

Problems with American Community Survey

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Preliminaries – very broad

In the effort to create a simulated Harris County - Sam City - we tried to work with the American Community Survey (ACS) from the US Census Bureau. The decennial census is broken into small groups and gives the answers provided by respondents to the household questionnaires in block groups. In the intervening years, the ACS provides estimates for the same categories. When we began this process, the 2020 census hadn't been completed, although we will talk about how to integrate it later. Our first task was to see whether the ACS estimates could help us. Block group data is the smallest unit made available to the public and is made available for some ACS tables, but we ran into the problem at the tract level, which is comprised of from 1 to 4 block groups, and the block group totals aggregate correctly into the tracts. (<https://www.census.gov/programs-surveys/geography/about/glossary.html>) Using our libraries (Census_Data.R and workflow.R) we were able to save the appropriate data locally. I reproduce the code, below, for completeness' sake, but there's no need to follow it closely. Using the three tracts that we had selected because we were familiar with the areas and they represented demographic variability, we wanted to look at the distribution of females by age, and then by race. When aggregating by tract. For the 2010 decennial census, these are women by age (with some overlap in age categories).

```
dec_sex_by_age_race_data_from_census_10 <- censusData_byGroupName(censusdir, vintage="2010",
                                                                    groupname = "P12",county="Harris",
                                                                    block="block_group",api_token="1234567890")

## [1] "found folder ~/Downloads/UH_OneDrive/OneDrive - University Of Houston/Social Network History"
## [1] "Read variable options from ~/Downloads/UH_OneDrive/OneDrive - University Of Houston/Social Network History"
## [1] "Percentage of NAs in file: 0"
## [1] "Writing census file for variable group as csv ..."
## [1] "Done."

SAR_2010 <- as.data.table(dec_sex_by_age_race_data_from_census_10)
F_SAR_2010 <- SAR_2010[str_detect(label,"Female")&!str_detect(concept,"0")] #all the design
F3_SAR_2010 <- F_SAR_2010[order(label),list(`label`,`48_201_312200_1`,`48_201_312200_2`,`48_201_312200_3`,`48_201_312200_4`,`48_201_310300_1`,`48_201_310300_2`,`48_201_310300_3`,`48_201_310300_4`,`48_201_411900_1`,`48_201_411900_2`,`48_201_411900_3`,`48_201_411900_4`)]
#add summary columns
F3_SAR_2010$`48201312200` <- as.integer(F3_SAR_2010$`48_201_312200_1`) +
```

```

as.integer(F3_SAR_2010$`48_201_312200_2`) + as.integer(F3_SAR_2010$`48_201_312200_3`)
F3_SAR_2010$`48201310300` <- as.integer(F3_SAR_2010$`48_201_310300_1`) + as.integer(F3_SAR_
as.integer(F3_SAR_2010$`48_201_310300_3`) + as.integer(F3_SAR_2010$`48_201_310300_4`) + as
as.integer(F3_SAR_2010$`48_201_310300_6`)
F3_SAR_2010$`48201411900` <- as.integer(F3_SAR_2010$`48_201_411900_1`) +
as.integer(F3_SAR_2010$`48_201_411900_2`) + as.integer(F3_SAR_2010$`48_201_411900_3`)

F3s_SAR_2010 <- F3_SAR_2010[order(label),list(`label`, `48201312200`, `48201310300`, `48201411900`)]

F3s_SAR_2010

```

```

##              label 48201312200 48201310300 48201411900
## 1:              Total!!Female          1019          2274          1773
## 2:    Total!!Female!!10 to 14 years           61           124           58
## 3:    Total!!Female!!15 to 17 years           45            75           35
## 4:    Total!!Female!!18 and 19 years           40            54           13
## 5:              Total!!Female!!20 years          12            35           12
## 6:              Total!!Female!!21 years          12            25           18
## 7:    Total!!Female!!22 to 24 years          45           122          120
## 8:    Total!!Female!!25 to 29 years          66           233          182
## 9:    Total!!Female!!30 to 34 years          65           188          151
## 10:   Total!!Female!!35 to 39 years          55           156          124
## 11:   Total!!Female!!40 to 44 years          71           144          105
## 12:   Total!!Female!!45 to 49 years          69           138          108
## 13:     Total!!Female!!5 to 9 years          63           147           69
## 14:     Total!!Female!!50 to 54 years         90           165          153
## 15:     Total!!Female!!55 to 59 years         57           162          167
## 16:   Total!!Female!!60 and 61 years          24            36           58
## 17:     Total!!Female!!62 to 64 years          29            59           82
## 18:   Total!!Female!!65 and 66 years          19            50           49
## 19:     Total!!Female!!67 to 69 years          25            43           59
## 20:   Total!!Female!!70 to 74 years          23            58           49
## 21:     Total!!Female!!75 to 79 years          27            36           33
## 22:     Total!!Female!!80 to 84 years          13            28           27
## 23:   Total!!Female!!85 years and over         26            32           34
## 24:     Total!!Female!!Under 5 years          82           164           67
##              label 48201312200 48201310300 48201411900

```

If we further restrict the display to Black females

```

BF_SAR_2010 <- SAR_2010[str_detect(label,"Female")&str_detect(concept,"BLACK")]
BF3_SAR_2010 <- BF_SAR_2010[order(label),list(`label`, `concept`, `48_201_312200_1`, `48_201_312200_2`,
`48_201_310300_1`, `48_201_310300_2`, `48_201_310300_3`, `48_201_310300_4`, `48_201_310300_5`,
`48_201_310300_6`, `48_201_411900_1`, `48_201_411900_2`, `48_201_411900_3`, `48_201_411900_4`, `48_201_411900_5`,
`48_201_411900_6`)]

#add summary columns
BF3_SAR_2010$`48201312200` <- as.integer(BF3_SAR_2010$`48_201_312200_1`) +
as.integer(BF3_SAR_2010$`48_201_312200_2`)
BF3_SAR_2010$`48201310300` <- as.integer(BF3_SAR_2010$`48_201_310300_1`) +
as.integer(BF3_SAR_2010$`48_201_310300_2`) + as.integer(BF3_SAR_2010$`48_201_310300_3`) +
as.integer(BF3_SAR_2010$`48_201_310300_4`) + as.integer(BF3_SAR_2010$`48_201_310300_5`) +
as.integer(BF3_SAR_2010$`48_201_310300_6`)
BF3_SAR_2010$`48201411900` <- as.integer(BF3_SAR_2010$`48_201_411900_1`) +
as.integer(BF3_SAR_2010$`48_201_411900_2`) + as.integer(BF3_SAR_2010$`48_201_411900_3`) +
as.integer(BF3_SAR_2010$`48_201_411900_4`) + as.integer(BF3_SAR_2010$`48_201_411900_5`) +
as.integer(BF3_SAR_2010$`48_201_411900_6`)

```

```

as.integer(BF3_SAR_2010$`48_201_312200_2`) + as.integer(BF3_SAR_2010$`48_201_312200_3`)
BF3_SAR_2010$`48201310300` <- as.integer(BF3_SAR_2010$`48_201_310300_1`) + as.integer(BF3_SAR_2010$`48_201_310300_2`) +
as.integer(BF3_SAR_2010$`48_201_310300_3`) + as.integer(BF3_SAR_2010$`48_201_310300_4`) +
as.integer(BF3_SAR_2010$`48_201_310300_6`)
BF3_SAR_2010$`48201411900` <- as.integer(BF3_SAR_2010$`48_201_411900_1`) +
as.integer(BF3_SAR_2010$`48_201_411900_2`) + as.integer(BF3_SAR_2010$`48_201_411900_3`)

BF3s_SAR_2010 <- BF3_SAR_2010[order(label),list(`label`, `concept`, `48201312200`, `48201310300`)]
BF3s_SAR_2010

```

```

##                                label
## 1:                               Total!!Female
## 2:   Total!!Female!!10 to 14 years
## 3:   Total!!Female!!15 to 17 years
## 4:   Total!!Female!!18 and 19 years
## 5:           Total!!Female!!20 years
## 6:           Total!!Female!!21 years
## 7:   Total!!Female!!22 to 24 years
## 8:   Total!!Female!!25 to 29 years
## 9:   Total!!Female!!30 to 34 years
## 10:  Total!!Female!!35 to 39 years
## 11:  Total!!Female!!40 to 44 years
## 12:  Total!!Female!!45 to 49 years
## 13:   Total!!Female!!5 to 9 years
## 14:  Total!!Female!!50 to 54 years
## 15:  Total!!Female!!55 to 59 years
## 16:  Total!!Female!!60 and 61 years
## 17:  Total!!Female!!62 to 64 years
## 18:  Total!!Female!!65 and 66 years
## 19:  Total!!Female!!67 to 69 years
## 20:  Total!!Female!!70 to 74 years
## 21:  Total!!Female!!75 to 79 years
## 22:  Total!!Female!!80 to 84 years
## 23: Total!!Female!!85 years and over
## 24:   Total!!Female!!Under 5 years
##                                label
##                                concept 48201312200 48201310300
## 1: SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)      814      93
## 2: SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)       47       4
## 3: SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)       30       5
## 4: SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)       28       1
## 5: SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)       11       1
## 6: SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)       10       3
## 7: SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)       31       2
## 8: SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)       47       8
## 9: SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)       42       8
## 10: SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)      35      12

```

```

## 11: SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)      61      7
## 12: SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)      60     13
## 13: SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)      40      4
## 14: SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)      83      8
## 15: SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)      51      5
## 16: SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)      23      0
## 17: SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)      25      1
## 18: SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)      18      1
## 19: SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)      25      0
## 20: SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)      21      2
## 21: SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)      27      1
## 22: SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)      13      1
## 23: SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)      26      3
## 24: SEX BY AGE (BLACK OR AFRICAN AMERICAN ALONE)      60      3
##                                     concept 48201312200 48201310300
##      48201411900
## 1:      32
## 2:      0
## 3:      0
## 4:      0
## 5:      0
## 6:      0
## 7:      1
## 8:      7
## 9:      6
## 10:     3
## 11:     4
## 12:     2
## 13:     1
## 14:     2
## 15:     1
## 16:     2
## 17:     1
## 18:     0
## 19:     2
## 20:     0
## 21:     0
## 22:     0
## 23:     0
## 24:     0
##      48201411900

```

But if we look at the 2017 estimates at the tract level

```

sex_by_age_race_data_from_census_17 <- censusData_byGroupName(censusdir, vintage, state, c
                                groupname = "B01001",county_1
                                block="tract",api_type="acs/5

```

```
## [1] "found folder ~/Downloads/UH_OneDrive/OneDrive - University Of Houston/Social Network Hy
## [1] "Reading file from ~/Downloads/UH_OneDrive/OneDrive - University Of Houston/Social Netw
```

```
SAR_2017 <- as.data.table(sex_by_age_race_data_from_census_17)
F_SAR_2017 <- SAR_2017[str_detect(label,"Female")&!str_detect(concept,"0")] #all the design
F3_SAR_2017 <- F_SAR_2017[order(label),list(`label`,`48201312200`,`48201310300`,`48201411900`)]
BF_SAR_2017 <- SAR_2017[str_detect(label,"Female")&str_detect(concept,"BLACK")]
BF3_SAR_2017 <- BF_SAR_2017[order(label),list(`label`,`48201312200`,`48201310300`,`48201411900`)]
F3_SAR_2017
```

```
##                                label 48201312200 48201310300
## 1:                                Estimate!!Total:!!Female:          908          2212
## 2:      Estimate!!Total:!!Female:!!10 to 14 years              1           133
## 3:      Estimate!!Total:!!Female:!!15 to 17 years             11           36
## 4:      Estimate!!Total:!!Female:!!18 and 19 years            24           28
## 5:      Estimate!!Total:!!Female:!!20 years                  41            0
## 6:      Estimate!!Total:!!Female:!!21 years                  11           20
## 7:      Estimate!!Total:!!Female:!!22 to 24 years            43          117
## 8:      Estimate!!Total:!!Female:!!25 to 29 years            50          265
## 9:      Estimate!!Total:!!Female:!!30 to 34 years            48          192
## 10:     Estimate!!Total:!!Female:!!35 to 39 years            68          132
## 11:     Estimate!!Total:!!Female:!!40 to 44 years            24          129
## 12:     Estimate!!Total:!!Female:!!45 to 49 years           134           40
## 13:      Estimate!!Total:!!Female:!!5 to 9 years             71          161
## 14:     Estimate!!Total:!!Female:!!50 to 54 years            53          106
## 15:     Estimate!!Total:!!Female:!!55 to 59 years            79          199
## 16:     Estimate!!Total:!!Female:!!60 and 61 years           19           68
## 17:     Estimate!!Total:!!Female:!!62 to 64 years           30           91
## 18:     Estimate!!Total:!!Female:!!65 and 66 years           9            27
## 19:     Estimate!!Total:!!Female:!!67 to 69 years           30          120
## 20:     Estimate!!Total:!!Female:!!70 to 74 years           21           64
## 21:     Estimate!!Total:!!Female:!!75 to 79 years            6           90
## 22:     Estimate!!Total:!!Female:!!80 to 84 years           19           30
## 23:     Estimate!!Total:!!Female:!!85 years and over         24            5
## 24:      Estimate!!Total:!!Female:!!Under 5 years           92          159
##                                label 48201312200 48201310300
##      48201411900
## 1:              1559
## 2:              41
## 3:              20
## 4:               0
## 5:              18
## 6:               0
## 7:              53
## 8:              94
## 9:             115
## 10:             44
```

```

## 11:      139
## 12:      160
## 13:       39
## 14:      115
## 15:      158
## 16:       45
## 17:       67
## 18:       59
## 19:       71
## 20:       91
## 21:       85
## 22:       17
## 23:       19
## 24:      109
##      48201411900

```

BF3_SAR_2017

```

##                                     label 48201312200 48201310300
## 1:                                Estimate!!Total:!!Female:      814      130
## 2:      Estimate!!Total:!!Female:!!10 to 14 years           1         0
## 3:      Estimate!!Total:!!Female:!!15 to 17 years          11         0
## 4:      Estimate!!Total:!!Female:!!18 and 19 years         24         0
## 5:      Estimate!!Total:!!Female:!!20 to 24 years          84         0
## 6:      Estimate!!Total:!!Female:!!25 to 29 years          50        58
## 7:      Estimate!!Total:!!Female:!!30 to 34 years          48        25
## 8:      Estimate!!Total:!!Female:!!35 to 44 years          83         9
## 9:      Estimate!!Total:!!Female:!!45 to 54 years         164         0
## 10:      Estimate!!Total:!!Female:!!5 to 9 years           71         0
## 11:      Estimate!!Total:!!Female:!!55 to 64 years         121        14
## 12:      Estimate!!Total:!!Female:!!65 to 74 years          51         0
## 13:      Estimate!!Total:!!Female:!!75 to 84 years          18         0
## 14:      Estimate!!Total:!!Female:!!85 years and over       24         0
## 15:      Estimate!!Total:!!Female:!!Under 5 years          64        24
##      48201411900
## 1:      0
## 2:      0
## 3:      0
## 4:      0
## 5:      0
## 6:      0
## 7:      0
## 8:      0
## 9:      0
## 10:     0
## 11:     0
## 12:     0

```

## 13:	0
## 14:	0
## 15:	0