SD_dataset

Katarzyna Otko s202872
Alvils Sture s202586

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1. A description of the dataset.

The dataset of our choice is a result of a **Speed Dating Experiment** that was conducted in years 2002 - 2004 by professors of Colombia University for their paper entitled *Gender Differences in Mate Selection: Evidence From a Speed Dating Experiment*. The goal of this two-year experiment was to discover what features and factors play the most important role during first minutes of a date. Overall, there were 21 speed dating events (waves), with participants ranging from 12 to 44 in each, which in overall sums up to 551 people. Those subjects were drawn from students in graduate and professional schools at Columbia University. Each date lasted 4 minutes.

The dataset also includes questionnaire data gathered from participants at different stages of the process. Attendees answered questions about their dating habits, self-perception, beliefs on what others may find attractive in a mate, lifestyle, demographics and many more. The process consisted of 4 steps:

- Signup (Time 1) - filling out a survey in order to register for the event
- Answering questions half way through meeting all potential dates during the night of the event
- 1st Followup (Time 2) - filling out a survey the day after participating in the event
- 2nd Followup (Time 3) - filling out a survey 3-4 weeks after participants had been sent their matches

```
library(dplyr)
library(ggplot2)
library(reshape2)
setwd('C:/Users/katin/Desktop/Folder/STUDIA/DTU/Semestr I/Intro to ML/Project I')
SD <- read.csv('Speed Dating Data.csv')


# numdim(SDber of rows and columns
dim(SD)
```

```
## [1] 8378  195
```

```
# number of women
length(unique(SD$iid[which(SD$gender == 0)])) # 274
```

```
## [1] 274
```

```
# number of men
length(unique(SD$iid[which(SD$gender == 1)])) # 277
```

```
## [1] 277
```

```
274 + 277
```

```
## [1] 551
```

```r
NAs <- sapply(SD, function(x) sum(is.na(x)))
sort(NAs[which(NAs > 0)])
```

```
##       id      pid     race   race_o  imprace imprelig     goal   go_out
##        1       10       63       73       79       79       79       79
##   sports tvsports exercise   dining  museums      art   hiking   gaming
##       79       79       79       79       79       79       79       79
## clubbing  reading       tv  theater   movies concerts    music shopping
##       79       79       79       79       79       79       79       79
##     yoga  attr1_1  sinc1_1 intel1_1  attr2_1  sinc2_1 intel2_1   fun2_1
##       79       79       79       79       79       79       79       79
## field_cd pf_o_att pf_o_sin pf_o_int   fun1_1   amb2_1  shar2_1      age
##       82       89       89       89       89       89       89       95
##     date pf_o_fun   amb1_1 exphappy    age_o  attr3_1  sinc3_1   fun3_1
##       97       98       99      101      104      105      105      105
## intel3_1   amb3_1 pf_o_amb  shar1_1 pf_o_sha career_c int_corr     attr
##      105      105      107      121      129      138      158      202
##   attr_o     like   like_o     sinc   sinc_o    intel  intel_o     prob
##      212      240      250      277      287      296      306      309
##   prob_o      fun    fun_o      met    met_o      amb    amb_o  satis_2
##      318      350      360      375      385      712      722      915
##   length  sinc1_2 intel1_2   fun1_2   amb1_2  shar1_2  attr3_2  sinc3_2
##      915      915      915      915      915      915      915      915
## intel3_2   fun3_2   amb3_2  attr1_2 numdat_2     shar   shar_o match_es
##      915      915      915      933      945     1067     1076     1173
## positin1  attr4_1  sinc4_1 intel4_1   fun4_1   amb4_1  shar4_1  attr4_2
##     1846     1889     1889     1889     1889     1889     1911     2603
##  sinc4_2 intel4_2   fun4_2   amb4_2  shar4_2  attr2_2  sinc2_2 intel2_2
##     2603     2603     2603     2603     2603     2603     2603     2603
##   fun2_2   amb2_2  shar2_2  attr5_1  sinc5_1 intel5_1   fun5_1   amb5_1
##     2603     2603     2603     3472     3472     3472     3472     3472
##  attr5_2  sinc5_2 intel5_2   fun5_2   amb5_2  attr1_s  sinc1_s intel1_s
##     4001     4001     4001     4001     4001     4282     4282     4282
##   fun1_s   amb1_s  shar1_s  attr3_s  sinc3_s intel3_s   fun3_s   amb3_s
##     4282     4282     4282     4378     4378     4378     4378     4378
## you_call them_cal   date_3  attr1_3  sinc1_3 intel1_3   fun1_3   amb1_3
##     4404     4404     4404     4404     4404     4404     4404     4404
##  shar1_3  attr3_3  sinc3_3 intel3_3   fun3_3   amb3_3  attr4_3  sinc4_3
##     4404     4404     4404     4404     4404     4404     5419     5419
## intel4_3   fun4_3   amb4_3  shar4_3  attr2_3  sinc2_3 intel2_3   fun2_3
##     5419     5419     5419     5419     5419     5419     5419     5419
##   amb2_3  attr7_3  sinc7_3 intel7_3   fun7_3   amb7_3  shar7_3  shar2_3
##     5419     6362     6362     6362     6362     6362     6362     6362
##  attr5_3  sinc5_3 intel5_3   fun5_3   amb5_3  attr7_2 intel7_2   fun7_2
##     6362     6362     6362     6362     6362     6394     6394     6394
##  shar7_2  sinc7_2   amb7_2   expnum numdat_3 num_in_3
##     6404     6423     6423     6578     6882     7710
```

```r
#filling one missing value in last id row
SD[which(is.na(SD$id)), 1:2] <- 22

# filling 10 missing values in pid columns
SD[which(is.na(SD$pid)), 1:15] # partner's id - 7
```

```
##      iid id gender idg condtn wave round position positin1 order partner pid
```

```
## 1756 122  1      1   2      1    5    10        4       NA     6       7  NA
## 1766 123  2      1   4      1    5    10        4       NA    10       7  NA
## 1776 124  3      1   6      1    5    10        4       NA     3       7  NA
## 1786 125  4      1   8      1    5    10        4       NA     8       7  NA
## 1796 126  5      1  10      1    5    10        4       NA     1       7  NA
## 1806 127  6      1  12      1    5    10        4       NA     7       7  NA
## 1816 128  7      1  14      1    5    10        4       NA     9       7  NA
## 1826 129  8      1  15      1    5    10        4       NA     5       7  NA
## 1836 130  9      1  16      1    5    10        4       NA     2       7  NA
## 1846 131 10      1  18      1    5    10        4       NA     4       7  NA
##      match int_corr samerace
## 1756     0    -0.12        0
## 1766     0    -0.29        0
## 1776     0    -0.05        0
## 1786     0     0.15        0
## 1796     0     0.01        0
## 1806     0     0.38        0
## 1816     0    -0.05        0
## 1826     0     0.09        0
## 1836     0    -0.40        0
## 1846     0    -0.14        0
```

```
SD[which(SD$id == 7 & SD$wave == 5), 1:2] # we have to fill these 10 NAs with 128
```

```
##      iid id
## 1807 128  7
## 1808 128  7
## 1809 128  7
## 1810 128  7
## 1811 128  7
## 1812 128  7
## 1813 128  7
## 1814 128  7
## 1815 128  7
## 1816 128  7
```

```
SD[which(is.na(SD$pid)), 'pid'] <- 128

# adding one column with explanation for race column (matching index with race names)
race_idx <- unique(SD$race)
race_val <- c('Asian', 'European', 'Other', 'Latino', 'Black', NA)
SD$race_explained <- race_val[match(SD$race, race_idx)]

# adding one column with explanation for field_cd column (matching index with race names)
# DISCUSS WITH ALVILS IMPUTING DATA INTO field_cd as 9 (because field is Operations Research)
field_idx <- c(1:18, NA)
field_val <- c('Law', 'Math', 'Social Science, Psychologist', 'Medical Science/Pharmaceuticals/Bio Tech
               'Engineering', 'English/Creative Writing/ Journalism', 'History/Religion/Philosophy',
              'Business/Econ/Finance', 'Education, Academia', 'Biological Sciences/Chemistry/Physics',
              'Social Work', 'Undergrad/undecided', 'Political Science/International Affairs',
              'Film', 'Fine Arts/Arts Administration', 'Languages', 'Architecture', 'Other', 'Other')
SD$field_explained <- field_val[match(SD$field_cd, field_idx)]
```

```r
#sum(is.na(field_df$field_cd))

# converting income from string to numeric
SD$income <- as.numeric(gsub(',', "", SD$income, fixed = T))

sum(is.na(SD$income))
```

```
## [1] 4099
```

```r
unique(SD$field_cd)
```

```
##  [1]  1  2 13  8  5  9  3 11 NA 12  4  7  6 10 14 16 15 17 18
```

```r
summary(SD[SD$wave >= 6 & SD$wave <= 9,129:134])
```

```
##     attr1_2         sinc1_2         intel1_2         fun1_2
##  Min.   :10.00   Min.   : 5.00   Min.   :13.95   Min.   :11.11
##  1st Qu.:15.38   1st Qu.:16.07   1st Qu.:17.39   1st Qu.:15.69
##  Median :16.67   Median :17.65   Median :18.52   Median :17.78
##  Mean   :17.45   Mean   :17.36   Mean   :18.79   Mean   :17.34
##  3rd Qu.:19.05   3rd Qu.:19.15   3rd Qu.:20.00   3rd Qu.:18.75
##  Max.   :26.32   Max.   :23.81   Max.   :25.00   Max.   :25.00
##  NA's   :164     NA's   :164     NA's   :164     NA's   :164
##      amb1_2         shar1_2
##  Min.   : 2.50   Min.   : 4.76
##  1st Qu.:12.77   1st Qu.:12.96
##  Median :15.38   Median :14.58
##  Mean   :14.65   Mean   :14.40
##  3rd Qu.:16.67   3rd Qu.:16.67
##  Max.   :22.22   Max.   :22.50
##  NA's   :164     NA's   :164
```

```r
# Waves 6 - 9:
# attr4_1 - shar4_1 have values between 0 and 10
# attr2_1 - shar2_1 OK
# attr1_2 - shar1_2 OK
```

```r
# Age analysis
sum(is.na(SD$age))
```

```
## [1] 95
```

```r
SD[is.na(SD$age), 1:10]
```

```
##      iid id gender idg condtn wave round position positin1 order
## 829   58  3      0   5      1    3    10        7       NA     9
## 830   58  3      0   5      1    3    10        7       NA     5
## 831   58  3      0   5      1    3    10        7       NA    10
## 832   58  3      0   5      1    3    10        7       NA     1
## 833   58  3      0   5      1    3    10        7       NA     6
## 834   58  3      0   5      1    3    10        7       NA     4
## 835   58  3      0   5      1    3    10        7       NA     3
## 836   58  3      0   5      1    3    10        7       NA     7
## 837   58  3      0   5      1    3    10        7       NA     2
## 838   58  3      0   5      1    3    10        7       NA     8
## 839   59  4      0   7      1    3    10        8       NA    10
## 840   59  4      0   7      1    3    10        8       NA     6
```

```
## 841   59  4      0   7      1    3    10         8        NA     1
## 842   59  4      0   7      1    3    10         8        NA     2
## 843   59  4      0   7      1    3    10         8        NA     7
## 844   59  4      0   7      1    3    10         8        NA     5
## 845   59  4      0   7      1    3    10         8        NA     4
## 846   59  4      0   7      1    3    10         8        NA     8
## 847   59  4      0   7      1    3    10         8        NA     3
## 848   59  4      0   7      1    3    10         8        NA     9
## 1817 129  8      1  15      1    5    10         6        NA     7
## 1818 129  8      1  15      1    5    10         9        NA    10
## 1819 129  8      1  15      1    5    10         7        NA     8
## 1820 129  8      1  15      1    5    10         1        NA     2
## 1821 129  8      1  15      1    5    10         8        NA     9
## 1822 129  8      1  15      1    5    10         2        NA     3
## 1823 129  8      1  15      1    5    10         5        NA     6
## 1824 129  8      1  15      1    5    10         3        NA     4
## 1825 129  8      1  15      1    5    10        10        NA     1
## 1826 129  8      1  15      1    5    10         4        NA     5
## 1867 136  6      0   8      1    6     5         5         5     3
## 1868 136  6      0   8      1    6     5         5         5     5
## 1869 136  6      0   8      1    6     5         5         5     1
## 1870 136  6      0   8      1    6     5         5         5     2
## 1871 136  6      0   8      1    6     5         5         5     4
## 5005 339  8      1  16      1   13    10         1         1     1
## 5006 339  8      1  16      1   13    10         5         5     5
## 5007 339  8      1  16      1   13    10         4         4     4
## 5008 339  8      1  16      1   13    10         6         6     6
## 5009 339  8      1  16      1   13    10         3         3     3
## 5010 339  8      1  16      1   13    10         9         9     9
## 5011 339  8      1  16      1   13    10         2         2     2
## 5012 339  8      1  16      1   13    10        10        10    10
## 5013 339  8      1  16      1   13    10         7         7     7
## 5014 339  8      1  16      1   13    10         8         8     8
## 5015 340  9      1  18      1   13    10         1         1     9
## 5016 340  9      1  18      1   13    10         5         5     3
## 5017 340  9      1  18      1   13    10         4         4     2
## 5018 340  9      1  18      1   13    10         6         6     4
## 5019 340  9      1  18      1   13    10         3         3     1
## 5020 340  9      1  18      1   13    10         9         9     7
## 5021 340  9      1  18      1   13    10         2         2    10
## 5022 340  9      1  18      1   13    10        10        10     8
## 5023 340  9      1  18      1   13    10         7         7     5
## 5024 340  9      1  18      1   13    10         8         8     6
## 5115 346  6      0  11      2   14    18        10        10     7
## 5116 346  6      0  11      2   14    18        10        10     1
## 5117 346  6      0  11      2   14    18        10        10    16
## 5118 346  6      0  11      2   14    18        10        10    18
## 5119 346  6      0  11      2   14    18        10        10    14
## 5120 346  6      0  11      2   14    18        10        10    17
## 5121 346  6      0  11      2   14    18        10        10    10
## 5122 346  6      0  11      2   14    18        10        10     8
## 5123 346  6      0  11      2   14    18        10        10    12
## 5124 346  6      0  11      2   14    18        10        10     6
## 5125 346  6      0  11      2   14    18        10        10     9
```

```
## 5126 346  6      0  11      2   14    18       10       10     4
## 5127 346  6      0  11      2   14    18       10       10     5
## 5128 346  6      0  11      2   14    18       10       10    15
## 5129 346  6      0  11      2   14    18       10       10    11
## 5130 346  6      0  11      2   14    18       10       10    13
## 5131 346  6      0  11      2   14    18       10       10     2
## 5132 346  6      0  11      2   14    18       10       10     3
## 7477 512  4      0   7      2   21    22        7        7    16
## 7478 512  4      0   7      2   21    22        7        7    13
## 7479 512  4      0   7      2   21    22        7        7     6
## 7480 512  4      0   7      2   21    22        7        7    15
## 7481 512  4      0   7      2   21    22        7        7    12
## 7482 512  4      0   7      2   21    22        7        7     5
## 7483 512  4      0   7      2   21    22        7        7    17
## 7484 512  4      0   7      2   21    22        7        7    22
## 7485 512  4      0   7      2   21    22        7        7     4
## 7486 512  4      0   7      2   21    22        7        7    19
## 7487 512  4      0   7      2   21    22        7        7     7
## 7488 512  4      0   7      2   21    22        7        7     2
## 7489 512  4      0   7      2   21    22        7        7    18
## 7490 512  4      0   7      2   21    22        7        7     3
## 7491 512  4      0   7      2   21    22        7        7    11
## 7492 512  4      0   7      2   21    22        7        7     8
## 7493 512  4      0   7      2   21    22        7        7    14
## 7494 512  4      0   7      2   21    22        7        7    21
## 7495 512  4      0   7      2   21    22        7        7     1
## 7496 512  4      0   7      2   21    22        7        7    10
## 7497 512  4      0   7      2   21    22        7        7     9
## 7498 512  4      0   7      2   21    22        7        7    20
```

```
age_df <- subset(SD, !duplicated(SD[,1])) %>%
  filter(!is.na(age)) %>%
  group_by(wave, gender) %>%
  summarize(Average_age = mean(age))
```

```
## `summarise()` regrouping output by 'wave' (override with `.groups` argument)
```

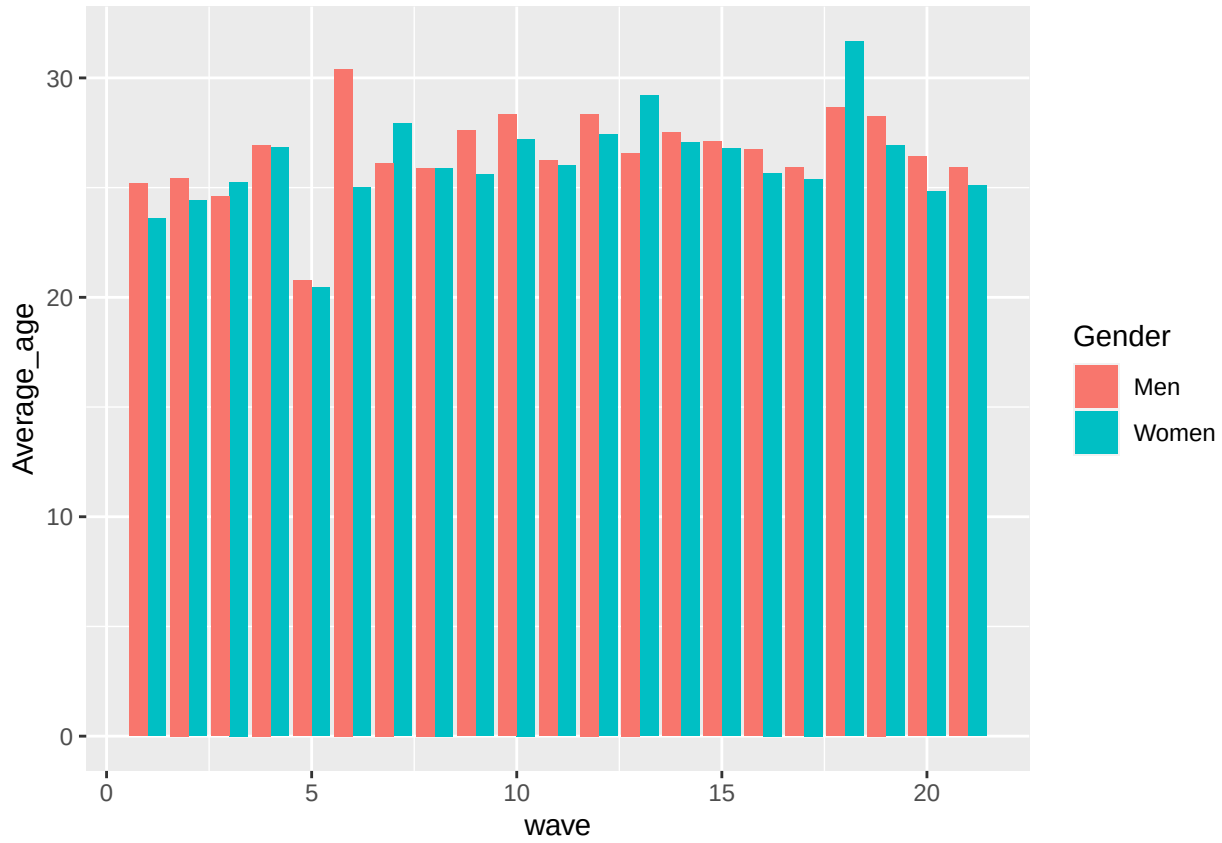
```
SD %>% nrow()
```

```
## [1] 8378
```

```
nrow(SD)
```

```
## [1] 8378
```

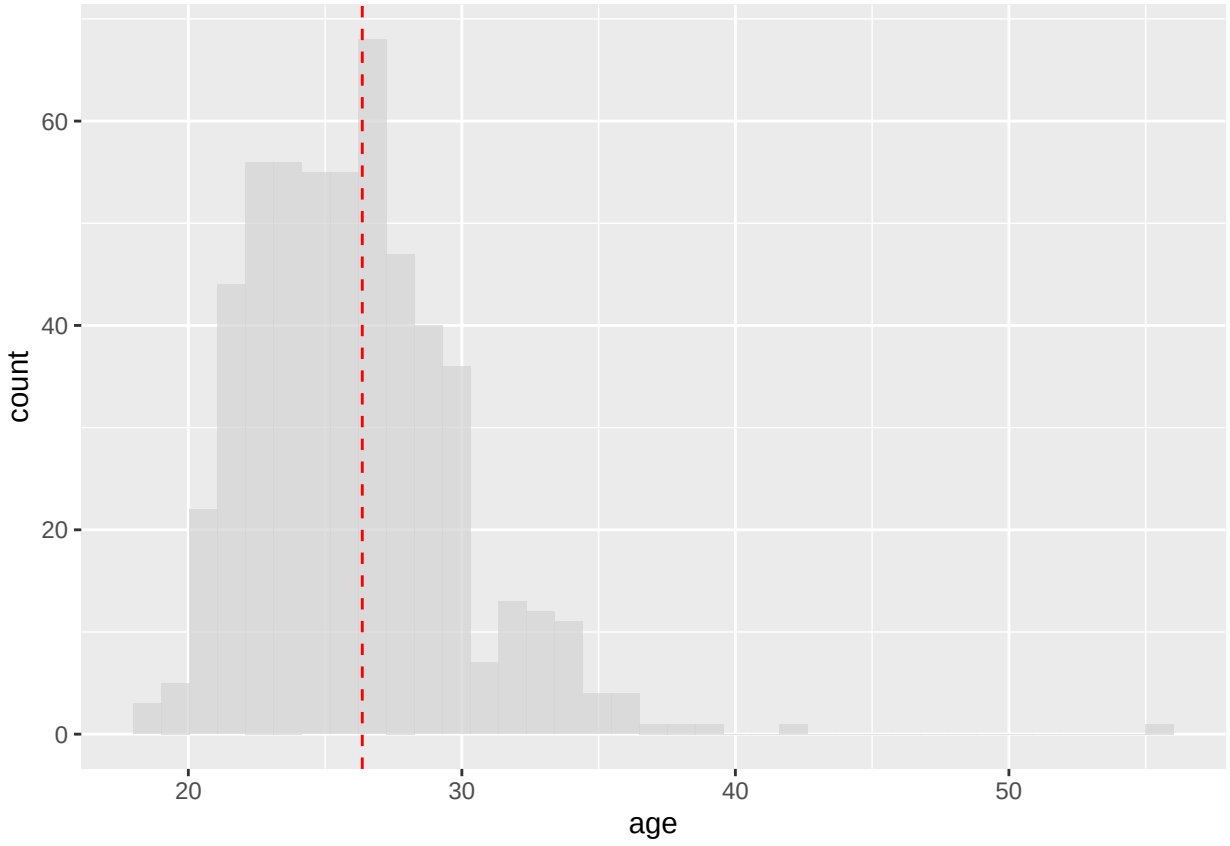
```
age_df$gender <- ifelse(age_df$gender == 0, 'Women', 'Men')

# Mean age per wave
age_df %>% ggplot(aes(x = wave, y = Average_age, fill = gender)) +
  geom_bar(stat = 'identity', position = 'dodge') +
  scale_fill_discrete(name = "Gender")
```




```
age_df <- subset(SD, !duplicated(SD$iid), select = c(iid, gender, age)) %>%
  filter(!is.na(age)) %>%
  mutate(mean = mean(age))
age_df$gender <- ifelse(age_df$gender == 0, 'Women', 'Men')

# Histogram of age
max(unique(age_df$age)) - min(unique(age_df$age)) # number of bins
```

```
## [1] 37
```

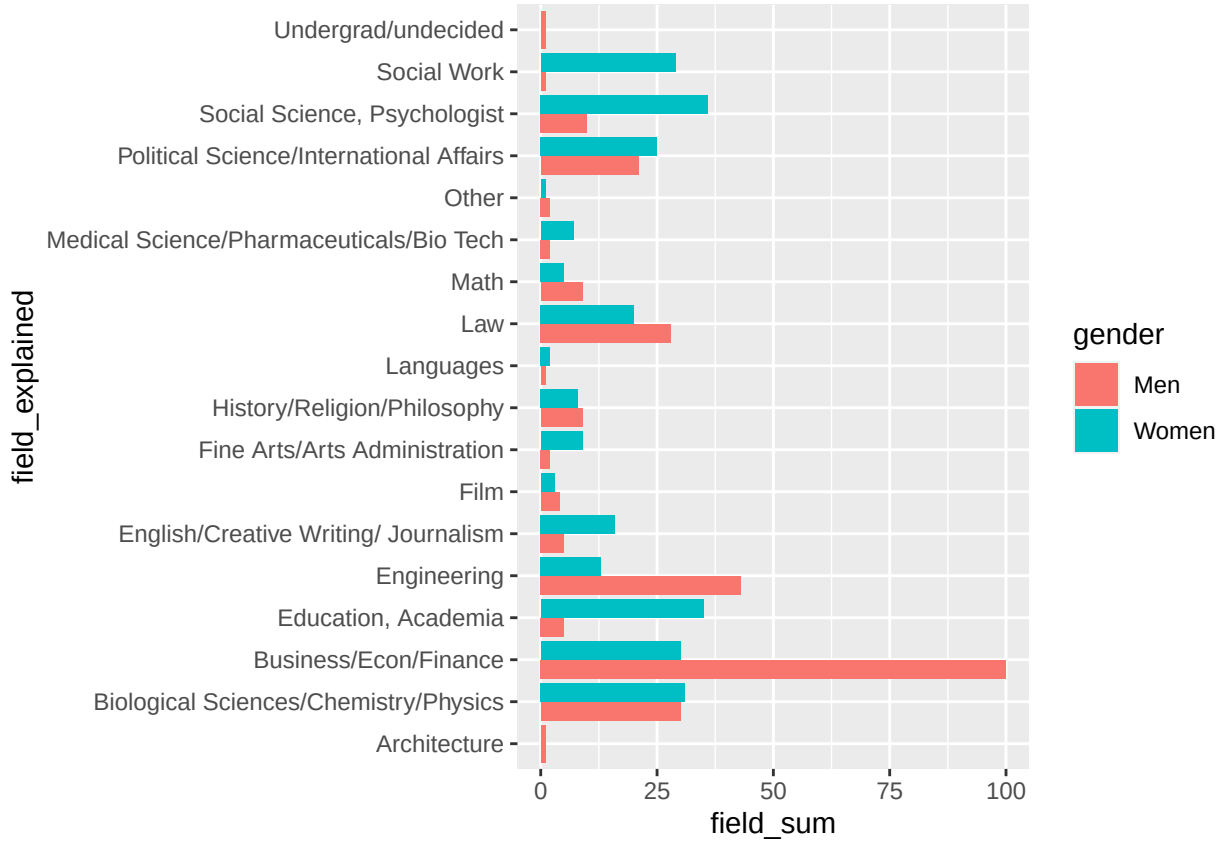
```
age_df %>% ggplot(aes(x = age)) +
  geom_histogram(bins = 37, fill = 'lightgrey', position = 'identity', alpha = .7) +
  geom_vline(aes(xintercept = mean), col = 'red', linetype = 'dashed')
```



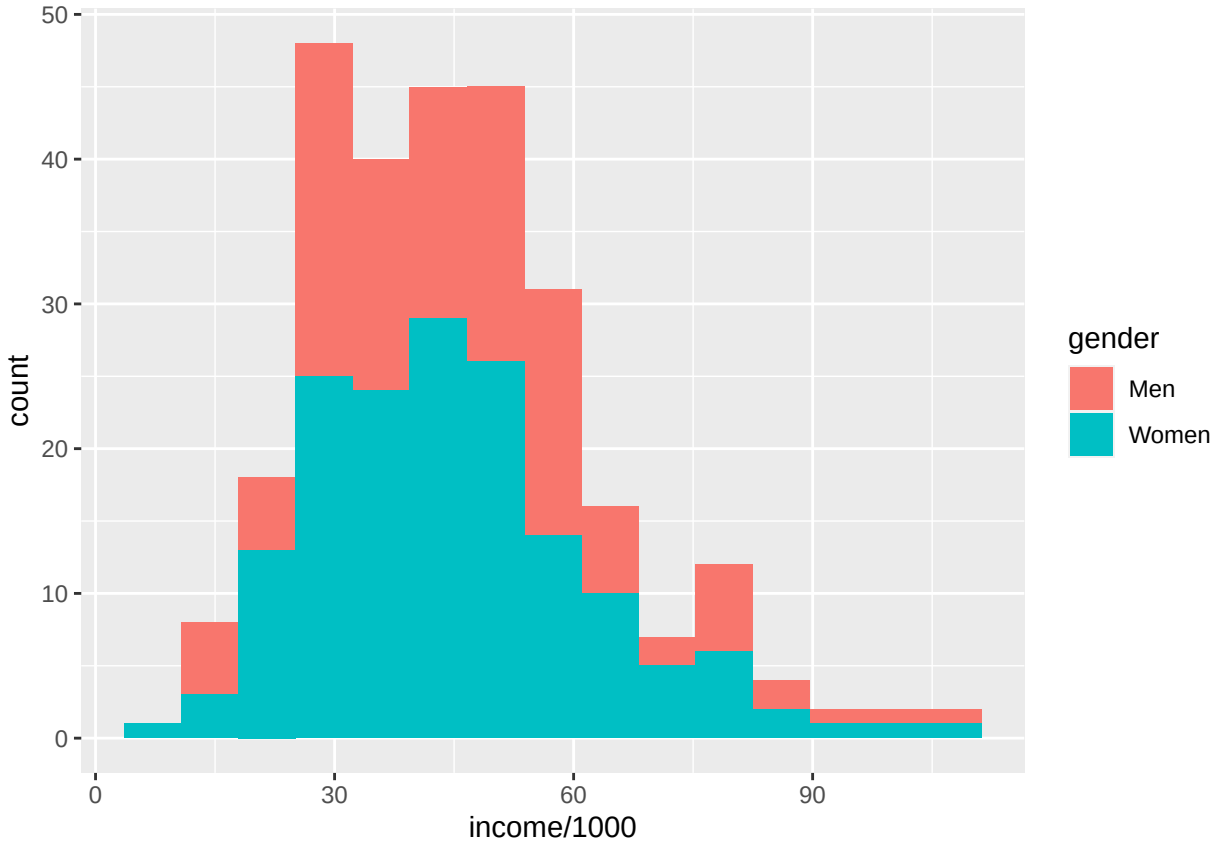

```
# Field analysis
field_df <- subset(SD, !duplicated(SD$iid)) %>%
  filter(!is.na(field_cd)) %>%
  group_by(field_explained, gender) %>%
  summarize(field_sum = n())
```

```
## `summarise()` regrouping output by 'field_explained' (override with `.groups` argument)
```

```
field_df$gender <- ifelse(field_df$gender == 0, 'Women', 'Men')

field_df %>% ggplot(aes(x = field_explained, y = field_sum, fill = gender)) +
  geom_bar(stat = 'identity', position = 'dodge') +
  coord_flip()
```



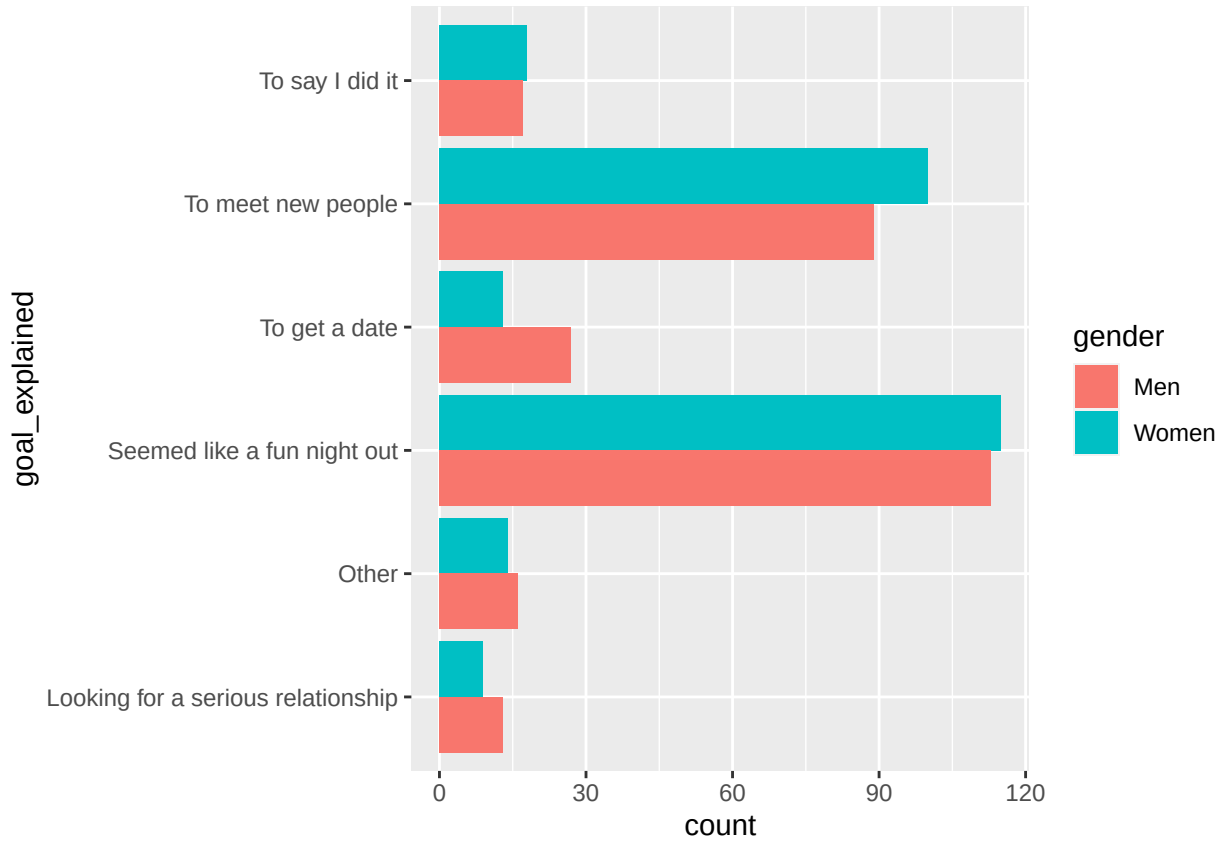

```r
# Income
income_df <- subset(SD, !duplicated(SD$iid)) %>%
  filter(!is.na(income))

income_df$gender <- ifelse(income_df$gender == 0, 'Women', 'Men')

income_df %>% ggplot(aes(x = income/1000, fill = gender)) +
  geom_histogram(bins = 15)
```




```
# Purpose
goal_df <- subset(SD, !duplicated(SD$iid)) %>%
  filter(!is.na(goal)) %>%
  group_by(goal, gender) %>%
  summarise(count = n())
```

```
## `summarise()` regrouping output by 'goal' (override with `.groups` argument)
```

```
goal_df$gender <- ifelse(goal_df$gender == 0, 'Women', 'Men')

goal_idx <- unique(goal_df$goal)
goal_val <- c('Seemed like a fun night out', 'To meet new people', 'To get a date',
              'Looking for a serious relationship', 'To say I did it',  'Other')
goal_df$goal_explained <- goal_val[match(goal_df$goal, goal_idx)]

goal_df %>% ggplot(aes(x = goal_explained, y = count, fill = gender)) +
  geom_bar(stat = 'identity', position = 'dodge') +
  coord_flip()
```




```
# Importance of features for men/women
```