

# R Notebook

AP VoteCast is a survey of the American electorate conducted in all 50 states by NORC at the University of Chicago for The Associated Press and Fox News. The survey is funded by AP. The survey of 138,929 registered voters was conducted October 29 to November 6, 2018, concluding as polls closed on Election Day. Interviews were conducted via phone and web, with 11,059 completing by phone and 127,870 completing by web.

```
library(readr)
library(dplyr)

##
## Attaching package: 'dplyr'

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

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

library(ggplot2)
library(fastDummies)
knitr::opts_chunk$set(echo = TRUE)
def.chunk.hook <- knitr::knit_hooks$get("chunk")
knitr::knit_hooks$set(chunk = function(x, options) {
  x <- def.chunk.hook(x, options)
  ifelse(options$size != "normalsize", paste0("\n", options$size, "\n\n", x, "\n\n \\normalsize"), x)
})
require(runjags)

## Loading required package: runjags

require(coda)

## Loading required package: coda

data <- read.csv("voting.csv")

data$RACETH5 <- recode(data$RACETH5, "(1) White" = 1, "(2) African American or Black" = 2, "(3) Latino or Hispanic" = 3, "(4) Other race" = 4, "(5) Don't know/refused" = 5)
data$RACETH <- NULL
data$EDUC <- recode(data$EDUC, "(1) High school or less" = 1, "(2) Some college/assoc. degree" = 2, "(3) Bachelor's degree" = 3, "(4) Graduate degree" = 4, "(5) Don't know/refused" = 5)
data$INCOME <- recode(data$INCOME, "(1) Under $25,000" = 1, "(2) $25,000-$49,999" = 2, "(3) $50,000-$74,999" = 3, "(4) $75,000-$99,999" = 4, "(5) $100,000 or more" = 5, "(99) Don't know/refused" = 99)
data$SEX <- recode(data$SEX, "(1) Men" = 1, "(2) Women" = 2, "(99) DON'T KNOW/SKIPPED/REFUSED (VOL)" = 99)
data$AGE <- recode(data$AGE65, "(1) 18-24" = 1, "(2) 25-29" = 2, "(3) 30-39" = 3, "(4) 40-49" = 4, "(5) 50-59" = 5, "(6) 60-64" = 6, "(7) 65-69" = 7, "(8) 70-74" = 8, "(9) 75-79" = 9, "(10) 80-84" = 10, "(11) 85-89" = 11, "(12) 90-94" = 12, "(13) 95-99" = 13, "(14) 100 or more" = 14, "(99) Don't know/refused" = 99)
data$AGE65 <- NULL
data$RELIG <- recode(data$RELIG, "(1) Protestant" = 1, "(2) Catholic" = 2, "(3) Mormon" = 3, "(4) Other Christian" = 4, "(5) Jewish" = 5, "(6) Muslim" = 6, "(7) Hindu" = 7, "(8) Buddhist" = 8, "(9) Other religion" = 9, "(10) No religion" = 10, "(11) Don't know/refused" = 11)
data$PARTY <- NULL
data$PARTY <- recode(data$PARTYFULL, "(1) Democrat/Lean Dem" = 1, "(2) Republican/Lean Rep" = 2, "(3) Independent/Lean Ind" = 3, "(4) Other" = 4, "(5) Don't know/refused" = 5)
data$PARTYFULL <- NULL
data$IDEO <- recode(data$IDEO, "(1) Very liberal" = 1, "(2) Somewhat liberal" = 2, "(3) Moderate" = 3, "(4) Somewhat conservative" = 4, "(5) Very conservative" = 5, "(99) Don't know/refused" = 99)
data$RELIG4 <- recode(data$RELIG4, "(1) Protestant/Other Christian" = 1, "(2) Catholic" = 2, "(3) Other" = 3, "(4) Don't know/refused" = 4)
data$RELIG4 <- NULL
data$FORMFLAG <- NULL
```

```
data[1:5,]
```

```
##      SU_ID POLLCLOSE_STATE_WEIGHT POLLCLOSE_NATIONAL_WEIGHT
## 1 20000058          86.625560          83.562187
## 2 20000102          231.679211          223.486250
## 3 20000106          7639.065341          7368.922117
## 4 20000165          34.959933          33.723631
## 5 20000191          4.811467          4.641317
##      FINALVOTE_STATE_WEIGHT FINALVOTE_NATIONAL_WEIGHT      P_STATE
## 1          57.404245          55.73196      (MT) Montana
## 2          156.736562          178.51506      (KS) Kansas
## 3          502.237088          484.47628      (FL) Florida
## 4          37.813306          36.95838      (MT) Montana
## 5          3.857918          3.67032 (NH) New Hampshire
##      STATENUM      LVA      LVB
## 1      (26) Montana (1) Extremely interested      (5) I already voted
## 2      (16) Kansas (1) Extremely interested (1) Definitely will vote
## 3      (9) Florida (1) Extremely interested (1) Definitely will vote
## 4      (26) Montana (1) Extremely interested      (5) I already voted
## 5 (30) New Hampshire (1) Extremely interested (1) Definitely will vote
##      LV      LIKELYVOTER      TIMEVOTE
## 1      (12) Already voted (1) Likely voter (2) Early/Absentee
## 2 (10) 10-Certain will vote (1) Likely voter (2) Early/Absentee
## 3 (10) 10-Certain will vote (1) Likely voter (1) Election Day
## 4      (12) Already voted (1) Likely voter (2) Early/Absentee
## 5 (10) 10-Certain will vote (1) Likely voter (1) Election Day
##      TRUMPFACOR3      FAVSENDEM
## 1 (2) Voted to express opposition for Trump (1) Very favorable
## 2      (3) Trump was not a factor
## 3      (3) Trump was not a factor (1) Very favorable
## 4 (2) Voted to express opposition for Trump (1) Very favorable
## 5      (1) Voted to express support for Trump
##      FAVSENREP      PARTYCONTROL
## 1 (99) DON'T KNOW/SKIPPED/REFUSED (VOL) (3) Not too important
## 2
## 3      (4) Very unfavorable (2) Somewhat important
## 4      (4) Very unfavorable (1) Very important
## 5
##      GETAHEAD TRADENATIONALECON TRADELOCALECON
## 1 (2) Holding steady      (2) Hurt      (2) Hurt
## 2 (1) Getting ahead      (1) Help      (2) Hurt
## 3 (3) Falling behind (3) No difference      (1) Help
## 4 (3) Falling behind      (2) Hurt      (2) Hurt
## 5 (1) Getting ahead      (1) Help      (1) Help
##      HEALTHLAW
## 1      (4) Expand the law
## 2 (1) Repeal the law entirely
## 3 (2) Repeal parts of the law
## 4      (4) Expand the law
## 5 (2) Repeal parts of the law
##      IMMDEPORT
## 1 (1) Offered a chance to apply for legal status
## 2 (1) Offered a chance to apply for legal status
## 3 (1) Offered a chance to apply for legal status
```

```

## 4 (1) Offered a chance to apply for legal status
## 5 (1) Offered a chance to apply for legal status
##          RUSSIA
## 1          (1) Yes
## 2          (2) No
## 3 (99) DON'T KNOW/SKIPPED/REFUSED (VOL)
## 4          (1) Yes
## 5          (2) No
##
##          QPVVOTE
## 1          (4) I'm sure I voted
## 2          (4) I'm sure I voted
## 3 (3) I usually vote, but I didn't in the 2016 presidential election
## 4          (4) I'm sure I voted
## 5          (4) I'm sure I voted
##  FIRSTTIME
## 1  (2) Not
## 2  (2) Not
## 3  (2) Not
## 4  (2) Not
## 5  (2) Not
##
##          QPVVOTE3
## 1          (4) I'm sure I voted
## 2          (4) I'm sure I voted
## 3 (2) I thought about voting in the 2014 election for Congress, but didn't
## 4          (4) I'm sure I voted
## 5          (4) I'm sure I voted
##
##          BREAKA          BREAKB
## 1 (2) No, it is not      (1) Yes, it is
## 2 (2) No, it is not      (2) No, it is not
## 3 (2) No, it is not      (1) Yes, it is
## 4 (2) No, it is not      (1) Yes, it is
## 5  (1) Yes, it is (2) No, it is not
##
##          BREAKC SEX RACETH5 EDUC INCOME
## 1          (1) I've known all along  2      1  2      2
## 2 (2) I decided over the course of the campaign  1      1  4      4
## 3          (1) I've known all along  1      2  1      5
## 4          (1) I've known all along  1      1  4      3
## 5 (2) I decided over the course of the campaign  1      3  4      5
##  IDEO RELIG      SIZEPLACE AGE PARTY
## 1  2      1      (4) Rural  6      3
## 2  4      1 (3) Small town  4      2
## 3  99     3 (3) Small town  5      1
## 4  1      2 (3) Small town  6      1
## 5  4      1  (2) Suburban  5      2

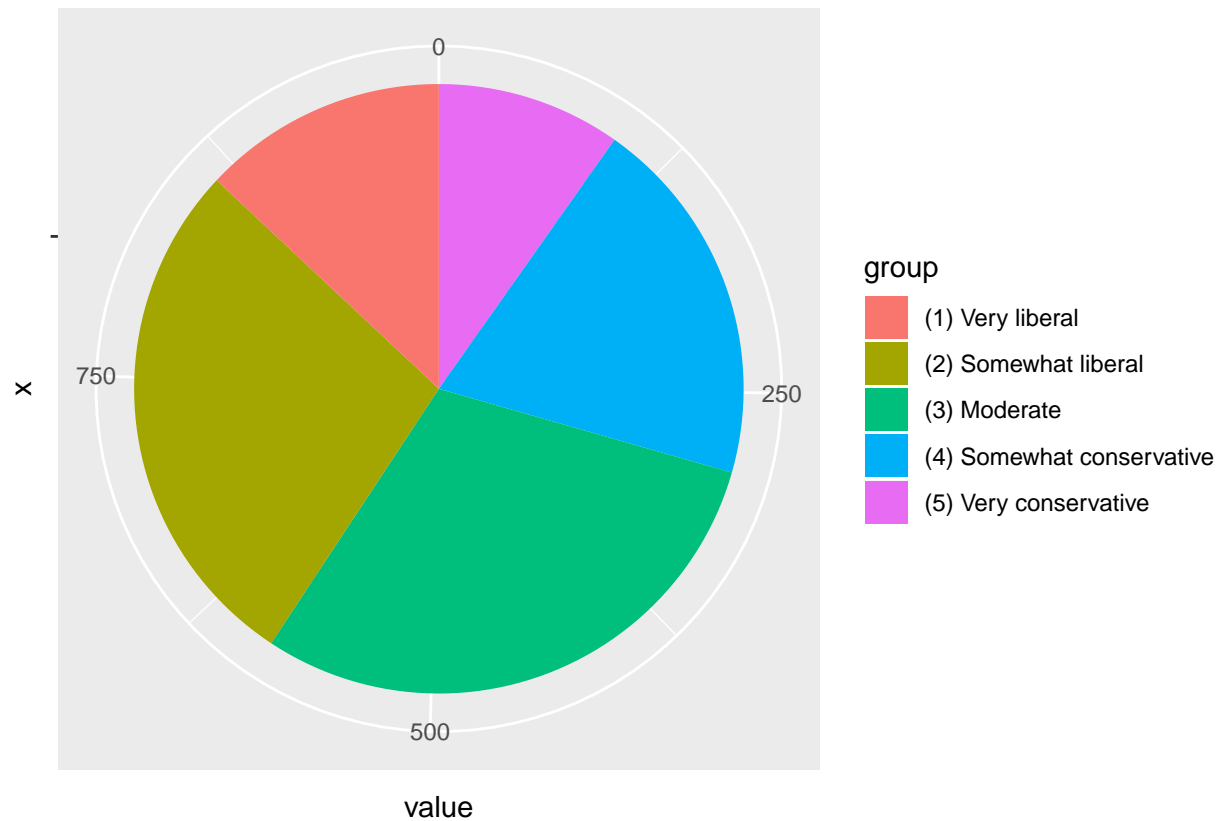
```

```

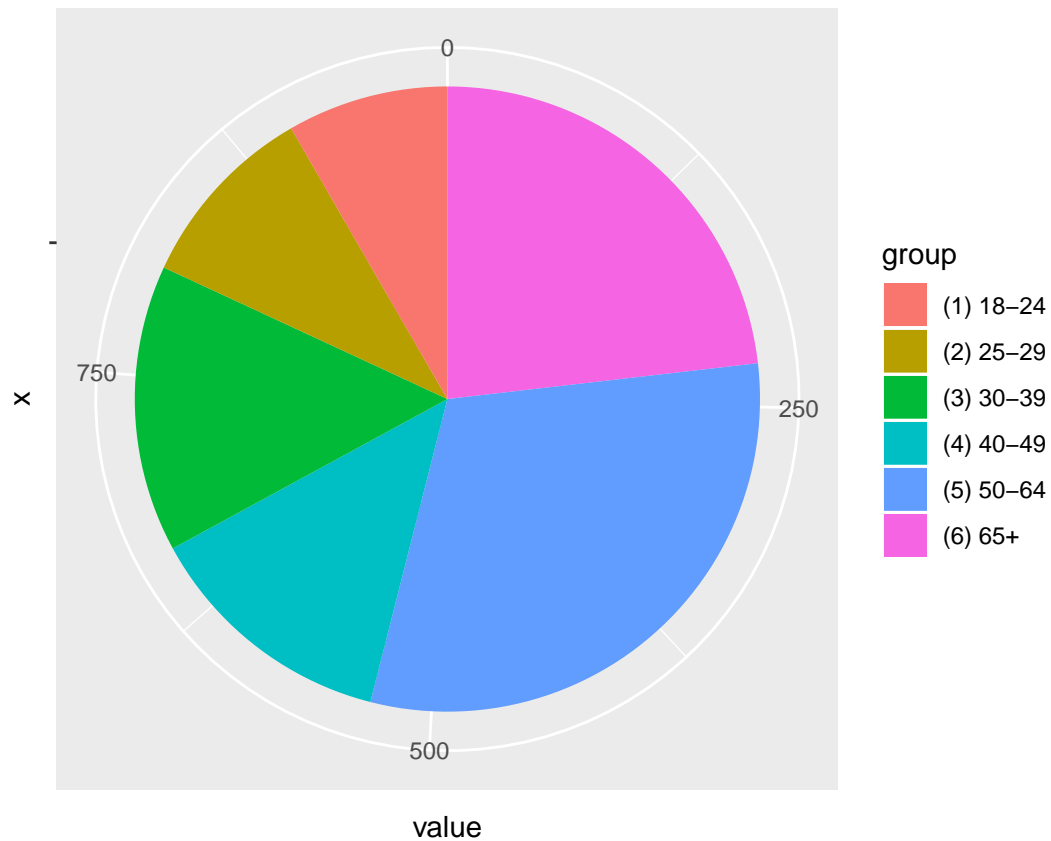
data <- data %>% filter(IDEO<99)
IDEO_data <- c()
for (i in 1:5){
  IDEO_data[i] <- sum(data$IDEO==i)
}
lbls <- c("(1) Very liberal", "(2) Somewhat liberal", "(3) Moderate", "(4) Somewhat conservative", "(5)
df <- data.frame(
  group = lbls,
  value = IDEO_data

```

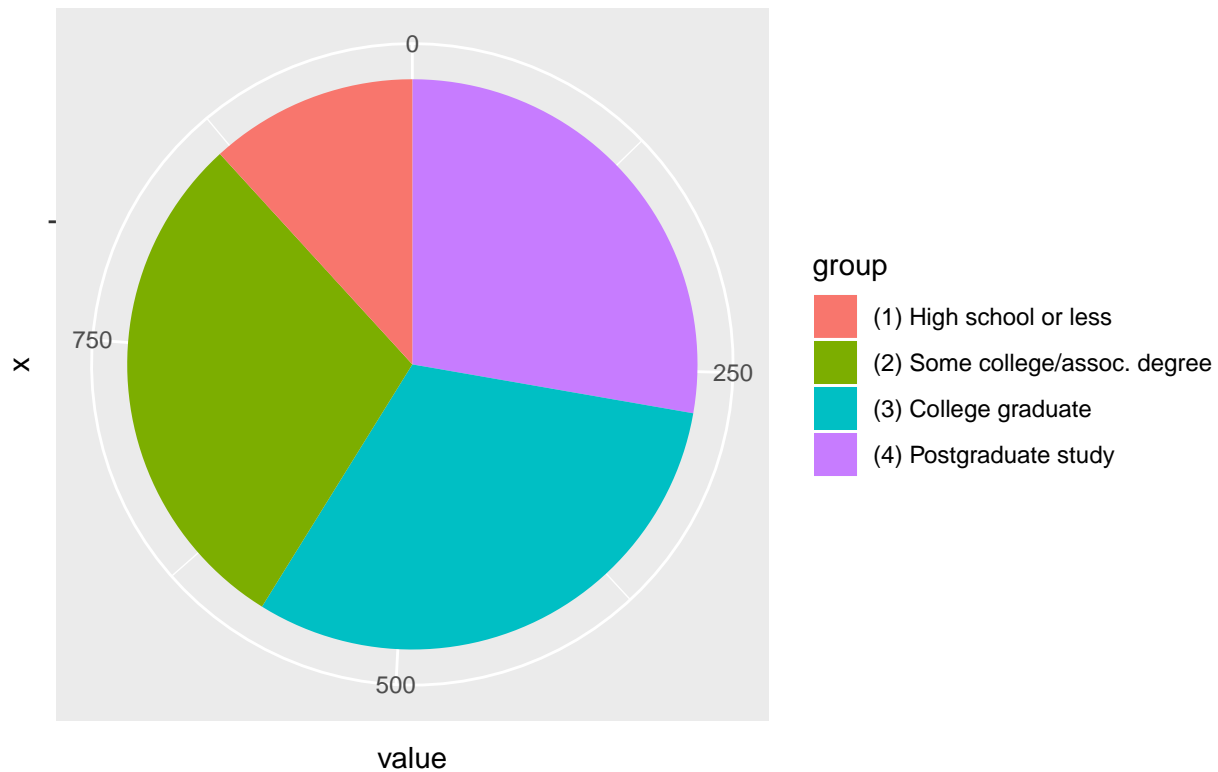
```
)
ggplot(df, aes(x="", y=value, fill=group))+ geom_bar(width = 1, stat = "identity")+ coord_polar("y", startAngle = 0)
```



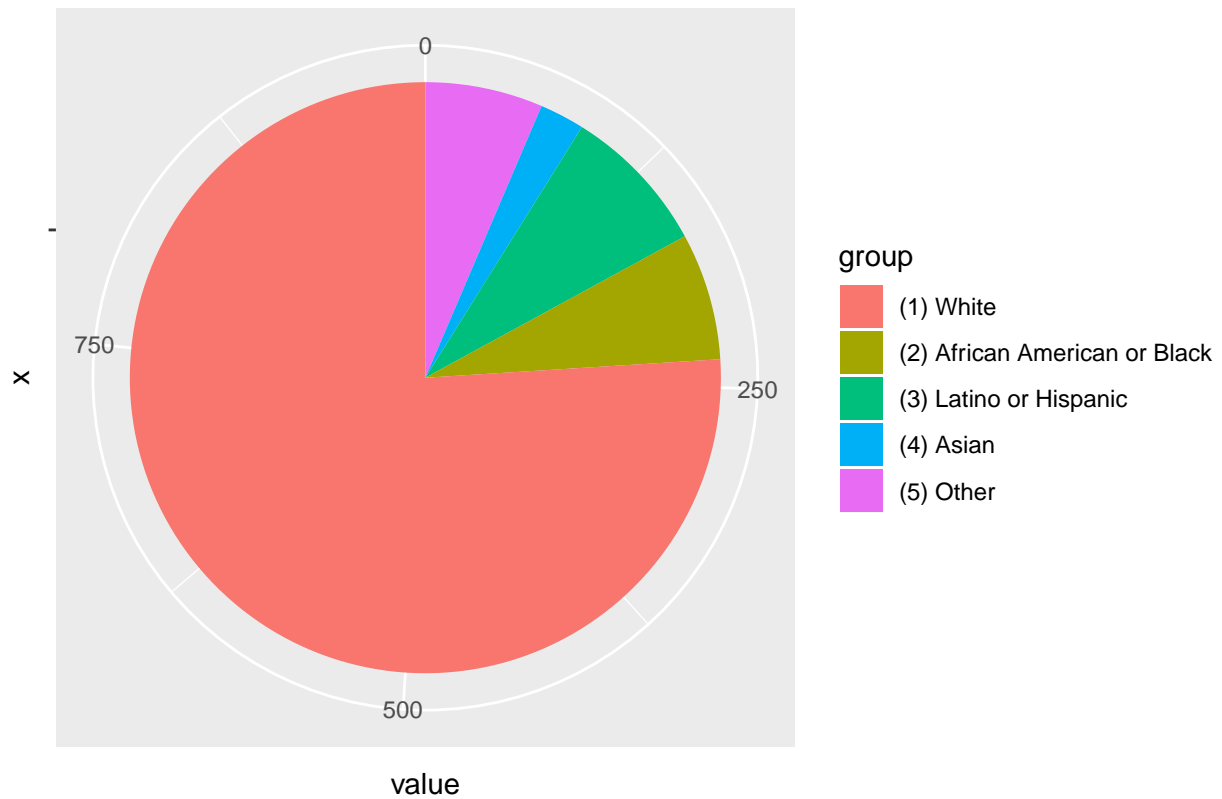
```
data <- data %>% filter(AGE<99)
AGE_data <- c()
for (i in 1:6){
  AGE_data[i] <- sum(data$AGE==i)
}
lbls <- c("(1) 18-24",
"(2) 25-29",
"(3) 30-39",
"(4) 40-49",
"(5) 50-64",
"(6) 65+")
df <- data.frame(
  group = lbls,
  value = AGE_data
)
ggplot(df, aes(x="", y=value, fill=group))+ geom_bar(width = 1, stat = "identity")+ coord_polar("y", startAngle = 0)
```



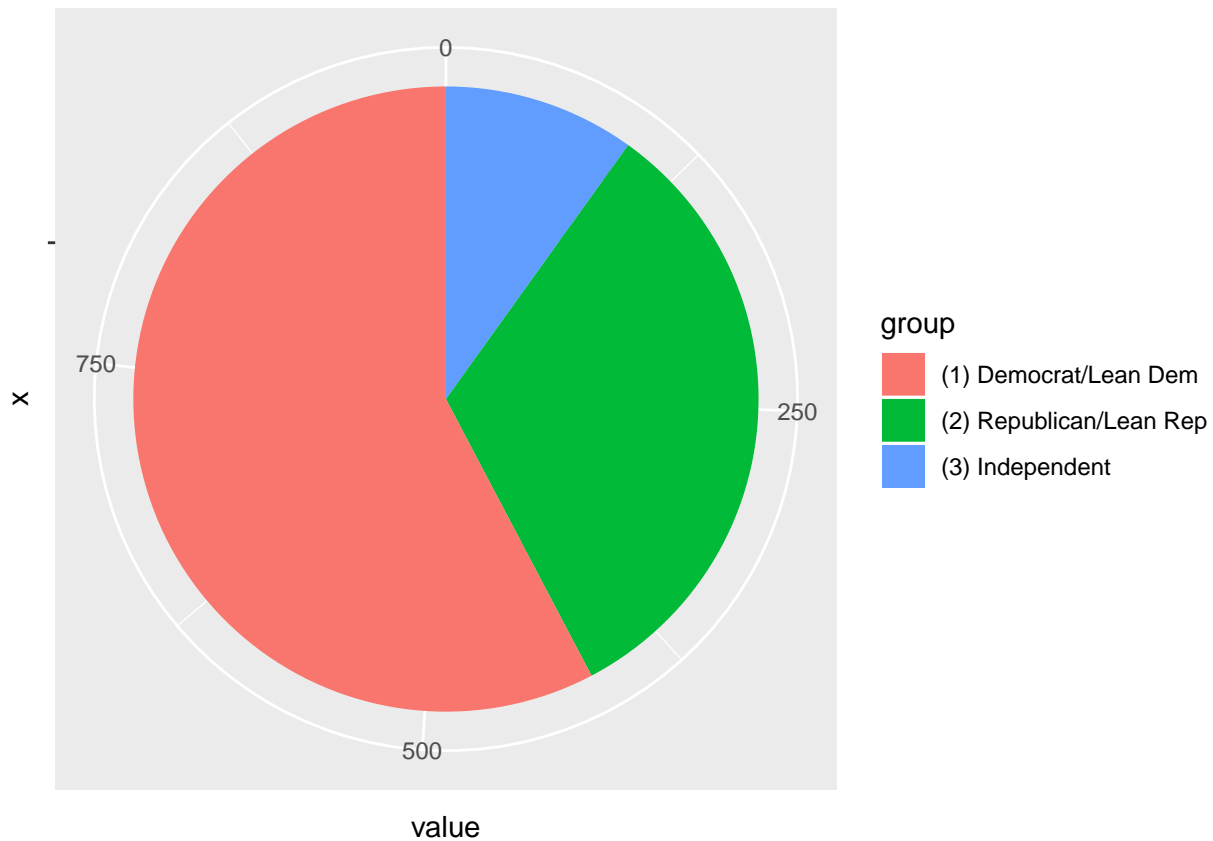
```
data <- data %>% filter(EDUC<88)
EDUC_data <- c()
for (i in 1:4){
  EDUC_data[i] <- sum(data$EDUC==i)
}
lbls <- c("(1) High school or less",
"(2) Some college/assoc. degree",
"(3) College graduate",
"(4) Postgraduate study")
df <- data.frame(
  group = lbls,
  value = EDUC_data
)
ggplot(df, aes(x="", y=value, fill=group))+ geom_bar(width = 1, stat = "identity")+ coord_polar("y", st
```



```
data <- data %>% filter(RACETH5<88)
RACE_data <- c()
for (i in 1:5){
  RACE_data[i] <- sum(data$RACETH5==i)
}
lbls <- c("(1) White",
"(2) African American or Black",
"(3) Latino or Hispanic",
"(4) Asian",
"(5) Other")
df <- data.frame(
  group = lbls,
  value = RACE_data
)
ggplot(df, aes(x="", y=value, fill=group))+ geom_bar(width = 1, stat = "identity")+ coord_polar("y", st
```

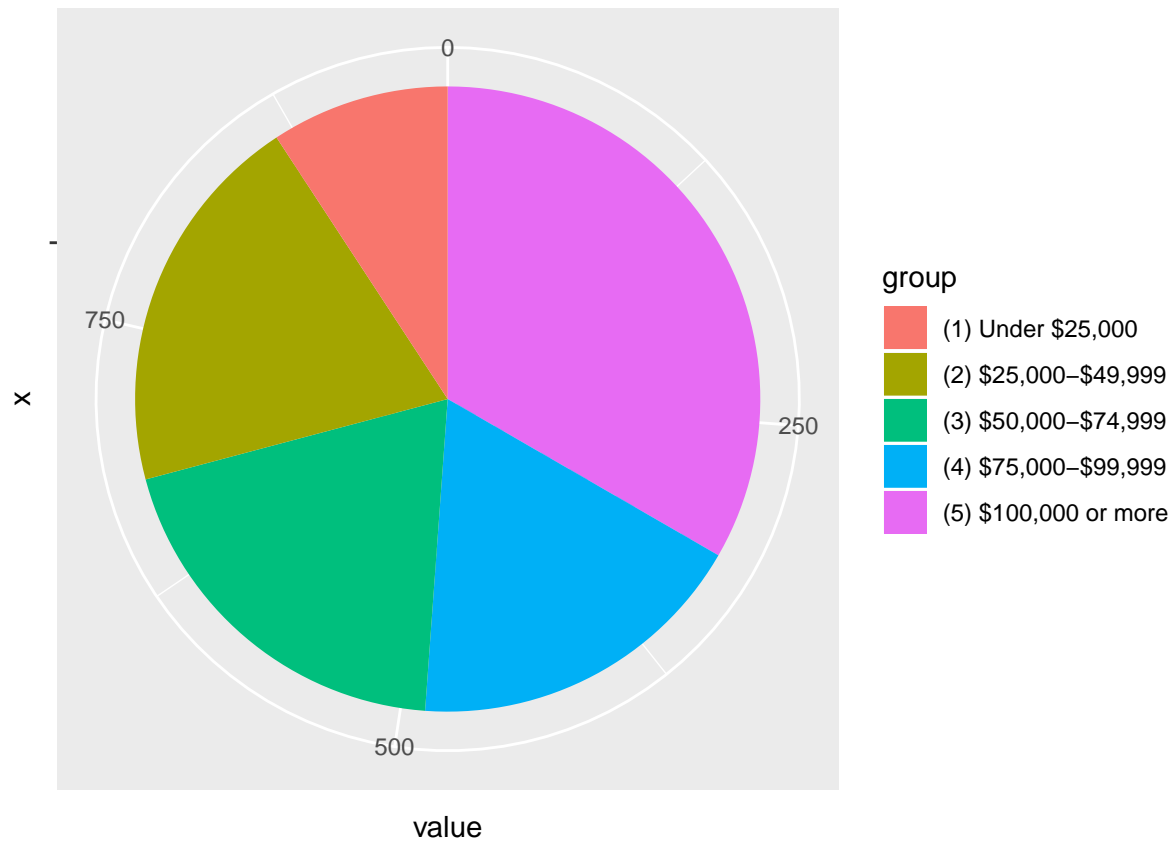


```
data <- data %>% filter(PARTY<88)
PAR_data <- c()
for (i in 1:3){
  PAR_data[i] <- sum(data$PARTY==i)
}
lbls <- c("(1) Democrat/Lean Dem", "(2) Republican/Lean Rep", "(3) Independent")
df <- data.frame(
  group = lbls,
  value = PAR_data
)
ggplot(df, aes(x="", y=value, fill=group))+ geom_bar(width = 1, stat = "identity")+ coord_polar("y", st
```

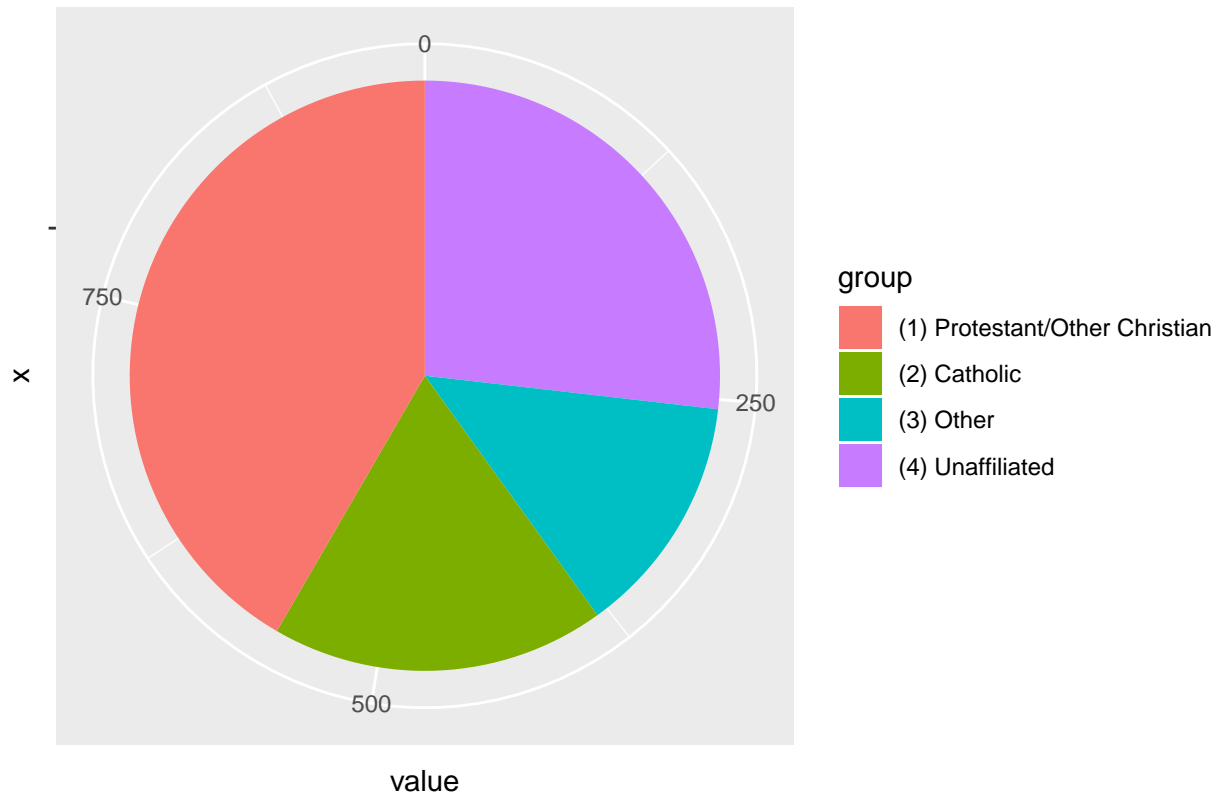


```
data <- data %>% filter(INCOME<88)
INC_data <- c()
for (i in 1:5){
  INC_data[i] <- sum(data$INCOME==i)
}
lbls <- c("(1) Under $25,000",
"(2) $25,000-$49,999",
"(3) $50,000-$74,999",
"(4) $75,000-$99,999",
"(5) $100,000 or more")
df <- data.frame(
  group = lbls,
  value = INC_data
)
ggplot(df, aes(x="", y=value, fill=group))+ geom_bar(width = 1, stat = "identity")+ coord_polar("y", st
```





```
data <- data %>% filter(RELIG<88)
REL_data <- c()
for (i in 1:4){
  REL_data[i] <- sum(data$RELIG==i)
}
lbls <- c("(1) Protestant/Other Christian",
"(2) Catholic",
"(3) Other",
"(4) Unaffiliated")
df <- data.frame(
  group = lbls,
  value = REL_data
)
ggplot(df, aes(x="", y=value, fill=group))+ geom_bar(width = 1, stat = "identity")+ coord_polar("y", st
```



```
table(data$IDEO, data$RACETH5)
```

```
##
##      1  2  3  4  5
##  1 100  6 10  1  9
##  2 199 23 17  9 16
##  3 198 31 28  9 21
##  4 149  4 15  4 11
##  5  78  3  7  0  3
```

```
table(data$IDEO, data$AGE)
```

```
##
##      1  2  3  4  5  6
##  1 15 18 25  8 32 28
##  2 23 38 36 34 70 63
##  3 19 25 53 35 97 58
##  4 16 10 20 33 66 38
##  5  6  3  9 12 29 32
```

```
table(data$IDEO, data$EDUC)
```

```
##
##      1  2  3  4
##  1 11 28 47 40
##  2 19 60 89 96
##  3 46 97 71 73
##  4 21 57 60 45
##  5 17 34 24 16
```

```
table(data$IDEO, data$INCOME)
```

```
##
##      1  2  3  4  5
##  1 13 25 26 16 46
##  2 23 49 65 46 81
##  3 32 63 43 55 94
##  4 13 32 31 35 72
##  5  7 20 22 17 25
```

```
table(data$IDEO, data$RELIG)
```

```
##
##      1  2  3  4
##  1 23 12 25 66
##  2 95 42 40 87
##  3 111 67 39 70
##  4 109 36 15 23
##  5  58 17  7  9
```

The group with the most conservative ideology is exposed to the greatest disclosure risk, across different demographic variables.

```
vcons <- data %>% filter(IDEO==5)
table(vcons$EDUC, vcons$RELIG)
```

```
##
##      1  2  3  4
##  1 11  2  0  4
##  2 21  6  4  3
##  3 15  6  2  1
##  4 11  3  1  1
```

```
table(vcons$INCOME, vcons$SEX)
```

```
##
##      1  2
##  1  4  3
##  2 12  8
##  3 13  9
##  4 12  5
##  5 17  8
```

```
table(data$PARTY, data$IDEO)
```

```
##
##      1  2  3  4  5
##  1 122 252 155 18  4
##  2  2  4  69 149 81
##  3  2  8  63 16  6
```

```
modelString <- "
model {
  ## sampling
  for (i in 1:N){
    y[i] ~ dmulti(p[i,1:C],1)
    for (c in 1:C){
      p[i,c] <- q[i,c]/sum(q[i,])
    }
  }
}
```

```

    log(q[i,c]) <- beta0[c] + beta1[c]*x[i]
  }
}
## priors
beta0[1] <- 0
beta1[1] <- 0
for (c in 2:C){
  beta0[c] ~ dnorm(0, 0.00001)
  beta1[c] ~ dnorm(0, 0.00001)
}
}
"

```

```

y = as.vector(data$IDEO)
x = as.vector(data$INCOME)
N = length(y)
C = 5

```

```

the_data <- list("y" = y,
                 "x" = x,
                 "N" = N,
                 "C" = C)

```

```

initsfunction <- function(chain){
  .RNG.seed <- c(1,2)[chain]
  .RNG.name <- c("base::Super-Duper",
                 "base::Wichmann-Hill")[chain]
  return(list(.RNG.seed=.RNG.seed,
              .RNG.name=.RNG.name))
}

```