# General profile of people voted

### Introduction

This is a data story about the general profile of people who participated in the voteoted. I'm curious about things like gender, education level, age of people who participated in vote. Will the profile of participated people change over year? Or will it remain stable?

```
# import data
library(readstata13)
mydata<-read.dta13('D:\\Applied data\\anes_timeseries_cdf_dta\\anes_timeseries_cdf.dta')
mydata<-data.frame(lapply(mydata, as.character), stringsAsFactors=FALSE)
```

```
# check what data looks like
print(dim(mydata)[1])
```

```
## [1] 59944
```

```
print(dim(mydata)[2])
```

```
## [1] 1029
```

```
head(mydata, 5)
```

```
##                       Version VCF0004 VCF0006 VCF0006a VCF0009x VCF0010x
## 1 ANES_CDF_VERSION:2019-Sep-10    1948    1001 19481001        1        1
## 2 ANES_CDF_VERSION:2019-Sep-10    1948    1002 19481002        1        1
## 3 ANES_CDF_VERSION:2019-Sep-10    1948    1003 19481003        1        1
## 4 ANES_CDF_VERSION:2019-Sep-10    1948    1004 19481004        1        1
## 5 ANES_CDF_VERSION:2019-Sep-10    1948    1005 19481005        1        1
##   VCF0011x VCF0009y VCF0010y VCF0011y VCF0009z VCF0010z VCF0011z VCF0012
## 1        1        1        1        1        1        1        1    <NA>
## 2        1        1        1        1        1        1        1    <NA>
## 3        1        1        1        1        1        1        1    <NA>
## 4        1        1        1        1        1        1        1    <NA>
## 5        1        1        1        1        1        1        1    <NA>
##                                 VCF0013
## 1 1. Post-election interview data present
## 2 1. Post-election interview data present
## 3 1. Post-election interview data present
## 4 1. Post-election interview data present
## 5 1. Post-election interview data present
##                                 VCF0014
## 1 1. Pre-election interview data present
## 2 1. Pre-election interview data present
```

```
## 3 1. Pre-election interview data present
## 4 1. Pre-election interview data present
## 5 1. Pre-election interview data present
##                                          VCF0015a
## 1 0. Pre IW not abbreviated [1992:'Long' form Pre]
## 2 0. Pre IW not abbreviated [1992:'Long' form Pre]
## 3 0. Pre IW not abbreviated [1992:'Long' form Pre]
## 4 0. Pre IW not abbreviated [1992:'Long' form Pre]
## 5 0. Pre IW not abbreviated [1992:'Long' form Pre]
##                         VCF0015b             VCF0016         VCF0017
## 1 0. Post IW is not abbreviated 0. Fresh Cross case 0. All personal
## 2 0. Post IW is not abbreviated 0. Fresh Cross case 0. All personal
## 3 0. Post IW is not abbreviated 0. Fresh Cross case 0. All personal
## 4 0. Post IW is not abbreviated 0. Fresh Cross case 0. All personal
## 5 0. Post IW is not abbreviated 0. Fresh Cross case 0. All personal
##                                                                VCF0018a
## 1 0. IW conducted entirely in English; 2008,2012: beginning language
## 2 0. IW conducted entirely in English; 2008,2012: beginning language
## 3 0. IW conducted entirely in English; 2008,2012: beginning language
## 4 0. IW conducted entirely in English; 2008,2012: beginning language
## 5 0. IW conducted entirely in English; 2008,2012: beginning language
##                                                                VCF0018b VCF0019
## 1 0. IW conducted entirely in English; 2008,2012: beginning language    <NA>
## 2 0. IW conducted entirely in English; 2008,2012: beginning language    <NA>
## 3 0. IW conducted entirely in English; 2008,2012: beginning language    <NA>
## 4 0. IW conducted entirely in English; 2008,2012: beginning language    <NA>
## 5 0. IW conducted entirely in English; 2008,2012: beginning language    <NA>
##   VCF0050a VCF0050b VCF0070a VCF0070b VCF0071a VCF0071b VCF0071c VCF0071d
## 1     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 2     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 3     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 4     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 5     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
##   VCF0072a VCF0072b VCF0101    VCF0102        VCF0103   VCF0104
## 1     <NA>     <NA>    <NA> 3. 35 - 44 7. 1895 - 1910   1. Male
## 2     <NA>     <NA>    <NA> 3. 35 - 44 7. 1895 - 1910 2. Female
## 3     <NA>     <NA>    <NA> 2. 25 - 34 6. 1911 - 1926 2. Female
## 4     <NA>     <NA>    <NA> 3. 35 - 44 7. 1895 - 1910 2. Female
## 5     <NA>     <NA>    <NA> 2. 25 - 34 6. 1911 - 1926   1. Male
##                             VCF0105a              VCF0105b                VCF0106
## 1 1. White non-Hispanic (1948-2012) 1. White non-Hispanic 1. White non-Hispanic
## 2 1. White non-Hispanic (1948-2012) 1. White non-Hispanic 1. White non-Hispanic
## 3 1. White non-Hispanic (1948-2012) 1. White non-Hispanic 1. White non-Hispanic
## 4 1. White non-Hispanic (1948-2012) 1. White non-Hispanic 1. White non-Hispanic
## 5 1. White non-Hispanic (1948-2012) 1. White non-Hispanic 1. White non-Hispanic
##   VCF0107 VCF0108 VCF0109                                                VCF0110
## 1    <NA>    <NA>    <NA>                  1. Grade school or less (0-8 grades)
## 2    <NA>    <NA>    <NA> 2. High school (12 grades or fewer, incl. non-college
## 3    <NA>    <NA>    <NA> 2. High school (12 grades or fewer, incl. non-college
## 4    <NA>    <NA>    <NA>     3. Some college (13 grades or more but no degree;
## 5    <NA>    <NA>    <NA>     3. Some college (13 grades or more but no degree;
##   VCF0111 VCF0112 VCF0113                 VCF0114 VCF0115 VCF0116
## 1    <NA>    <NA>    <NA>  3. 34 to 67 percentile    <NA>    <NA>
## 2    <NA>    <NA>    <NA> 5. 96 to 100 percentile    <NA>    <NA>
```

```
## 3    <NA>    <NA>    <NA>  4. 68 to 95 percentile    <NA>    <NA>
## 4    <NA>    <NA>    <NA> 5. 96 to 100 percentile    <NA>    <NA>
## 5    <NA>    <NA>    <NA>  4. 68 to 95 percentile    <NA>    <NA>
##          VCF0117 VCF0118 VCF0119 VCF0120 VCF0121 VCF0122 VCF0123 VCF0124
## 1 1. Working now    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 2 1. Working now    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 3 1. Working now    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 4 1. Working now    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5 1. Working now    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF0125 VCF0126 VCF0126a VCF0126b VCF0126c
## 1    <NA>    <NA>     <NA>     <NA>     <NA>
## 2    <NA>    <NA>     <NA>     <NA>     <NA>
## 3    <NA>    <NA>     <NA>     <NA>     <NA>
## 4    <NA>    <NA>     <NA>     <NA>     <NA>
## 5    <NA>    <NA>     <NA>     <NA>     <NA>
##                                                 VCF0127 VCF0127a VCF0127b
## 1 1. Yes, someone (1948: head) in household belongs to a     <NA>     <NA>
## 2    2. No, no one in household belongs to a labor union     <NA>     <NA>
## 3    2. No, no one in household belongs to a labor union     <NA>     <NA>
## 4    2. No, no one in household belongs to a labor union     <NA>     <NA>
## 5    2. No, no one in household belongs to a labor union     <NA>     <NA>
##                       VCF0128 VCF0128a VCF0128b VCF0129 VCF0130 VCF0130a
## 1               1. Protestant     <NA>     <NA>    <NA>    <NA>     <NA>
## 2               1. Protestant     <NA>     <NA>    <NA>    <NA>     <NA>
## 3 2. Catholic [Roman Catholic]     <NA>     <NA>    <NA>    <NA>     <NA>
## 4               1. Protestant     <NA>     <NA>    <NA>    <NA>     <NA>
## 5 2. Catholic [Roman Catholic]     <NA>     <NA>    <NA>    <NA>     <NA>
##   VCF0131 VCF0132 VCF0133 VCF0134 VCF0135 VCF0136 VCF0137 VCF0138 VCF0138a
## 1    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>     <NA>
## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>     <NA>
## 3    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>     <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>     <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>     <NA>
##   VCF0138b VCF0138c VCF0138d VCF0138e VCF0139 VCF0140 VCF0140a VCF0141 VCF0142
## 1     <NA>     <NA>     <NA>     <NA>    <NA>    <NA>     <NA>    <NA>    <NA>
## 2     <NA>     <NA>     <NA>     <NA>    <NA>    <NA>     <NA>    <NA>    <NA>
## 3     <NA>     <NA>     <NA>     <NA>    <NA>    <NA>     <NA>    <NA>    <NA>
## 4     <NA>     <NA>     <NA>     <NA>    <NA>    <NA>     <NA>    <NA>    <NA>
## 5     <NA>     <NA>     <NA>     <NA>    <NA>    <NA>     <NA>    <NA>    <NA>
##   VCF0143 VCF0144 VCF0145 VCF0146 VCF0147 VCF0148 VCF0148a VCF0149 VCF0150
## 1    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>     <NA>    <NA>    <NA>
## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>     <NA>    <NA>    <NA>
## 3    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>     <NA>    <NA>    <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>     <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>     <NA>    <NA>    <NA>
##   VCF0151 VCF0152 VCF0153a VCF0153b VCF0153c VCF0154a VCF0154b VCF0155 VCF0156
## 1    <NA>    <NA>     <NA>     <NA>     <NA>     <NA>     <NA>    <NA>    <NA>
## 2    <NA>    <NA>     <NA>     <NA>     <NA>     <NA>     <NA>    <NA>    <NA>
## 3    <NA>    <NA>     <NA>     <NA>     <NA>     <NA>     <NA>    <NA>    <NA>
## 4    <NA>    <NA>     <NA>     <NA>     <NA>     <NA>     <NA>    <NA>    <NA>
## 5    <NA>    <NA>     <NA>     <NA>     <NA>     <NA>     <NA>    <NA>    <NA>
##   VCF0157 VCF0170a VCF0170b VCF0170c VCF0170d VCF0201 VCF0202 VCF0203 VCF0204
## 1    <NA>     <NA>     <NA>     <NA>     <NA>    <NA>    <NA>    <NA>    <NA>
## 2    <NA>     <NA>     <NA>     <NA>     <NA>    <NA>    <NA>    <NA>    <NA>
```

```
## 3    <NA>     <NA>     <NA>     <NA>     <NA>    <NA>    <NA>    <NA>    <NA>
## 4    <NA>     <NA>     <NA>     <NA>     <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>     <NA>     <NA>     <NA>     <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF0205 VCF0206 VCF0207 VCF0208 VCF0209 VCF0210 VCF0211 VCF0212 VCF0213
## 1    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 3    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF0214 VCF0215 VCF0216 VCF0217 VCF0218 VCF0219 VCF0220 VCF0221 VCF0222
## 1    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 3    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF0223 VCF0224 VCF0225 VCF0226 VCF0227 VCF0228 VCF0229 VCF0230 VCF0231
## 1    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 3    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF0232 VCF0233 VCF0234 VCF0235 VCF0236 VCF0253 VCF0290 VCF0291 VCF0301
## 1    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 3    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF0302 VCF0303 VCF0305 VCF0306 VCF0307 VCF0308 VCF0309 VCF0310 VCF0311
## 1    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 3    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF0312 VCF0313 VCF0314 VCF0315 VCF0316 VCF0317 VCF0318 VCF0319 VCF0320
## 1    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 3    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF0321 VCF0322 VCF0323 VCF0324 VCF0338 VCF0339 VCF0340 VCF0341 VCF0342
## 1    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 3    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF0343 VCF0344 VCF0345 VCF0346 VCF0347 VCF0348 VCF0349 VCF0350 VCF0351
## 1    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 3    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF0352 VCF0353 VCF0354 VCF0355 VCF0356 VCF0357 VCF0358 VCF0359 VCF0360
## 1    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
```

```
## 3    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF0361 VCF0362 VCF0363 VCF0364 VCF0365 VCF0366 VCF0367 VCF0368 VCF0369
## 1    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 3    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF0370 VCF0371 VCF0372 VCF0373 VCF0374 VCF0375a VCF0375b VCF0375c VCF0375d
## 1    <NA>    <NA>    <NA>    <NA>    <NA>     <NA>     <NA>     <NA>     <NA>
## 2    <NA>    <NA>    <NA>    <NA>    <NA>     <NA>     <NA>     <NA>     <NA>
## 3    <NA>    <NA>    <NA>    <NA>    <NA>     <NA>     <NA>     <NA>     <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>     <NA>     <NA>     <NA>     <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>     <NA>     <NA>     <NA>     <NA>
##   VCF0376a VCF0376b VCF0376c VCF0376d VCF0377a VCF0377b VCF0377c VCF0377d
## 1     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 2     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 3     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 4     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 5     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
##   VCF0378a VCF0378b VCF0378c VCF0378d VCF0379a VCF0379b VCF0379c VCF0379d
## 1     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 2     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 3     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 4     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 5     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
##   VCF0380 VCF0381a VCF0381b VCF0381c VCF0381d VCF0382a VCF0382b VCF0382c
## 1    <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 2    <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 3    <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 4    <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 5    <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
##   VCF0382d VCF0383a VCF0383b VCF0383c VCF0383d VCF0384a VCF0384b VCF0384c
## 1     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 2     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 3     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 4     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 5     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
##   VCF0384d VCF0385a VCF0385b VCF0385c VCF0385d VCF0386 VCF0387a VCF0387b
## 1     <NA>     <NA>     <NA>     <NA>     <NA>    <NA>     <NA>     <NA>
## 2     <NA>     <NA>     <NA>     <NA>     <NA>    <NA>     <NA>     <NA>
## 3     <NA>     <NA>     <NA>     <NA>     <NA>    <NA>     <NA>     <NA>
## 4     <NA>     <NA>     <NA>     <NA>     <NA>    <NA>     <NA>     <NA>
## 5     <NA>     <NA>     <NA>     <NA>     <NA>    <NA>     <NA>     <NA>
##   VCF0387c VCF0387d VCF0388a VCF0388b VCF0388c VCF0388d VCF0389a VCF0389b
## 1     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 2     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 3     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 4     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 5     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
##   VCF0389c VCF0389d VCF0390a VCF0390b VCF0390c VCF0390d VCF0391a VCF0391b
## 1     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
## 2     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
```

```
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## 4     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>     <NA>
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## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA> 2. Yes, voted
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## 2    <NA> 2. Republican 2. Republican 2. Republican 2. Republican    <NA>
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## 5    <NA>   1. Democrat   1. Democrat   1. Democrat   1. Democrat    <NA>
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## 5    <NA>    <NA>    <NA>    <NA>
##                                                VCF0712
## 1 1. Knew all along (incl.: always vote for same party;
## 2 1. Knew all along (incl.: always vote for same party;
## 3 1. Knew all along (incl.: always vote for same party;
## 4                                3. During conventions
## 5                                3. During conventions
##                                                    VCF0713 VCF0714 VCF0715
## 1 1. Democratic candidate (with or without qualifications,    <NA>    <NA>
## 2 2. Republican candidate (with or without qualifications,    <NA>    <NA>
## 3                           3. Undecided; DK (except 1964)    <NA>    <NA>
## 4 2. Republican candidate (with or without qualifications,    <NA>    <NA>
## 5 1. Democratic candidate (with or without qualifications,    <NA>    <NA>
##              VCF0716 VCF0717 VCF0718 VCF0719 VCF0720 VCF0721 VCF0722 VCF0723
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## 5    1. Split-ticket    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF0723a VCF0724 VCF0725 VCF0726 VCF0727 VCF0728 VCF0729 VCF0730 VCF0731
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## 5     <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF0732 VCF0733                                    VCF0734 VCF0735 VCF0736
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## 2    <NA>    <NA> 9. INTENDED Republican: voted Republican    <NA>    <NA>
## 3    <NA>    <NA> 2. INTENDED undecided: voted Democratic;    <NA>    <NA>
## 4    <NA>    <NA> 9. INTENDED Republican: voted Republican    <NA>    <NA>
## 5    <NA>    <NA> 1. INTENDED Democratic: voted Democratic    <NA>    <NA>
##                                    VCF0737 VCF0738 VCF0738a VCF0739 VCF0740
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## 2 2. Yes (includes Rs who reported voting)    <NA>     <NA>    <NA>    <NA>
## 3 2. Yes (includes Rs who reported voting)    <NA>     <NA>    <NA>    <NA>
## 4 2. Yes (includes Rs who reported voting)    <NA>     <NA>    <NA>    <NA>
## 5 2. Yes (includes Rs who reported voting)    <NA>     <NA>    <NA>    <NA>
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## 1    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
```

```
## 3    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF9054 VCF9055 VCF9056 VCF9057 VCF9058 VCF9059 VCF9060 VCF9061 VCF9062
## 1    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 3    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
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## 1    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 3    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF9073 VCF9074 VCF9075 VCF9076 VCF9077 VCF9078 VCF9079 VCF9080 VCF9081
## 1    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
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##   VCF9082 VCF9083 VCF9084 VCF9085 VCF9086 VCF9087 VCF9088 VCF9089 VCF9090
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## 3    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
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## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
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## 3    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
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## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 3    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF9132 VCF9133 VCF9134 VCF9149 VCF9150 VCF9151 VCF9152 VCF9153 VCF9154
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## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
```

```
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## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF9155 VCF9201 VCF9202 VCF9203 VCF9204 VCF9205 VCF9206 VCF9207 VCF9208
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## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 3    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF9209 VCF9210 VCF9211 VCF9212 VCF9213 VCF9214 VCF9215 VCF9216 VCF9217
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## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF9218 VCF9219 VCF9220 VCF9221 VCF9222 VCF9223 VCF9224 VCF9225 VCF9226
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## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
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## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF9227 VCF9228 VCF9229 VCF9230 VCF9231 VCF9232 VCF9233 VCF9234 VCF9235
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## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
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## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 3    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF9245 VCF9246 VCF9247 VCF9248 VCF9249 VCF9250 VCF9251 VCF9252 VCF9253
## 1    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 3    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF9254 VCF9255 VCF9256 VCF9257 VCF9258 VCF9259 VCF9260 VCF9261 VCF9262
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## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 3    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF9263 VCF9264 VCF9265 VCF9266 VCF9267 VCF9268 VCF9269 VCF9270 VCF9271
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## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 3    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF9272 VCF9273 VCF9274 VCF9275 VCF9277 VCF9278 VCF9279 VCF9280 VCF9281
## 1    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 2    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
```

```
## 3    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 4    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
## 5    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>    <NA>
##   VCF9282
## 1    <NA>
## 2    <NA>
## 3    <NA>
## 4    <NA>
## 5    <NA>
```

We need to extract some useful columns from this big dataset. I extracted five columns—-'year', 'age', 'gender', 'race' and 'education'. In addition, I only use data after 1984, because questions in census changed frequently before 1984. Besides, there will be too many data if we use all the data since 1948.

```
# find useful variables
data<-mydata[,c('VCF0004', 'VCF0102', 'VCF0104', 'VCF0105b', 'VCF0110')]
data<-data[which(data$VCF0004>=1984),]
print(dim(data)[1])
```

```
## [1] 32764
```

```
print(dim(data)[2])
```

```
## [1] 5
```

```
head(data, 5)
```

```
##       VCF0004    VCF0102   VCF0104              VCF0105b
## 27181    1984 2. 25 - 34 2. Female 1. White non-Hispanic
## 27182    1984 5. 55 - 64 2. Female 1. White non-Hispanic
## 27183    1984 1. 17 - 24 2. Female 1. White non-Hispanic
## 27184    1984 6. 65 - 74 2. Female 2. Black non-Hispanic
## 27185    1984 6. 65 - 74   1. Male 1. White non-Hispanic
##                                                    VCF0110
## 27181 2. High school (12 grades or fewer, incl. non-college
## 27182         4. College or advanced degree (no cases 1948)
## 27183     3. Some college (13 grades or more but no degree;
## 27184 2. High school (12 grades or fewer, incl. non-college
## 27185     3. Some college (13 grades or more but no degree;
```

Now we have a dataframe of data we needed, we need to do some simple check about whether there are problems inside data.

```
# check data status
MissingValue<-c()
UniqueValue<-c()
MostFreqValue<-c()
MostFreqValueRate<-c()
for (i in colnames(data)){
  MissingValue<-c(MissingValue, sum(is.na(data[,i])))
  UniqueValue<-c(UniqueValue, round(length(unique(data[,i])),2))
```

```
  temp<-sort(table(data[,i], useNA = "ifany"), decreasing = TRUE)
  MostFreqValue<-c(MostFreqValue, names(temp)[1])
  MostFreqValueRate<-c(MostFreqValueRate, round(temp[1]/nrow(data),2))
}
df<-data.frame(MissingValue, UniqueValue, MostFreqValue, MostFreqValueRate)
rownames(df)<-c('year', 'age', 'gender', 'race', 'education')
df
```

```
##           MissingValue UniqueValue
## year                 0          14
## age                290           8
## gender              41           4
## race               242           5
## education          360           5
##                                                MostFreqValue
## year                                                    2012
## age                                                3. 35 - 44
## gender                                              2. Female
## race                                     1. White non-Hispanic
## education 2. High school (12 grades or fewer, incl. non-college
##           MostFreqValueRate
## year                   0.18
## age                    0.20
## gender                 0.54
## race                   0.71
## education              0.39
```

The dataset has few missing value, and there are not many repeated value in the dataset. Since there are not many missing value, I simply delete all the missing value.

```
# delete na data
newdata<-na.omit(data)
colnames(newdata)<-c('year', 'age', 'gender', 'race', 'education')

print(dim(newdata)[1])
```

```
## [1] 31934
```

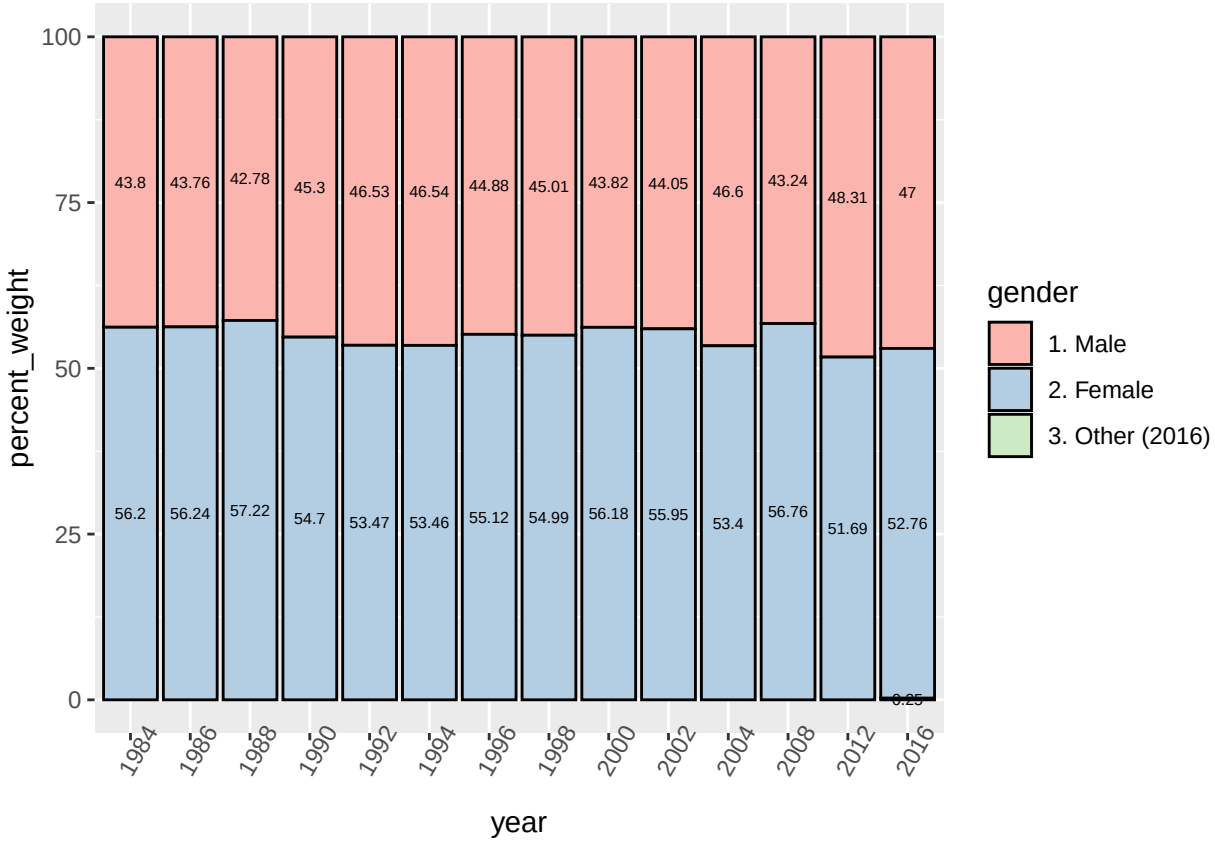
```
print(dim(newdata)[2])
```

```
## [1] 5
```

I used percentage histogram to visualize each variables.

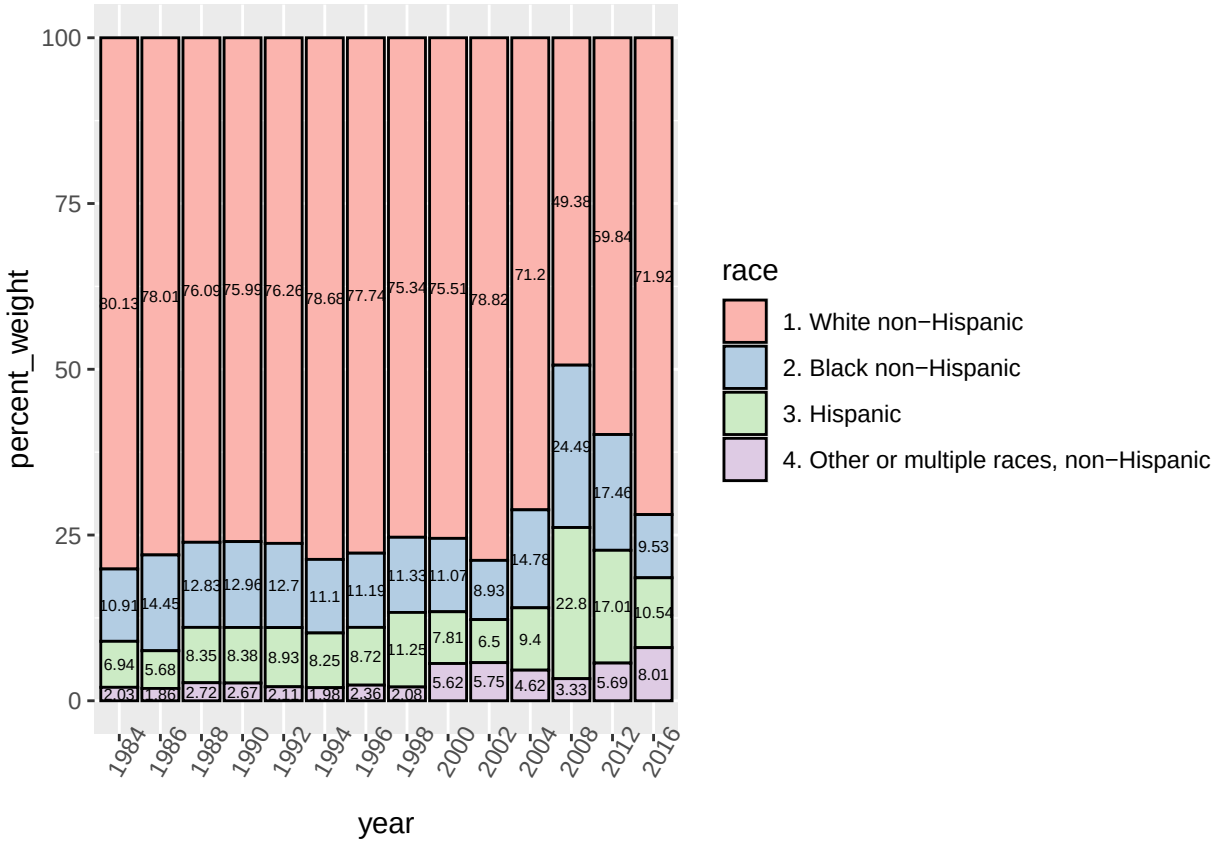
```
library(dplyr)
library(plyr)
library(ggplot2)
# gender
a<-newdata %>%
  group_by(year, gender) %>%
  dplyr::summarize(n=n())
```

```
ce<-ddply(a, "year", transform, percent_weight = n / sum(n) * 100)
ggplot(ce, aes(x = year, y = percent_weight, fill = gender)) +
  geom_bar(stat = "identity", colour = "black") +
  scale_fill_brewer(palette = "Pastel1")+
  geom_text(aes(label = round(percent_weight,2), y = percent_weight), size = 2,
            position = position_stack(vjust = 0.5))+
  theme(axis.text.x = element_text(angle = 60))
```



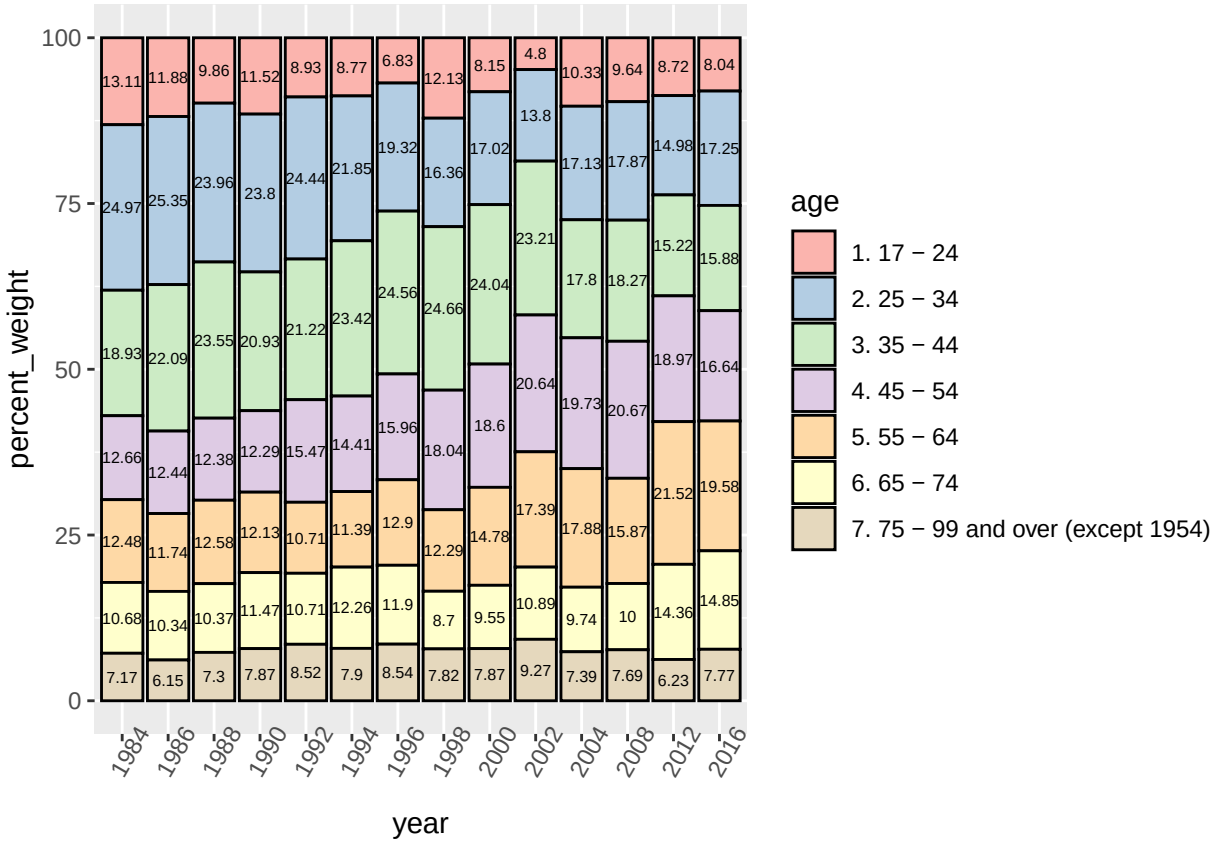

The porpotion of male and female is stable over year. Female is slightly fewer male.

```
# race
a<-newdata %>%
  group_by(year, race) %>%
  dplyr::summarise(n=n())
ce<-ddply(a, "year", transform, percent_weight = n / sum(n) * 100)
ggplot(ce, aes(x = year, y = percent_weight, fill = race)) +
  geom_bar(stat = "identity", colour = "black") +
  scale_fill_brewer(palette = "Pastel1")+
  geom_text(aes(label = round(percent_weight,2), y = percent_weight), size = 2,
            position = position_stack(vjust = 0.5))+
  theme(axis.text.x = element_text(angle = 60))
```



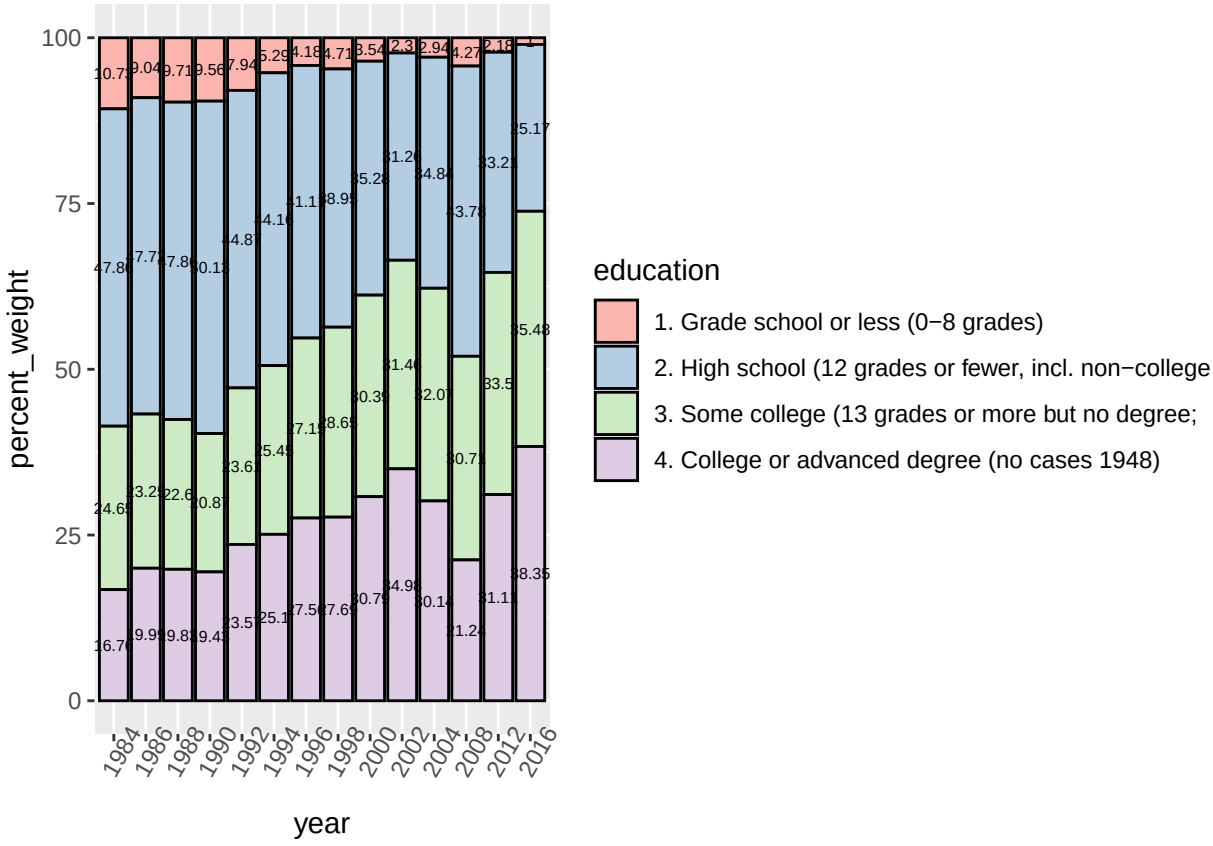

The porpotion of different race of people participated in vote is stable until 2000. Maybe this is because survey sample change.

```
# age
a<-newdata %>%
  group_by(year, age) %>%
  dplyr::summarise(n=n())
ce<-ddply(a, "year", transform, percent_weight = n / sum(n) * 100)
ggplot(ce, aes(x = year, y = percent_weight, fill = age)) +
  geom_bar(stat = "identity", colour = "black") +
  scale_fill_brewer(palette = "Pastel1")+
  geom_text(aes(label = round(percent_weight,2), y = percent_weight), size = 2,
            position = position_stack(vjust = 0.5))+
  theme(axis.text.x = element_text(angle = 60))
```



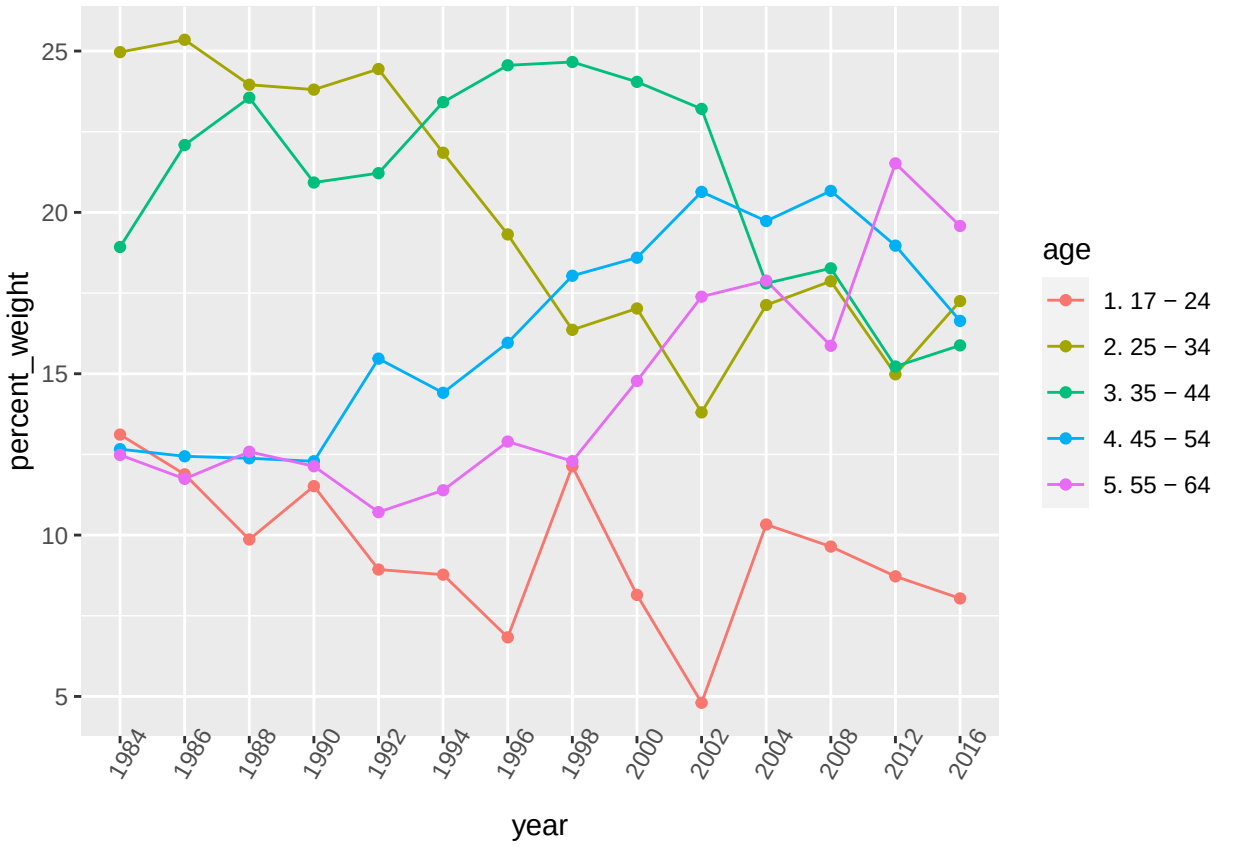

The porpotion of different age of people participated in vote is not stable. From the graph we can see number of people in age group 1 going down first then going up and then going down. People in age group 2 keeping going down. People in age group 3 and 4 going up then going down. people in age group 5 keep going up. In order to visualize the pattern, I will produce a line chart later.

```
# education
a<-newdata %>%
  group_by(year, education) %>%
  dplyr::summarise(n=n())
ce<-ddply(a, "year", transform, percent_weight = n / sum(n) * 100)
ggplot(ce, aes(x = year, y = percent_weight, fill = education)) +
  geom_bar(stat = "identity", colour = "black") +
  scale_fill_brewer(palette = "Pastel1")+
  geom_text(aes(label = round(percent_weight,2), y = percent_weight), size = 2,
            position = position_stack(vjust = 0.5))+
  theme(axis.text.x = element_text(angle = 60))
```



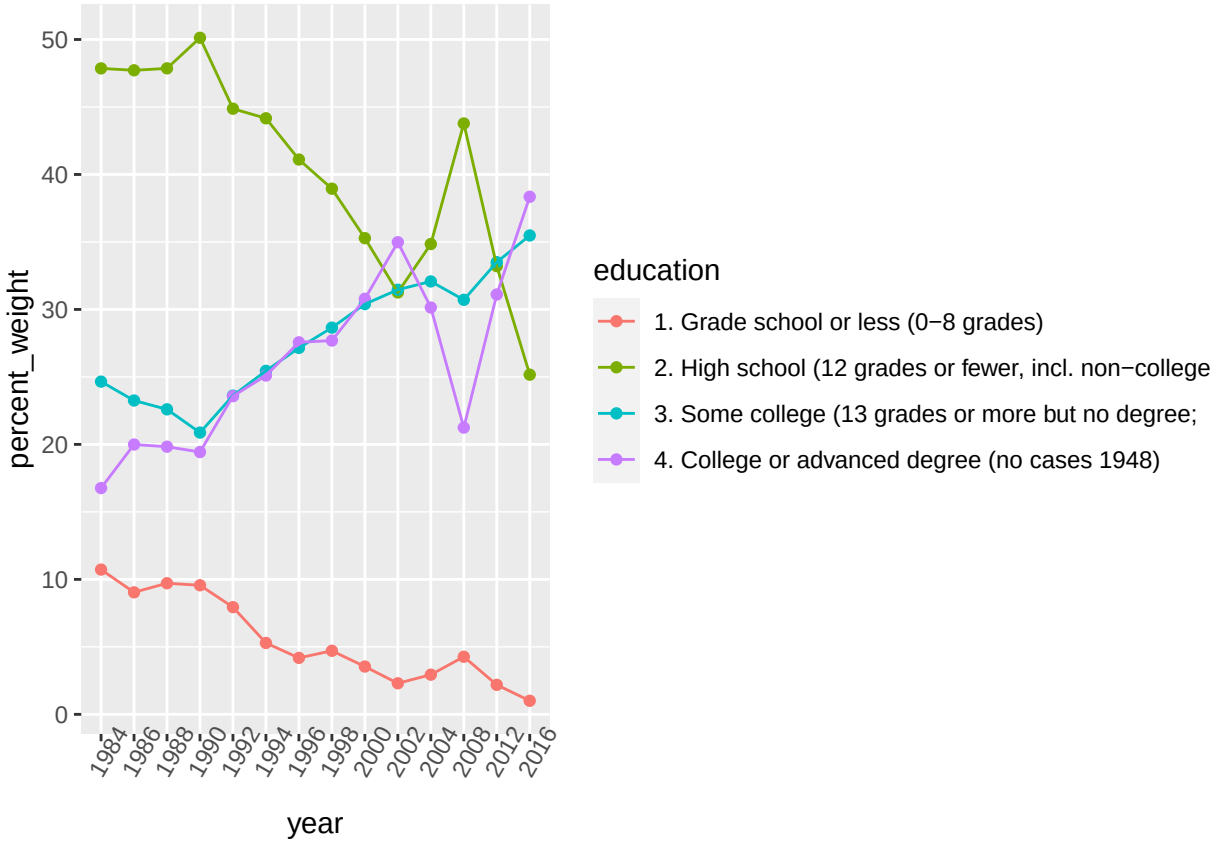

The porpotion of different education level of people participated in vote is not stable. From the graph we can see number of people in group 1 and 2 keep going down except for 2008. People in group 3 and 4 keep going up except for 2008. I think 2008 year should be exclude from analysis.

```
# line chart for age
a<-newdata %>%
  group_by(year, age) %>%
  dplyr::summarise(n=n())
ce<-ddply(a, "year", transform, percent_weight = n / sum(n) * 100)
temp<-ce[which(ce$age != '6. 65 - 74'),]
temp<-temp[which(temp$age != '7. 75 - 99 and over (except 1954)'),]
ggplot(temp, aes(x=year, y = percent_weight, colour = age, group = age)) +
  geom_line()+
  geom_point()+
  theme(axis.text.x = element_text(angle = 60))
```




From the graph we can see that group 2 number of people participated in vote peak at approximately year 1984. Group 3 peak at approximately 1996. Group 4 peak at approximately 2004, group 5 at 2012. The peak point of each groups are approximately 10 year apart, which is exactly the age difference between each groups. Maybe only the same group of people are willing to vote, young people are not very willing to participate. Age of people participate in vote tend to become elder and elder.

```
# line chart for education
a<-newdata %>%
  group_by(year, education) %>%
  dplyr::summarise(n=n())
ce<-ddply(a, "year", transform, percent_weight = n / sum(n) * 100)
ggplot(ce, aes(x = year, y = percent_weight, colour = education, group=education)) +
  geom_point()+
  geom_line()+
  theme(axis.text.x = element_text(angle = 60))
```




From line chart above we can clearly see that number of people in group 1 and 2 keep decreasing, number of people from group 3 and 4 keep increasing. More and more people with higher level of education participate in vote.

**Summary**

White non Hispanic and male people are main voter. Age of people participate in vote tend to become elder and elder. Educational level of people participate in vote tend to become higher and higher.