## educational attainment

Rick Gilmore 2018-03-27 08:00:12

## **Educational Attainment**

```
counties <- read.csv(paste0(csv.dir, "city-state-county.csv"), stringsAsFactors = FALSE)</pre>
data("county.regions")
counties <- left_join(counties, county.regions)</pre>
## Joining, by = "region"
demog <- get_county_demographics(endyear=2013, span=5)</pre>
county.demo <- left_join(counties, demog)</pre>
## Joining, by = "region"
# Recapitalize county
county.demo$County <- unlist(lapply(county.demo$County, Cap_all))</pre>
# Hack District Of columbia...TODO(ROG): Fix Cap_all()
county.demo$County[county.demo$County == "District Of columbia"] = "District of Columbia"
To gather educational attainment data, must create specific ACS 'geometry'.
state.fips <- as.numeric(county.demo$state.fips.character)</pre>
county.fips <- as.numeric(substr(county.demo$county.fips.character,3,5))</pre>
play.geo <- geo.make(state = state.fips, county = county.fips)</pre>
Make.county.geo <- function(i, df) {</pre>
  geo.make(state = as.numeric(df$state.fips.character[i]),
              county =
             as.numeric(substr(county.demo$county.fips.character[i],4, 6)))
}
cty <- 1
# Generate name for county-level geography
geo.name <- paste0(county.demo$Site.code[cty], " ",</pre>
                    county.demo$county.name[cty], "_", county.demo$State[cty])
# Create geography and assign to generated name
assign(geo.name, Make.county.geo(cty, county.demo))
ed.attain <- acs.lookup(table.name="Educational Attainment for the Population 25 Years and Over",
                         endyear=2015)
# Manual inspection shows variables 1:25 seem to contain the relevant info
play.ed <- acs.fetch(geography = play.geo, endyear = 2015, variable = ed.attain[1:25],</pre>
                      col.names = c("Total", #1
                                     "None", #2
                                     "<K",
                                              #3
                                     "K",
                                              #4
                                     "1st", #5
```

```
"3rd",
                                              #7
                                    "4th",
                                              #8
                                    "5th",
                                              #9
                                    "6th",
                                              #10
                                    "7th",
                                              #11
                                    "8th",
                                              #12
                                    "9th",
                                              #13
                                    "10th", #14
                                    "11th", #15
                                    "12th", #16
                                    "HS",
                                              #17
                                    "GED",
                                              #18
                                    "Coll <1yr", #19
                                    "Coll >1yr", #20
                                    "AA", #21
                                    "BA", #22
                                    "MA", #23
                                    "Prof", #24
                                    "Ph.D")) #25
# Columns 2:16 are grades < HS diploma
lt.7 <- function(i) sum(play.ed[i,2:10])</pre>
mid.hs <- function(i) sum(play.ed[i,11:16])
lt.hs <- function(i) sum(play.ed[i,2:16])</pre>
hs.grad <- function(i) sum(play.ed[i,17:18])
some.coll <- function(i) sum(play.ed[i,19:21])</pre>
ba <- function(i) sum(play.ed[i,22])</pre>
ba.plus <- function(i) sum(play.ed[i,22:25])</pre>
gt.ba <- function(i) sum(play.ed[i,23:25])</pre>
# Use functions to create data table for easier manipulation
Make.ed.attain.table <- function(i) {</pre>
  this.cty <- slot(play.ed[i,1], "geography")$NAME</pre>
  data.frame(county = this.cty,
             tot = as.numeric(slot(play.ed[i,1], "estimate")),
             lt.7 = as.numeric(slot(lt.7(i), "estimate")),
             mid.hs = as.numeric(slot(mid.hs(i), "estimate")),
             lt.hs = as.numeric(slot(lt.hs(i), "estimate")),
             hs.grad = as.numeric(slot(hs.grad(i), "estimate")),
             some.coll = as.numeric(slot(some.coll(i), "estimate")),
             ba = as.numeric(slot(ba(i), "estimate")),
             gt.ba = as.numeric(slot(gt.ba(i), "estimate")),
             ba.plus = as.numeric(slot(ba.plus(i), "estimate")))
}
ed.attain.list <- lapply(1:dim(play.ed)[1], Make.ed.attain.table)
ed.attain.df <- Reduce(function(x,y) full_join(x,y, all=TRUE), ed.attain.list)
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining factors with different levels, coercing to
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
```

"2nd",

```
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
```

## Warning: Column `county` joining character vector and factor, coercing into

```
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
```

## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "

```
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
```

## Warning: Column `county` joining character vector and factor, coercing into

```
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
ed.attain.df %>%
  mutate(p.lt.hs = 100*lt.hs/tot,
         p.hs.grad = 100*hs.grad/tot,
         p.some.coll = 100*some.coll/tot,
         p.ba.plus = 100*ba.plus/tot) %>%
  select(county, p.lt.hs, p.hs.grad, p.some.coll, p.ba.plus) ->
  ed.attain.by.county
names(ed.attain.by.county) <- c("County", "<HS", "HS", "HS+", "BA+")</pre>
ed.attain.by.county %>%
 knitr::kable()
```

Merced County, California         32.124274         24.848266         29.94784         13.07962           Orange County, California         15.731238         17.689816         28.84002         37.73893           Riverside County, California         19.913051         25.819297         33.34025         20.92741           Sant Mateo County, California         11.672114         16.535181         26.17003         45.62267           Santa Clara County, California         14.396614         15.487459         31.87140         38.24453           Yolo County, California         14.506227         19.697083         26.82260         38.97409           District of Columbia, District of Columbia         10.668529         17.996837         16.75794         54.57670           Miami-Dade County, Florida         19.910852         28.492734         24.67464         26.92177           Fulton County, Georgia         6.846064         21.285932         26.98576         44.88224           Cook County, Illiana         7.644555         22.310366         25.06800         44.97708           Tippecanoe County, Indiana         7.644555         22.310366         25.06800         44.97708           Suffolk County, Massachusetts         15.70832         23.607559         19.00435         41.67977 <tr< th=""><th>County</th><th><hs< th=""><th>HS</th><th>HS+</th><th>BA+</th></hs<></th></tr<>	County	<hs< th=""><th>HS</th><th>HS+</th><th>BA+</th></hs<>	HS	HS+	BA+
Orange County, California         15.731238         17.689816         28.84002         37.73893           Riverside County, California         19.913051         25.819297         33.34025         20.92741           San Mateo County, California         11.672114         16.535181         26.17003         45.62267           Santa Clara County, California         14.396614         15.487459         31.87140         38.24453           Yolo County, California         14.506227         19.697083         26.82260         38.97409           District of Columbia, District of Columbia         10.668529         17.996837         16.75794         54.57670           Miami-Dade County, Florida         19.910852         28.492734         24.67464         26.92177           Fulton County, Georgia         6.846064         21.285932         26.98576         44.88224           Cook County, Ildiana         7.644555         22.310366         25.06800         44.97708           Monroe County, Indiana         7.644555         22.310366         25.06800         44.97708           Suffolk County, Massachusetts         15.70832         23.607559         19.00435         41.67977           Montgomery County, Michigan         12.522949         35.394723         35.39403         57.86500	Los Angeles County, California	22.718630	20.676552	26.33454	30.27027
Riverside County, California       19.913051       25.819297       33.34025       20.92741         San Mateo County, California       11.672114       16.535181       26.17003       45.62267         Santa Clara County, California       13.024218       15.167082       23.86490       47.94380         Santa Cruz County, California       14.396614       15.487459       31.87140       38.24453         Yolo County, California       14.506227       19.697083       26.82260       38.97409         District of Columbia, District of Columbia       10.668529       17.996837       16.75794       54.57670         Miami-Dade County, Florida       19.910852       28.492734       24.67464       26.92177         Fulton County, Georgia       6.846064       21.285932       26.98576       44.88224         Cook County, Ildiana       7.644555       22.310366       25.06800       44.9708         Monroe County, Indiana       9.719412       26.604045       28.51591       35.16063         Orleans Parish, Louisiana       14.842995       23.151391       26.71059       35.29503         Suffolk County, Massachusetts       15.708324       23.607559       19.00435       41.67977         Montgomery County, Maryland       8.822279       13.968895       19.3438	Merced County, California	32.124274	24.848266	29.94784	13.07962
San Mateo County, California         11.672114         16.535181         26.17003         45.62267           Santa Clara County, California         13.024218         15.167082         23.86490         47.94380           Santa Cruz County, California         14.396614         15.487459         31.87140         38.24453           Yolo County, California         14.506227         19.697083         26.82260         38.97409           District of Columbia, District of Columbia         10.668529         17.996837         16.75794         54.57670           Miami-Dade County, Florida         19.910852         28.492734         24.67464         26.92177           Fulton County, Georgia         6.846064         21.285932         26.98576         44.88224           Cook County, Illinois         14.709575         23.951799         25.56936         35.76927           Monroe County, Indiana         7.644555         22.310366         25.06800         44.97708           Tippecanoe County, Massachusetts         15.708324         23.607559         19.00435         41.67977           Montgomery County, Maryland         8.822279         13.968895         19.34383         57.86500           Crawford County, Michigan         12.522949         35.394724         34.93091         17.15142	Orange County, California	15.731238	17.689816	28.84002	37.73893
Santa Clara County, California       13.024218       15.167082       23.86490       47.94380         Santa Cruz County, California       14.396614       15.487459       31.87140       38.24453         Yolo County, California       14.506227       19.697083       26.82260       38.97409         District of Columbia, District of Columbia       10.668529       17.996837       16.75794       54.57670         Miami-Dade County, Florida       19.910852       28.492734       24.67464       24.692177         Fulton County, Georgia       9.055800       18.005673       23.63889       49.29963         Oconee County, Georgia       6.846064       21.285932       26.98576       44.88224         Cook County, Illinois       14.709575       23.951799       25.56936       35.76927         Monroe County, Indiana       7.644555       22.310366       25.06800       44.97708         Tippecanoe County, Indiana       9.719412       26.604045       28.51591       35.16063         Orleans Parish, Louisiana       14.842995       23.151391       26.71059       35.29503         Suffolk County, Massachusetts       15.708324       23.607559       19.00435       41.67977         Montgomery County, Michigan       12.522949       35.394724       34.93091 <td>Riverside County, California</td> <td>19.913051</td> <td>25.819297</td> <td>33.34025</td> <td>20.92741</td>	Riverside County, California	19.913051	25.819297	33.34025	20.92741
Santa Cruz County, California       14.396614       15.487459       31.87140       38.24453         Yolo County, California       14.506227       19.697083       26.82260       38.97409         District of Columbia, District of Columbia       10.668529       17.996837       16.75794       54.57670         Miami-Dade County, Florida       19.910852       28.492734       24.67464       26.92177         Fulton County, Georgia       9.055800       18.005673       23.63889       49.29963         Oconee County, Georgia       6.846064       21.285932       26.98576       44.88224         Cook County, Ildiana       7.644555       22.310366       25.06800       44.97708         Monroe County, Indiana       9.719412       26.604045       28.51591       35.16063         Orleans Parish, Louisiana       14.842995       23.151391       26.71059       35.29503         Suffolk County, Massachusetts       15.708324       23.607559       19.00435       41.67977         Montgomery County, Michigan       12.522949       35.394724       34.93091       17.15142         Ingham County, Michigan       12.522949       35.394724       34.93091       17.15142         Ingham County, New Jersey       15.806027       28.728008       22.77177 <t< td=""><td>San Mateo County, California</td><td>11.672114</td><td>16.535181</td><td>26.17003</td><td>45.62267</td></t<>	San Mateo County, California	11.672114	16.535181	26.17003	45.62267
Yolo County, California         14.506227         19.697083         26.82260         38.97409           District of Columbia, District of Columbia         10.668529         17.996837         16.75794         54.57670           Miami-Dade County, Florida         19.910852         28.492734         24.67464         26.92177           Fulton County, Georgia         9.055800         18.005673         23.63889         49.29963           Oconee County, Georgia         6.846064         21.285932         26.98576         44.88224           Cook County, Illinois         14.709575         23.951799         25.56936         35.76927           Monroe County, Indiana         7.644555         22.310366         25.06800         44.97708           Tippecanoe County, Indiana         9.719412         26.604045         28.51591         35.16063           Orleans Parish, Louisiana         14.842995         23.151391         26.71059         35.29503           Suffolk County, Massachusetts         15.708324         23.607559         19.00435         41.67977           Montgomery County, Maryland         8.822279         13.968895         19.34383         57.86500           Crawford County, Michigan         12.522949         35.394724         34.93091         17.15142           In	Santa Clara County, California	13.024218	15.167082	23.86490	47.94380
District of Columbia, District of Columbia       10.668529       17.996837       16.75794       54.57670         Miami-Dade County, Florida       19.910852       28.492734       24.67464       26.92177         Fulton County, Georgia       9.055800       18.005673       23.63889       49.29963         Oconee County, Georgia       6.846064       21.285932       26.98576       44.88224         Cook County, Illinois       14.709575       23.951799       25.56936       35.76927         Monroe County, Indiana       7.644555       22.310366       25.06800       44.97708         Tippecanoe County, Indiana       9.719412       26.604045       28.51591       35.16063         Orleans Parish, Louisiana       14.842995       23.151391       26.71059       35.29503         Suffolk County, Massachusetts       15.708324       23.607559       19.00435       41.67977         Montgomery County, Maryland       8.822279       13.968895       19.34383       57.86500         Crawford County, Michigan       12.522949       35.394724       34.93091       17.15142         Ingham County, Michigan       8.202319       21.622739       32.92508       37.24986         Camden County, New Jersey       15.806027       28.728008       22.77177	Santa Cruz County, California	14.396614	15.487459	31.87140	38.24453
Miami-Dade County, Florida       19.910852       28.492734       24.67464       26.92177         Fulton County, Georgia       9.055800       18.005673       23.63889       49.29963         Oconee County, Georgia       6.846064       21.285932       26.98576       44.88224         Cook County, Illinois       14.709575       23.951799       25.56936       35.76927         Monroe County, Indiana       7.644555       22.310366       25.06800       44.97708         Tippecanoe County, Indiana       9.719412       26.604045       28.51591       35.16063         Orleans Parish, Louisiana       14.842995       23.151391       26.71059       35.29503         Suffolk County, Massachusetts       15.708324       23.607559       19.00435       41.67977         Montgomery County, Michigan       8.822279       13.968895       19.34383       57.86500         Crawford County, Michigan       8.202319       21.622739       32.92508       37.24986         Camden County, New Jersey       12.074268       31.320041       26.44240       30.16329         Essex County, New Jersey       15.806027       28.728008       22.77177       22.69419         Mercer County, New Jersey       12.561574       25.615744       25.615744       25.615744	Yolo County, California	14.506227	19.697083	26.82260	38.97409
Fulton County, Georgia 9.055800 18.005673 23.63889 49.29963 Oconee County, Georgia 6.846064 21.285932 26.98576 44.88224 Cook County, Illinois 14.709575 23.951799 25.56936 35.76927 Monroe County, Indiana 7.644555 22.310366 25.06800 44.97708 Tippecanoe County, Indiana 9.719412 26.604045 28.51591 35.16063 Orleans Parish, Louisiana 14.842995 23.151391 26.71059 35.29503 Suffolk County, Massachusetts 15.708324 23.607559 19.00435 41.67977 Montgomery County, Maryland 8.822279 13.968895 19.34383 57.86500 Crawford County, Michigan 12.522949 35.394724 34.93091 17.15142 Ingham County, New Jersey 12.074268 31.320041 26.44240 30.16329 Essex County, New Jersey 15.806027 28.728008 22.77177 32.69419 Gloucester County, New Jersey 12.561574 25.615744 22.17729 39.64540 Mercer County, New York 13.376256 12.610941 14.08307 59.92973 Richmond County, New York 11.300797 31.964367 25.94675 30.78809 Tompkins County, Oregon 8.892151 24.967860 37.74043 28.39956 Allegheny County, Pennsylvania 6.458414 29.826715 25.95835 37.5653 Bucks County, Pennsylvania 6.822231 31.613749 20.17269 41.39133	District of Columbia, District of Columbia	10.668529	17.996837	16.75794	54.57670
Oconee County, Georgia       6.846064       21.285932       26.98576       44.88224         Cook County, Illinois       14.709575       23.951799       25.56936       35.76927         Monroe County, Indiana       7.644555       22.310366       25.06800       44.97708         Tippecanoe County, Indiana       9.719412       26.604045       28.51591       35.16063         Orleans Parish, Louisiana       14.842995       23.151391       26.71059       35.29503         Suffolk County, Massachusetts       15.708324       23.607559       19.00435       41.67977         Montgomery County, Maryland       8.822279       13.968895       19.34383       57.86500         Crawford County, Michigan       12.522949       35.394724       34.93091       17.15142         Ingham County, Michigan       8.202319       21.622739       32.92508       37.24986         Camden County, New Jersey       15.806027       28.728008       22.77177       32.69419         Gloucester County, New Jersey       15.806027       28.728008       22.77177       32.69419         Mercer County, New Jersey       12.561574       25.615744       22.17729       39.64540         New York County, New York       13.376256       12.610941       14.08307       59.92973 </td <td>Miami-Dade County, Florida</td> <td>19.910852</td> <td>28.492734</td> <td>24.67464</td> <td>26.92177</td>	Miami-Dade County, Florida	19.910852	28.492734	24.67464	26.92177
Cook County, Illinois         14.709575         23.951799         25.56936         35.76927           Monroe County, Indiana         7.644555         22.310366         25.06800         44.97708           Tippecanoe County, Indiana         9.719412         26.604045         28.51591         35.16063           Orleans Parish, Louisiana         14.842995         23.151391         26.71059         35.29503           Suffolk County, Massachusetts         15.708324         23.607559         19.00435         41.67977           Montgomery County, Maryland         8.822279         13.968895         19.34383         57.86500           Crawford County, Michigan         12.522949         35.394724         34.93091         17.15142           Ingham County, Michigan         8.202319         21.622739         32.92508         37.24986           Camden County, New Jersey         12.074268         31.320041         26.44240         30.16329           Essex County, New Jersey         15.806027         28.728008         22.77177         32.69419           Gloucester County, New Jersey         12.561574         25.615744         22.17729         39.64540           New York County, New York         13.376256         12.610941         14.08307         59.92973           Richmond C	Fulton County, Georgia	9.055800	18.005673	23.63889	49.29963
Monroe County, Indiana7.64455522.31036625.0680044.97708Tippecanoe County, Indiana9.71941226.60404528.5159135.16063Orleans Parish, Louisiana14.84299523.15139126.7105935.29503Suffolk County, Massachusetts15.70832423.60755919.0043541.67977Montgomery County, Maryland8.82227913.96889519.3438357.86500Crawford County, Michigan12.52294935.39472434.9309117.15142Ingham County, Michigan8.20231921.62273932.9250837.24986Camden County, New Jersey12.07426831.32004126.4424030.16329Essex County, New Jersey15.80602728.72800822.7717732.69419Gloucester County, New Jersey12.56157425.61574422.1772939.64540Mercer County, New York13.37625612.61094114.0830759.92973Richmond County, New York11.30079731.96436725.9467530.78809Tompkins County, New York5.76336319.81693423.5928750.82683Franklin County, Ohio10.00430325.14793027.2808637.56691Lane County, Oregon8.89215124.96786037.7404328.39956Allegheny County, Pennsylvania6.45841429.82671525.9583537.75653Bucks County, Pennsylvania6.82223131.61374920.1726941.39133	Oconee County, Georgia	6.846064	21.285932	26.98576	44.88224
Tippecanoe County, Indiana       9.719412       26.604045       28.51591       35.16063         Orleans Parish, Louisiana       14.842995       23.151391       26.71059       35.29503         Suffolk County, Massachusetts       15.708324       23.607559       19.00435       41.67977         Montgomery County, Maryland       8.822279       13.968895       19.34383       57.86500         Crawford County, Michigan       12.522949       35.394724       34.93091       17.15142         Ingham County, New Jersey       12.074268       31.320041       26.44240       30.16329         Essex County, New Jersey       15.806027       28.728008       22.77177       32.69419         Gloucester County, New Jersey       8.335119       34.333650       28.01957       29.31166         Mercer County, New Jersey       12.561574       25.615744       22.17729       39.64540         New York County, New York       13.376256       12.610941       14.08307       59.92973         Richmond County, New York       11.300797       31.964367       25.94675       30.78809         Tompkins County, New York       5.763363       19.816934       23.59287       50.82683         Franklin County, Ohio       10.004303       25.147930       27.28086       37	Cook County, Illinois	14.709575	23.951799	25.56936	35.76927
Orleans Parish, Louisiana       14.842995       23.151391       26.71059       35.29503         Suffolk County, Massachusetts       15.708324       23.607559       19.00435       41.67977         Montgomery County, Maryland       8.822279       13.968895       19.34383       57.86500         Crawford County, Michigan       12.522949       35.394724       34.93091       17.15142         Ingham County, Michigan       8.202319       21.622739       32.92508       37.24986         Camden County, New Jersey       12.074268       31.320041       26.44240       30.16329         Essex County, New Jersey       15.806027       28.728008       22.77177       32.69419         Gloucester County, New Jersey       8.335119       34.333650       28.01957       29.31166         Mercer County, New Jersey       12.561574       25.615744       22.17729       39.64540         New York County, New York       13.376256       12.610941       14.08307       59.92973         Richmond County, New York       11.300797       31.964367       25.94675       30.78809         Tompkins County, New York       5.763363       19.816934       23.59287       50.82683         Franklin County, Ohio       10.004303       25.147930       27.28086       37.56	Monroe County, Indiana	7.644555	22.310366	25.06800	44.97708
Suffolk County, Massachusetts15.70832423.60755919.0043541.67977Montgomery County, Maryland8.82227913.96889519.3438357.86500Crawford County, Michigan12.52294935.39472434.9309117.15142Ingham County, Michigan8.20231921.62273932.9250837.24986Camden County, New Jersey12.07426831.32004126.4424030.16329Essex County, New Jersey15.80602728.72800822.7717732.69419Gloucester County, New Jersey8.33511934.33365028.0195729.31166Mercer County, New Jersey12.56157425.61574422.1772939.64540New York County, New York13.37625612.61094114.0830759.92973Richmond County, New York11.30079731.96436725.9467530.78809Tompkins County, New York5.76336319.81693423.5928750.82683Franklin County, Ohio10.00430325.14793027.2808637.56691Lane County, Oregon8.89215124.96786037.7404328.39956Allegheny County, Pennsylvania6.45841429.82671525.9583537.75653Bucks County, Pennsylvania6.82223131.61374920.1726941.39133	Tippecanoe County, Indiana	9.719412	26.604045	28.51591	35.16063
Montgomery County, Maryland8.82227913.96889519.3438357.86500Crawford County, Michigan12.52294935.39472434.9309117.15142Ingham County, Michigan8.20231921.62273932.9250837.24986Camden County, New Jersey12.07426831.32004126.4424030.16329Essex County, New Jersey15.80602728.72800822.7717732.69419Gloucester County, New Jersey8.33511934.33365028.0195729.31166Mercer County, New Jersey12.56157425.61574422.1772939.64540New York County, New York13.37625612.61094114.0830759.92973Richmond County, New York11.30079731.96436725.9467530.78809Tompkins County, New York5.76336319.81693423.5928750.82683Franklin County, Ohio10.00430325.14793027.2808637.56691Lane County, Oregon8.89215124.96786037.7404328.39956Allegheny County, Pennsylvania6.45841429.82671525.9583537.75653Bucks County, Pennsylvania6.84218330.65204125.3879537.41782Centre County, Pennsylvania6.82223131.61374920.1726941.39133	Orleans Parish, Louisiana	14.842995	23.151391	26.71059	35.29503
Crawford County, Michigan       12.522949       35.394724       34.93091       17.15142         Ingham County, Michigan       8.202319       21.622739       32.92508       37.24986         Camden County, New Jersey       12.074268       31.320041       26.44240       30.16329         Essex County, New Jersey       15.806027       28.728008       22.77177       32.69419         Gloucester County, New Jersey       8.335119       34.333650       28.01957       29.31166         Mercer County, New Jersey       12.561574       25.615744       22.17729       39.64540         New York County, New York       13.376256       12.610941       14.08307       59.92973         Richmond County, New York       11.300797       31.964367       25.94675       30.78809         Tompkins County, New York       5.763363       19.816934       23.59287       50.82683         Franklin County, Ohio       10.004303       25.147930       27.28086       37.56691         Lane County, Oregon       8.892151       24.967860       37.74043       28.39956         Allegheny County, Pennsylvania       6.542183       30.652041       25.38795       37.41782         Centre County, Pennsylvania       6.822231       31.613749       20.17269       41.39133 <td>Suffolk County, Massachusetts</td> <td>15.708324</td> <td>23.607559</td> <td>19.00435</td> <td>41.67977</td>	Suffolk County, Massachusetts	15.708324	23.607559	19.00435	41.67977
Ingham County, Michigan       8.202319       21.622739       32.92508       37.24986         Camden County, New Jersey       12.074268       31.320041       26.44240       30.16329         Essex County, New Jersey       15.806027       28.728008       22.77177       32.69419         Gloucester County, New Jersey       8.335119       34.333650       28.01957       29.31166         Mercer County, New Jersey       12.561574       25.615744       22.17729       39.64540         New York County, New York       13.376256       12.610941       14.08307       59.92973         Richmond County, New York       11.300797       31.964367       25.94675       30.78809         Tompkins County, New York       5.763363       19.816934       23.59287       50.82683         Franklin County, Ohio       10.004303       25.147930       27.28086       37.56691         Lane County, Oregon       8.892151       24.967860       37.74043       28.39956         Allegheny County, Pennsylvania       6.458414       29.826715       25.95835       37.75653         Bucks County, Pennsylvania       6.822231       31.613749       20.17269       41.39133	Montgomery County, Maryland	8.822279	13.968895	19.34383	57.86500
Camden County, New Jersey       12.074268       31.320041       26.44240       30.16329         Essex County, New Jersey       15.806027       28.728008       22.77177       32.69419         Gloucester County, New Jersey       8.335119       34.333650       28.01957       29.31166         Mercer County, New Jersey       12.561574       25.615744       22.17729       39.64540         New York County, New York       13.376256       12.610941       14.08307       59.92973         Richmond County, New York       11.300797       31.964367       25.94675       30.78809         Tompkins County, New York       5.763363       19.816934       23.59287       50.82683         Franklin County, Ohio       10.004303       25.147930       27.28086       37.56691         Lane County, Oregon       8.892151       24.967860       37.74043       28.39956         Allegheny County, Pennsylvania       6.458414       29.826715       25.95835       37.75653         Bucks County, Pennsylvania       6.842183       30.652041       25.38795       37.41782         Centre County, Pennsylvania       6.822231       31.613749       20.17269       41.39133	Crawford County, Michigan	12.522949	35.394724	34.93091	17.15142
Essex County, New Jersey       15.806027       28.728008       22.77177       32.69419         Gloucester County, New Jersey       8.335119       34.333650       28.01957       29.31166         Mercer County, New Jersey       12.561574       25.615744       22.17729       39.64540         New York County, New York       13.376256       12.610941       14.08307       59.92973         Richmond County, New York       11.300797       31.964367       25.94675       30.78809         Tompkins County, New York       5.763363       19.816934       23.59287       50.82683         Franklin County, Ohio       10.004303       25.147930       27.28086       37.56691         Lane County, Oregon       8.892151       24.967860       37.74043       28.39956         Allegheny County, Pennsylvania       6.458414       29.826715       25.95835       37.75653         Bucks County, Pennsylvania       6.542183       30.652041       25.38795       37.41782         Centre County, Pennsylvania       6.822231       31.613749       20.17269       41.39133	Ingham County, Michigan	8.202319	21.622739	32.92508	37.24986
Gloucester County, New Jersey       8.335119       34.333650       28.01957       29.31166         Mercer County, New Jersey       12.561574       25.615744       22.17729       39.64540         New York County, New York       13.376256       12.610941       14.08307       59.92973         Richmond County, New York       11.300797       31.964367       25.94675       30.78809         Tompkins County, New York       5.763363       19.816934       23.59287       50.82683         Franklin County, Ohio       10.004303       25.147930       27.28086       37.56691         Lane County, Oregon       8.892151       24.967860       37.74043       28.39956         Allegheny County, Pennsylvania       6.458414       29.826715       25.95835       37.75653         Bucks County, Pennsylvania       6.542183       30.652041       25.38795       37.41782         Centre County, Pennsylvania       6.822231       31.613749       20.17269       41.39133	Camden County, New Jersey	12.074268	31.320041	26.44240	30.16329
Mercer County, New Jersey       12.561574       25.615744       22.17729       39.64540         New York County, New York       13.376256       12.610941       14.08307       59.92973         Richmond County, New York       11.300797       31.964367       25.94675       30.78809         Tompkins County, New York       5.763363       19.816934       23.59287       50.82683         Franklin County, Ohio       10.004303       25.147930       27.28086       37.56691         Lane County, Oregon       8.892151       24.967860       37.74043       28.39956         Allegheny County, Pennsylvania       6.458414       29.826715       25.95835       37.75653         Bucks County, Pennsylvania       6.542183       30.652041       25.38795       37.41782         Centre County, Pennsylvania       6.822231       31.613749       20.17269       41.39133	Essex County, New Jersey	15.806027	28.728008	22.77177	32.69419
New York County, New York       13.376256       12.610941       14.08307       59.92973         Richmond County, New York       11.300797       31.964367       25.94675       30.78809         Tompkins County, New York       5.763363       19.816934       23.59287       50.82683         Franklin County, Ohio       10.004303       25.147930       27.28086       37.56691         Lane County, Oregon       8.892151       24.967860       37.74043       28.39956         Allegheny County, Pennsylvania       6.458414       29.826715       25.95835       37.75653         Bucks County, Pennsylvania       6.542183       30.652041       25.38795       37.41782         Centre County, Pennsylvania       6.822231       31.613749       20.17269       41.39133	Gloucester County, New Jersey	8.335119	34.333650	28.01957	29.31166
Richmond County, New York       11.300797       31.964367       25.94675       30.78809         Tompkins County, New York       5.763363       19.816934       23.59287       50.82683         Franklin County, Ohio       10.004303       25.147930       27.28086       37.56691         Lane County, Oregon       8.892151       24.967860       37.74043       28.39956         Allegheny County, Pennsylvania       6.458414       29.826715       25.95835       37.75653         Bucks County, Pennsylvania       6.542183       30.652041       25.38795       37.41782         Centre County, Pennsylvania       6.822231       31.613749       20.17269       41.39133	Mercer County, New Jersey	12.561574	25.615744	22.17729	39.64540
Tompkins County, New York       5.763363       19.816934       23.59287       50.82683         Franklin County, Ohio       10.004303       25.147930       27.28086       37.56691         Lane County, Oregon       8.892151       24.967860       37.74043       28.39956         Allegheny County, Pennsylvania       6.458414       29.826715       25.95835       37.75653         Bucks County, Pennsylvania       6.542183       30.652041       25.38795       37.41782         Centre County, Pennsylvania       6.822231       31.613749       20.17269       41.39133	New York County, New York	13.376256	12.610941	14.08307	59.92973
Franklin County, Ohio       10.004303       25.147930       27.28086       37.56691         Lane County, Oregon       8.892151       24.967860       37.74043       28.39956         Allegheny County, Pennsylvania       6.458414       29.826715       25.95835       37.75653         Bucks County, Pennsylvania       6.542183       30.652041       25.38795       37.41782         Centre County, Pennsylvania       6.822231       31.613749       20.17269       41.39133	Richmond County, New York	11.300797	31.964367	25.94675	30.78809
Lane County, Oregon       8.892151       24.967860       37.74043       28.39956         Allegheny County, Pennsylvania       6.458414       29.826715       25.95835       37.75653         Bucks County, Pennsylvania       6.542183       30.652041       25.38795       37.41782         Centre County, Pennsylvania       6.822231       31.613749       20.17269       41.39133	Tompkins County, New York	5.763363	19.816934	23.59287	50.82683
Allegheny County, Pennsylvania       6.458414       29.826715       25.95835       37.75653         Bucks County, Pennsylvania       6.542183       30.652041       25.38795       37.41782         Centre County, Pennsylvania       6.822231       31.613749       20.17269       41.39133	Franklin County, Ohio	10.004303	25.147930	27.28086	37.56691
Bucks County, Pennsylvania       6.542183       30.652041       25.38795       37.41782         Centre County, Pennsylvania       6.822231       31.613749       20.17269       41.39133	Lane County, Oregon	8.892151	24.967860	37.74043	28.39956
Centre County, Pennsylvania 6.822231 31.613749 20.17269 41.39133	Allegheny County, Pennsylvania	6.458414	29.826715	25.95835	37.75653
V / V	Bucks County, Pennsylvania	6.542183	30.652041	25.38795	37.41782
	Centre County, Pennsylvania	6.822231	31.613749	20.17269	41.39133
	Chester County, Pennsylvania	7.276344	23.179965	20.40566	49.13803

County	<hs< th=""><th>HS</th><th>HS+</th><th>BA+</th></hs<>	HS	HS+	BA+
Delaware County, Pennsylvania	7.793264	31.782900	24.37388	36.04996
Montgomery County, Pennsylvania	6.248537	24.813364	22.06307	46.87503
Philadelphia County, Pennsylvania	17.981287	33.822359	22.78378	25.41257
Davidson County, Tennessee	12.716788	24.092843	25.90111	37.28926
Williamson County, Tennessee	4.656689	16.371417	23.23685	55.73504
Harris County, Texas	20.412793	23.326487	26.80649	29.45423
Travis County, Texas	12.166591	17.104836	24.77124	45.95733
Arlington County, Virginia	6.522062	8.299942	12.29320	72.88480
Chesterfield County, Virginia	9.037095	24.096152	29.97047	36.89628
Henrico County, Virginia	9.341698	22.841190	27.13650	40.68061
James City County, Virginia	6.207560	21.079798	25.68395	47.02869
Richmond city, Virginia	16.815834	23.029182	24.10500	36.04999

```
# ed.attain.by.county %>%
    gather(key = ed.level, value = proportion.pop, -County) %>%
   mutate(ed.level = ordered(ed.level, levels = c("<HS", "HS", "HS+", "BA+"))) %>%
   ggplot() +
   aes(x = ed.level, y = proportion.pop, fill = ed.level,
#
#
        color = ed.level,
#
       group = County) +
#
  geom_line(color = "black", linetype = 3) +
   geom\_point(size = 3) +
#
  xlab("Level of educational attainment") +
   ylab("Proportion of population") +
#
  theme_classic() +
   theme(legend.position = "none",
#
          axis.title = element_text(size = rel(1.5), face = "bold"),
          axis.text = element_text(size = rel(1.2)))
ed.attain.by.county %>%
  gather(key = ed.level, value = proportion.pop, -County) %>%
  mutate(ed.level = ordered(ed.level, levels = rev(c("<HS", "HS", "HS+", "BA+")))) ->
  ed.attain.gathered
ed.attain.by.county %>%
  select(County, `BA+`) ->
  p.ba.sortlist
left_join(ed.attain.gathered, p.ba.sortlist) %>%
  arrange(`BA+`) %>%
  mutate(County = factor(County, unique(County))) %>%
  ggplot() +
  aes(x = County, y = proportion.pop, fill = ed.level) +
  geom_col() +
  coord_flip() +
  play.theme +
  play.palette +
  scale_y_continuous(expand=c(0,0)) +
  ylab("Percent of population")
```

```
Arlington County, Virginia
New York County, New York
Montgomery County, Maryland
Williamson County, Tennessee
District of Columbia, District of Columbia
Tompkins County, New York
Fulton County, Georgia
Chester County, Pennsylvania
Santa Clara County, California
James City County, Virginia
Montgomery County, Pennsylvania
Travis County, California
Monroe County, Indiana
Oconee County, Georgia
Suffolk County, Massachusetts
Centre County, Pennsylvania
Henrico County, Virginia
Mercer County, New Jersey
                                           Centre County, Pennsylvania
Henrico County, Virginia
Mercer County, New Jersey
Yolo County, California
Santa Cruz County, California
County, California
Franklin County, California
Franklin County, California
Franklin County, Colifornia
Davidson County, Tennessee
Ingham County, Michigan
Chesterfield County, Virginia
Richmond city, Virginia
Delaware County, Pennsylvania
Cook County, Illinois
Orleans Parish, Louisiana
Tippecanoe County, Indiana
Essex County, New Jersey
Richmond County, New Jersey
Richmond County, New Jersey
Richmond County, New Jersey
Harris County, Texas
Gloucester County, New Jersey
Lane County, New Jersey
Lane County, New Jersey
Harris County, Texas
Gloucester County, New Jersey
Lane County, New Jersey
Lane County, New Jersey
Lane County, New Jersey
Harris County, Texas
Gloucester County, New Jersey
Lane County, California
Crawford County, California
Crawford County, California
Crawford County, California
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          25
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      50
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   75
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          100
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Percent of population
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          BA+ HS+ HS
```

```
ed.attain.df <- Reduce(function(x,y) full_join(x,y, all=TRUE), ed.attain.list)
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining factors with different levels, coercing to
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
```

## Warning: Column `county` joining character vector and factor, coercing into ## character vector

ed.attain.list <- lapply(1:dim(play.ed)[1], Make.ed.attain.table)

## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "

## Warning: Column `county` joining character vector and factor, coercing into

## character vector

## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "

## Warning: Column `county` joining character vector and factor, coercing into

## character vector

## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "

## Warning: Column `county` joining character vector and factor, coercing into

## character vector

## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "

## Warning: Column `county` joining character vector and factor, coercing into

```
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
```

## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "

```
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
```

## Warning: Column `county` joining character vector and factor, coercing into

```
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
## Joining, by = c("county", "tot", "lt.7", "mid.hs", "lt.hs", "hs.grad", "some.coll", "ba", "gt.ba", "
## Warning: Column `county` joining character vector and factor, coercing into
## character vector
ed.attain.df %>%
 mutate(p.lt.7 = 100*lt.7/tot,
        p.mid.hs = 100*mid.hs/tot,
        p.hs.grad = 100*hs.grad/tot,
        p.some.coll = 100*some.coll/tot,
        p.ba = 100*ba/tot,
         p.ma.plus = 100*gt.ba/tot) %>%
  select(county, p.lt.7, p.mid.hs, p.hs.grad, p.some.coll, p.ba, p.ma.plus) ->
  ed.attain.by.county
```

```
names(ed.attain.by.county) <- c("County", "<7th", "<HS", "HS", "HS+", "BA", "MA+")</pre>
ed.attain.by.county %>%
  gather(key = ed.level, value = proportion.pop, -County) %>%
  mutate(ed.level = ordered(ed.level, levels = rev(c("<7th", "<HS", "HS", "HS+", "BA", "MA+")))) ->
  ed.attain.gathered
ed.attain.by.county %>%
  mutate(ba.plus = `BA` + `MA+`) %>%
  select(County, ba.plus) ->
  p.ba.sortlist
left_join(ed.attain.gathered, p.ba.sortlist) %>%
  arrange(ba.plus) %>%
  mutate(County = factor(County, unique(County))) %>%
  ggplot() +
  aes(x = County, y = proportion.pop, fill = ed.level) +
  geom_col() +
  coord_flip() +
  play.theme +
 play.palette +
  scale_y_continuous(expand=c(0,0)) +
 ylab("Percent of population")
```

## ## Joining, by = "County"

