HSDegree >= 90)

update_PopGroupID2 <- modified_ac_survey2 %>% mutate(PopGroupID =
replace(PopGroupID, PopGroupID ==1, 1.2)) # Modify data 2: Update group id
for HSDegree <=70)

library(readr)

joined_data <- merge(x=update_PopGroupID, y=update_PopGroupID2, all.x = TRUE,
all.y = TRUE) # Combine df's
joined_data

##                Id   Id2                                  Geography
PopGroupID
## 1  0500000US08005  8005                Arapahoe County, Colorado
1.1
## 2  0500000US08041  8041                 El Paso County, Colorado
1.1
## 3  0500000US08059  8059               Jefferson County, Colorado
1.1
## 4  0500000US10003 10003              New Castle County, Delaware
1.1
## 5  0500000US11001 11001 District of Columbia, District of Columbia
1.1
## 6  0500000US12009 12009                  Brevard County, Florida
1.1
## 7  0500000US12103 12103                 Pinellas County, Florida
1.1
## 8  0500000US13067 13067                     Cobb County, Georgia
1.1
## 9  0500000US13121 13121                   Fulton County, Georgia
1.1
## 10 0500000US15003 15003                  Honolulu County, Hawaii
1.1
## 11 0500000US17043 17043                  DuPage County, Illinois
1.1
## 12 0500000US17097 17097                    Lake County, Illinois
1.1
## 13 0500000US17197 17197                    Will County, Illinois
1.1
```

```
## 14 0500000US20091 20091                    Johnson County, Kansas
1.1
## 15 0500000US24003 24003              Anne Arundel County, Maryland
1.1
## 16 0500000US24005 24005                 Baltimore County, Maryland
1.1
## 17 0500000US24031 24031               Montgomery County, Maryland
1.1
## 18 0500000US25017 25017            Middlesex County, Massachusetts
1.1
## 19 0500000US25021 25021              Norfolk County, Massachusetts
1.1
## 20 0500000US25023 25023             Plymouth County, Massachusetts
1.1
## 21 0500000US25027 25027            Worcester County, Massachusetts
1.1
## 22 0500000US26125 26125                   Oakland County, Michigan
1.1
## 23 0500000US27053 27053                 Hennepin County, Minnesota
1.1
## 24 0500000US29095 29095                   Jackson County, Missouri
1.1
## 25 0500000US29189 29189                 St. Louis County, Missouri
1.1
## 26 0500000US34003 34003                  Bergen County, New Jersey
1.1
## 27 0500000US34025 34025                Monmouth County, New Jersey
1.1
## 28 0500000US34029 34029                   Ocean County, New Jersey
1.1
## 29 0500000US36029 36029                      Erie County, New York
1.1
## 30 0500000US36055 36055                    Monroe County, New York
1.1
## 31 0500000US36059 36059                    Nassau County, New York
1.1
## 32 0500000US37183 37183                 Wake County, North Carolina
1.1
## 33 0500000US39049 39049                    Franklin County, Ohio
1.1
## 34 0500000US39061 39061                    Hamilton County, Ohio
1.1
## 35 0500000US39153 39153                      Summit County, Ohio
1.1
## 36 0500000US41051 41051                   Multnomah County, Oregon
1.1
## 37 0500000US41067 41067                  Washington County, Oregon
1.1
## 38 0500000US42003 42003              Allegheny County, Pennsylvania
1.1
```

```
## 39 0500000US42017 42017                  Bucks County, Pennsylvania
1.1
## 40 0500000US42029 42029                Chester County, Pennsylvania
1.1
## 41 0500000US42045 42045              Delaware County, Pennsylvania
1.1
## 42 0500000US42091 42091            Montgomery County, Pennsylvania
1.1
## 43 0500000US48085 48085                       Collin County, Texas
1.1
## 44 0500000US48121 48121                       Denton County, Texas
1.1
## 45 0500000US48215 48215                      Hidalgo County, Texas
1.2
## 46 0500000US49049 49049                          Utah County, Utah
1.1
## 47 0500000US51059 51059                    Fairfax County, Virginia
1.1
## 48 0500000US53033 53033                     King County, Washington
1.1
## 49 0500000US53053 53053                    Pierce County, Washington
1.1
## 50 0500000US53061 53061                 Snohomish County, Washington
1.1
## 51 0500000US55025 55025                       Dane County, Wisconsin
1.1
##    POPGROUP.display.label RacesReported HSDegree BachDegree
## 1         Total population        618821     91.9       40.9
## 2         Total population        663519     92.8       36.5
## 3         Total population        558503     94.1       42.0
## 4         Total population        552778     90.1       35.8
## 5         Total population        658893     90.2       55.0
## 6         Total population        556885     91.6       27.2
## 7         Total population        938098     90.1       29.5
## 8         Total population        730981     90.3       43.7
## 9         Total population        996319     91.3       49.2
## 10        Total population        991788     91.8       32.6
## 11        Total population        932708     92.3       48.0
## 12        Total population        705186     90.3       44.0
## 13        Total population        685419     90.7       33.1
## 14        Total population        574272     95.5       52.8
## 15        Total population        560133     91.9       38.8
## 16        Total population        826925     90.4       37.2
## 17        Total population       1030447     90.9       58.5
## 18        Total population       1570315     92.3       52.3
## 19        Total population        692254     94.1       51.9
## 20        Total population        507022     92.2       34.1
## 21        Total population        813475     90.1       34.6
## 22        Total population       1237868     93.6       44.8
## 23        Total population       1212064     93.2       47.3
```

```
## 24       Total population        683191     90.0       29.5
## 25       Total population       1001876     93.2       42.8
## 26       Total population        933572     91.5       46.2
## 27       Total population        629279     93.1       43.7
## 28       Total population        586301     91.7       28.6
## 29       Total population        922835     90.6       31.3
## 30       Total population        749857     90.3       35.9
## 31       Total population       1358627     90.7       43.2
## 32       Total population        998691     92.4       49.2
## 33       Total population       1231393     90.0       38.0
## 34       Total population        806631     90.5       35.6
## 35       Total population        541943     91.1       30.3
## 36       Total population        776712     91.1       41.6
## 37       Total population        562998     90.2       39.7
## 38       Total population       1231255     93.9       37.7
## 39       Total population        626685     93.9       37.7
## 40       Total population        512784     92.3       49.3
## 41       Total population        562960     91.5       36.3
## 42       Total population        816857     93.7       47.3
## 43       Total population        885241     93.7       50.0
## 44       Total population        753363     91.9       41.5
## 45       Total population        831073     62.2       17.9
## 46       Total population        560974     93.7       37.5
## 47       Total population       1137538     91.5       60.3
## 48       Total population       2079967     92.3       48.6
## 49       Total population        831928     90.3       24.6
## 50       Total population        759583     92.0       29.1
## 51       Total population        516284     94.9       49.8
```

```
# Check distributions of the data
library(ggplot2)
histo<-ggplot(joined_data, aes(HSDegree)) + geom_histogram(bins = 10)
histo
```

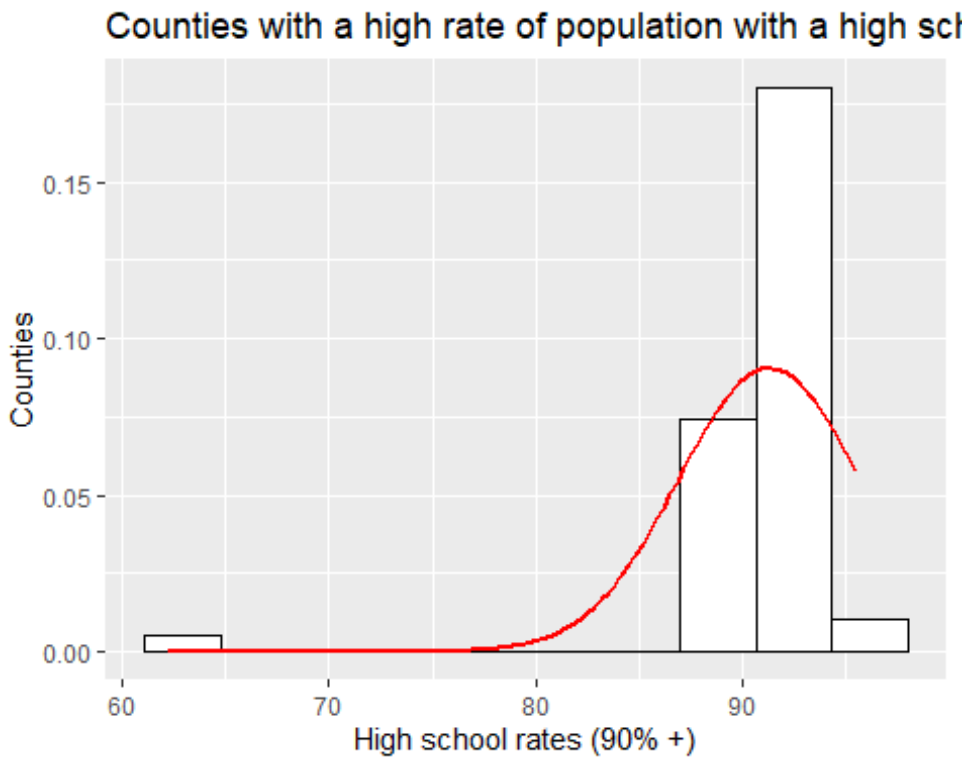



```
curve <- ggplot(joined_data, aes(HSDegree)) + geom_histogram(bins = 10, aes(y
= ..density..), fill ='white', colour='black') + stat_function(fun = dnorm,
args = list(mean = mean(joined_data$HSDegree, na.rm = TRUE),
sd=sd(joined_data$HSDegree, na.rm = TRUE)), colour ="red",  size=1) +
ggtitle('Counties with a high rate of population with a high school degree
(90% +)') + xlab('High school rates (90% +)') + ylab('Counties')
```

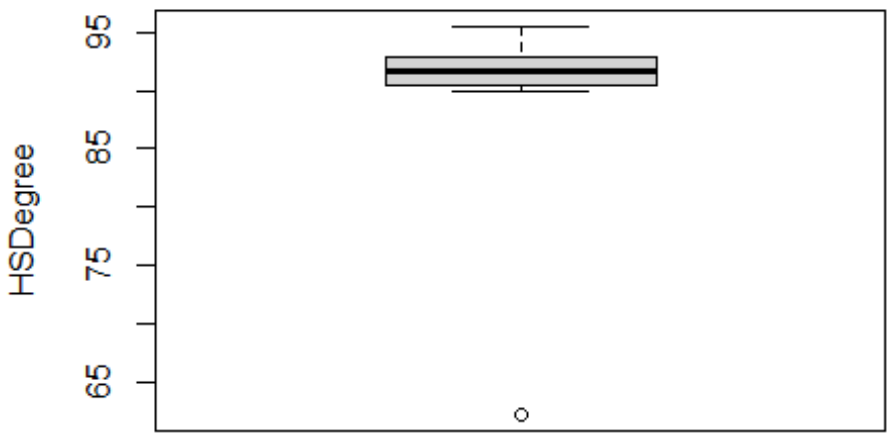
```
## Warning: Using `size` aesthetic for lines was deprecated in ggplot2 3.4.0.
## ℹ Please use `linewidth` instead.
## This warning is displayed once every 8 hours.
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was
## generated.
```

```
curve
```

```
## 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.
```




```
# Per the plots, the distribution is not normal; distribution is skewed to
the left(it is not bell-shaped).

# Identify if there are any outliers
boxplot(joined_data$HSDegree, ylab = "HSDegree")
```




```
boxplot.stats(joined_data$HSDegree)$out
```

```
## [1] 62.2
```

```
# Per the box plot functions, "high school rate: 62.2" is an outlier.

# Create at least 2 new variables
variable1<- mutate(joined_data, "County with a high level of high  school
education" = HSDegree >= 90)
variable1
```

```
##                Id   Id2                                    Geography
PopGroupID
## 1  0500000US08005  8005                  Arapahoe County, Colorado
1.1
## 2  0500000US08041  8041                    El Paso County, Colorado
1.1
## 3  0500000US08059  8059                 Jefferson County, Colorado
1.1
## 4  0500000US10003 10003                New Castle County, Delaware
1.1
## 5  0500000US11001 11001 District of Columbia, District of Columbia
1.1
## 6  0500000US12009 12009                     Brevard County, Florida
1.1
## 7  0500000US12103 12103                    Pinellas County, Florida
1.1
```

```
## 8  0500000US13067 13067                      Cobb County, Georgia
1.1
## 9  0500000US13121 13121                     Fulton County, Georgia
1.1
## 10 0500000US15003 15003                   Honolulu County, Hawaii
1.1
## 11 0500000US17043 17043                   DuPage County, Illinois
1.1
## 12 0500000US17097 17097                     Lake County, Illinois
1.1
## 13 0500000US17197 17197                     Will County, Illinois
1.1
## 14 0500000US20091 20091                   Johnson County, Kansas
1.1
## 15 0500000US24003 24003             Anne Arundel County, Maryland
1.1
## 16 0500000US24005 24005                Baltimore County, Maryland
1.1
## 17 0500000US24031 24031               Montgomery County, Maryland
1.1
## 18 0500000US25017 25017           Middlesex County, Massachusetts
1.1
## 19 0500000US25021 25021             Norfolk County, Massachusetts
1.1
## 20 0500000US25023 25023            Plymouth County, Massachusetts
1.1
## 21 0500000US25027 25027           Worcester County, Massachusetts
1.1
## 22 0500000US26125 26125                Oakland County, Michigan
1.1
## 23 0500000US27053 27053               Hennepin County, Minnesota
1.1
## 24 0500000US29095 29095                 Jackson County, Missouri
1.1
## 25 0500000US29189 29189               St. Louis County, Missouri
1.1
## 26 0500000US34003 34003                Bergen County, New Jersey
1.1
## 27 0500000US34025 34025               Monmouth County, New Jersey
1.1
## 28 0500000US34029 34029                  Ocean County, New Jersey
1.1
## 29 0500000US36029 36029                    Erie County, New York
1.1
## 30 0500000US36055 36055                  Monroe County, New York
1.1
## 31 0500000US36059 36059                  Nassau County, New York
1.1
## 32 0500000US37183 37183               Wake County, North Carolina
1.1
```

```
## 33 0500000US39049 39049                        Franklin County, Ohio
1.1
## 34 0500000US39061 39061                        Hamilton County, Ohio
1.1
## 35 0500000US39153 39153                          Summit County, Ohio
1.1
## 36 0500000US41051 41051                    Multnomah County, Oregon
1.1
## 37 0500000US41067 41067                   Washington County, Oregon
1.1
## 38 0500000US42003 42003               Allegheny County, Pennsylvania
1.1
## 39 0500000US42017 42017                  Bucks County, Pennsylvania
1.1
## 40 0500000US42029 42029                 Chester County, Pennsylvania
1.1
## 41 0500000US42045 42045                Delaware County, Pennsylvania
1.1
## 42 0500000US42091 42091              Montgomery County, Pennsylvania
1.1
## 43 0500000US48085 48085                        Collin County, Texas
1.1
## 44 0500000US48121 48121                        Denton County, Texas
1.1
## 45 0500000US48215 48215                       Hidalgo County, Texas
1.2
## 46 0500000US49049 49049                          Utah County, Utah
1.1
## 47 0500000US51059 51059                     Fairfax County, Virginia
1.1
## 48 0500000US53033 53033                      King County, Washington
1.1
## 49 0500000US53053 53053                    Pierce County, Washington
1.1
## 50 0500000US53061 53061                 Snohomish County, Washington
1.1
## 51 0500000US55025 55025                       Dane County, Wisconsin
1.1
##    POPGROUP.display.label RacesReported HSDegree BachDegree
## 1         Total population        618821     91.9       40.9
## 2         Total population        663519     92.8       36.5
## 3         Total population        558503     94.1       42.0
## 4         Total population        552778     90.1       35.8
## 5         Total population        658893     90.2       55.0
## 6         Total population        556885     91.6       27.2
## 7         Total population        938098     90.1       29.5
## 8         Total population        730981     90.3       43.7
## 9         Total population        996319     91.3       49.2
## 10        Total population        991788     91.8       32.6
## 11        Total population        932708     92.3       48.0
```

```
## 12       Total population        705186     90.3       44.0
## 13       Total population        685419     90.7       33.1
## 14       Total population        574272     95.5       52.8
## 15       Total population        560133     91.9       38.8
## 16       Total population        826925     90.4       37.2
## 17       Total population       1030447     90.9       58.5
## 18       Total population       1570315     92.3       52.3
## 19       Total population        692254     94.1       51.9
## 20       Total population        507022     92.2       34.1
## 21       Total population        813475     90.1       34.6
## 22       Total population       1237868     93.6       44.8
## 23       Total population       1212064     93.2       47.3
## 24       Total population        683191     90.0       29.5
## 25       Total population       1001876     93.2       42.8
## 26       Total population        933572     91.5       46.2
## 27       Total population        629279     93.1       43.7
## 28       Total population        586301     91.7       28.6
## 29       Total population        922835     90.6       31.3
## 30       Total population        749857     90.3       35.9
## 31       Total population       1358627     90.7       43.2
## 32       Total population        998691     92.4       49.2
## 33       Total population       1231393     90.0       38.0
## 34       Total population        806631     90.5       35.6
## 35       Total population        541943     91.1       30.3
## 36       Total population        776712     91.1       41.6
## 37       Total population        562998     90.2       39.7
## 38       Total population       1231255     93.9       37.7
## 39       Total population        626685     93.9       37.7
## 40       Total population        512784     92.3       49.3
## 41       Total population        562960     91.5       36.3
## 42       Total population        816857     93.7       47.3
## 43       Total population        885241     93.7       50.0
## 44       Total population        753363     91.9       41.5
## 45       Total population        831073     62.2       17.9
## 46       Total population        560974     93.7       37.5
## 47       Total population       1137538     91.5       60.3
## 48       Total population       2079967     92.3       48.6
## 49       Total population        831928     90.3       24.6
## 50       Total population        759583     92.0       29.1
## 51       Total population        516284     94.9       49.8
##    County with a high level of high  school education
## 1                                                TRUE
## 2                                                TRUE
## 3                                                TRUE
## 4                                                TRUE
## 5                                                TRUE
## 6                                                TRUE
## 7                                                TRUE
## 8                                                TRUE
## 9                                                TRUE
```

```
## 10                                                    TRUE
## 11                                                    TRUE
## 12                                                    TRUE
## 13                                                    TRUE
## 14                                                    TRUE
## 15                                                    TRUE
## 16                                                    TRUE
## 17                                                    TRUE
## 18                                                    TRUE
## 19                                                    TRUE
## 20                                                    TRUE
## 21                                                    TRUE
## 22                                                    TRUE
## 23                                                    TRUE
## 24                                                    TRUE
## 25                                                    TRUE
## 26                                                    TRUE
## 27                                                    TRUE
## 28                                                    TRUE
## 29                                                    TRUE
## 30                                                    TRUE
## 31                                                    TRUE
## 32                                                    TRUE
## 33                                                    TRUE
## 34                                                    TRUE
## 35                                                    TRUE
## 36                                                    TRUE
## 37                                                    TRUE
## 38                                                    TRUE
## 39                                                    TRUE
## 40                                                    TRUE
## 41                                                    TRUE
## 42                                                    TRUE
## 43                                                    TRUE
## 44                                                    TRUE
## 45                                                   FALSE
## 46                                                    TRUE
## 47                                                    TRUE
## 48                                                    TRUE
## 49                                                    TRUE
## 50                                                    TRUE
## 51                                                    TRUE
```

```
variable2 <- mutate(modified_ac_survey, "County with a high level of high
school education and low rate of population with a bachelor's degree" =
BachDegree <= 50)
variable2
```

```
##                 Id   Id2                                  Geography
PopGroupID
```

```
## 21  0500000US08005  8005                  Arapahoe County, Colorado
1
## 23  0500000US08041  8041                   El Paso County, Colorado
1
## 24  0500000US08059  8059                 Jefferson County, Colorado
1
## 28  0500000US10003 10003                New Castle County, Delaware
1
## 29  0500000US11001 11001 District of Columbia, District of Columbia
1
## 30  0500000US12009 12009                    Brevard County, Florida
1
## 38  0500000US12103 12103                   Pinellas County, Florida
1
## 41  0500000US13067 13067                      Cobb County, Georgia
1
## 43  0500000US13121 13121                    Fulton County, Georgia
1
## 45  0500000US15003 15003                   Honolulu County, Hawaii
1
## 47  0500000US17043 17043                   DuPage County, Illinois
1
## 49  0500000US17097 17097                     Lake County, Illinois
1
## 50  0500000US17197 17197                     Will County, Illinois
1
## 52  0500000US20091 20091                   Johnson County, Kansas
1
## 55  0500000US24003 24003               Anne Arundel County, Maryland
1
## 56  0500000US24005 24005                  Baltimore County, Maryland
1
## 57  0500000US24031 24031                Montgomery County, Maryland
1
## 62  0500000US25017 25017             Middlesex County, Massachusetts
1
## 63  0500000US25021 25021               Norfolk County, Massachusetts
1
## 64  0500000US25023 25023              Plymouth County, Massachusetts
1
## 66  0500000US25027 25027             Worcester County, Massachusetts
1
## 69  0500000US26125 26125                   Oakland County, Michigan
1
## 71  0500000US27053 27053                  Hennepin County, Minnesota
1
## 73  0500000US29095 29095                    Jackson County, Missouri
1
## 74  0500000US29189 29189                  St. Louis County, Missouri
1
```

```
## 77  0500000US34003 34003                 Bergen County, New Jersey
1
## 82  0500000US34025 34025               Monmouth County, New Jersey
1
## 83  0500000US34029 34029                  Ocean County, New Jersey
1
## 88  0500000US36029 36029                    Erie County, New York
1
## 90  0500000US36055 36055                  Monroe County, New York
1
## 91  0500000US36059 36059                  Nassau County, New York
1
## 98  0500000US37183 37183               Wake County, North Carolina
1
## 100 0500000US39049 39049                  Franklin County, Ohio
1
## 101 0500000US39061 39061                  Hamilton County, Ohio
1
## 103 0500000US39153 39153                    Summit County, Ohio
1
## 106 0500000US41051 41051                 Multnomah County, Oregon
1
## 107 0500000US41067 41067               Washington County, Oregon
1
## 108 0500000US42003 42003            Allegheny County, Pennsylvania
1
## 109 0500000US42017 42017               Bucks County, Pennsylvania
1
## 110 0500000US42029 42029             Chester County, Pennsylvania
1
## 111 0500000US42045 42045            Delaware County, Pennsylvania
1
## 113 0500000US42091 42091          Montgomery County, Pennsylvania
1
## 119 0500000US48085 48085                  Collin County, Texas
1
## 121 0500000US48121 48121                  Denton County, Texas
1
## 130 0500000US49049 49049                     Utah County, Utah
1
## 131 0500000US51059 51059                Fairfax County, Virginia
1
## 132 0500000US53033 53033                 King County, Washington
1
## 133 0500000US53053 53053               Pierce County, Washington
1
## 134 0500000US53061 53061             Snohomish County, Washington
1
## 135 0500000US55025 55025                  Dane County, Wisconsin
1
```

```
##     POPGROUP.display.label RacesReported HSDegree BachDegree
## 21        Total population        618821     91.9       40.9
## 23        Total population        663519     92.8       36.5
## 24        Total population        558503     94.1       42.0
## 28        Total population        552778     90.1       35.8
## 29        Total population        658893     90.2       55.0
## 30        Total population        556885     91.6       27.2
## 38        Total population        938098     90.1       29.5
## 41        Total population        730981     90.3       43.7
## 43        Total population        996319     91.3       49.2
## 45        Total population        991788     91.8       32.6
## 47        Total population        932708     92.3       48.0
## 49        Total population        705186     90.3       44.0
## 50        Total population        685419     90.7       33.1
## 52        Total population        574272     95.5       52.8
## 55        Total population        560133     91.9       38.8
## 56        Total population        826925     90.4       37.2
## 57        Total population       1030447     90.9       58.5
## 62        Total population       1570315     92.3       52.3
## 63        Total population        692254     94.1       51.9
## 64        Total population        507022     92.2       34.1
## 66        Total population        813475     90.1       34.6
## 69        Total population       1237868     93.6       44.8
## 71        Total population       1212064     93.2       47.3
## 73        Total population        683191     90.0       29.5
## 74        Total population       1001876     93.2       42.8
## 77        Total population        933572     91.5       46.2
## 82        Total population        629279     93.1       43.7
## 83        Total population        586301     91.7       28.6
## 88        Total population        922835     90.6       31.3
## 90        Total population        749857     90.3       35.9
## 91        Total population       1358627     90.7       43.2
## 98        Total population        998691     92.4       49.2
## 100       Total population       1231393     90.0       38.0
## 101       Total population        806631     90.5       35.6
## 103       Total population        541943     91.1       30.3
## 106       Total population        776712     91.1       41.6
## 107       Total population        562998     90.2       39.7
## 108       Total population       1231255     93.9       37.7
## 109       Total population        626685     93.9       37.7
## 110       Total population        512784     92.3       49.3
## 111       Total population        562960     91.5       36.3
## 113       Total population        816857     93.7       47.3
## 119       Total population        885241     93.7       50.0
## 121       Total population        753363     91.9       41.5
## 130       Total population        560974     93.7       37.5
## 131       Total population       1137538     91.5       60.3
## 132       Total population       2079967     92.3       48.6
## 133       Total population        831928     90.3       24.6
## 134       Total population        759583     92.0       29.1
```

```
## 135       Total population        516284     94.9       49.8
##     County with a high level of high  school education and low rate of
population with a bachelor's degree
## 21
TRUE
## 23
TRUE
## 24
TRUE
## 28
TRUE
## 29
FALSE
## 30
TRUE
## 38
TRUE
## 41
TRUE
## 43
TRUE
## 45
TRUE
## 47
TRUE
## 49
TRUE
## 50
TRUE
## 52
FALSE
## 55
TRUE
## 56
TRUE
## 57
FALSE
## 62
FALSE
## 63
FALSE
## 64
TRUE
## 66
TRUE
## 69
TRUE
## 71
TRUE
## 73
```

```
TRUE
## 74
TRUE
## 77
TRUE
## 82
TRUE
## 83
TRUE
## 88
TRUE
## 90
TRUE
## 91
TRUE
## 98
TRUE
## 100
TRUE
## 101
TRUE
## 103
TRUE
## 106
TRUE
## 107
TRUE
## 108
TRUE
## 109
TRUE
## 110
TRUE
## 111
TRUE
## 113
TRUE
## 119
TRUE
## 121
TRUE
## 130
TRUE
## 131
FALSE
## 132
TRUE
## 133
TRUE
## 134
```

```
TRUE
## 135
TRUE
```