educational_attainment

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Educational Attainment

```
counties <- read.csv(paste0(csv.dir, "city-state-county.csv"), stringsAsFactors = FALSE)

data("county.regions")
counties <- left_join(counties, county.regions)
```

```
## Joining, by = "region"
```

```
demog <- get_county_demographics(endyear=2013, span=5)
county.demo <- left_join(counties, demog)
```

```
## Joining, by = "region"
```

```
# Recapitalize county
county.demo$County <- unlist(lapply(county.demo$County, Cap_all))
# 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$state.fips.character)
county.fips <- as.numeric(substr(county.demo$county.fips.character,3,5))
play.geo <- geo.make(state = state.fips, county = county.fips)

Make.county.geo <- function(i, df) {
  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$Site.code[cty], "_",
                   county.demo$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],
                     col.names = c("Total", #1
                                   "None",  #2
                                   "<K",    #3
                                   "K",     #4
                                   "1st",   #5
```

```
                                    "2nd",   #6
                                    "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])
mid.hs <- function(i) sum(play.ed[i,11:16])
lt.hs <- function(i) sum(play.ed[i,2:16])
hs.grad <- function(i) sum(play.ed[i,17:18])
some.coll <- function(i) sum(play.ed[i,19:21])
ba <- function(i) sum(play.ed[i,22])
ba.plus <- function(i) sum(play.ed[i,22:25])
gt.ba <- function(i) sum(play.ed[i,23:25])

# Use functions to create data table for easier manipulation
Make.ed.attain.table <- function(i) {
  this.cty <- slot(play.ed[i,1], "geography")$NAME
  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", "
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## character vector
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```
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+")
ed.attain.by.county %>%
  knitr::kable()
```

County	<HS	HS	HS+	BA+
Los Angeles County, California	22.718630	20.676552	26.33454	30.27027
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
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	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	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	6.542183	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	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

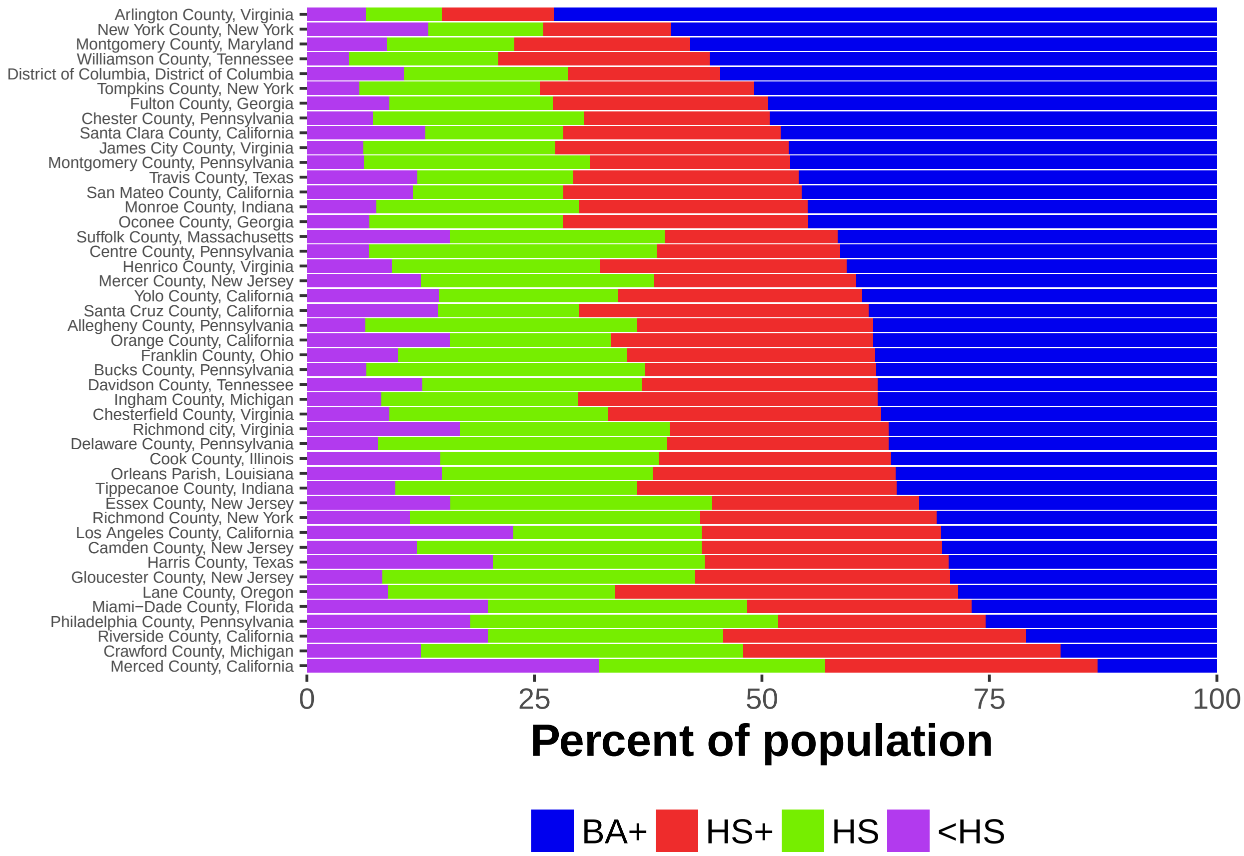
```
# ed.attain.by.county %>%
#   gather(key = ed.level, value = proportion.pop, -County) %>%
#   mutate(ed.level = ordered(ed.level, levels = c("<HS", "HS", "HS+", "BA+"))) %>%
#   ggplot() +
#   aes(x = ed.level, y = proportion.pop, fill = ed.level,
#       color = ed.level,
#       group = County) +
#   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")
```

```
## Joining, by = "County"
```

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```
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+")

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"
```