Homework 3

Georgie Moore

26/11/2021

Population and sample (10 points) In this homework we will start to explore the relationship between left-right ideology and demographics. The specific population that we are interested in are voting age citizens in Austria. Please manipulate the ESS 2018 dataset such that the sample you are using to compute statistics are useful for generating predictions about the population. Save the new data. How many observations do you have?

```
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(dbplyr)
```

```
##
## Attaching package: 'dbplyr'

## The following objects are masked from 'package:dplyr':
##
##     ident, sql
```

```
library(dtplyr)
library(tinytex)
library(haven)
```

```
# Followed tutorial from ROpenSci by Jorge Cimentada.
```

```
library(essurvey)
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.1 --
## v ggplot2 3.3.3     v purrr   0.3.4
## v tibble  3.1.0     v stringr 1.4.0
## v tidyr   1.1.3     v forcats 0.5.1
## v readr   1.4.0
```

```
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dbplyr::ident() masks dplyr::ident()
## x dplyr::lag()    masks stats::lag()
## x dbplyr::sql()   masks dplyr::sql()
```

```
set_email("a12016033@unet.univie.ac.at")
```

```
# Most of the questions in the ESS use likert-type scales which means that the possible answers to any
show_countries()
```

```
##  [1] "Albania"            "Austria"            "Belgium"
##  [4] "Bulgaria"           "Croatia"            "Cyprus"
##  [7] "Czechia"            "Denmark"            "Estonia"
## [10] "Finland"            "France"             "Germany"
## [13] "Greece"             "Hungary"            "Iceland"
## [16] "Ireland"            "Israel"             "Italy"
## [19] "Kosovo"             "Latvia"             "Lithuania"
## [22] "Luxembourg"         "Montenegro"         "Netherlands"
## [25] "Norway"             "Poland"             "Portugal"
## [28] "Romania"            "Russian Federation" "Serbia"
## [31] "Slovakia"           "Slovenia"           "Spain"
## [34] "Sweden"             "Switzerland"        "Turkey"
## [37] "Ukraine"            "United Kingdom"
```

```
au_runds <- show_country_rounds("Austria")
au_runds
```

```
## [1] 1 2 3 4 5 7 8 9
```

```
library(foreign)
```

```
# POPULATION AND SAMPLE (10 POINTS)

# Manipulate the ESS 2018 dataset such that the sample is useful for generating predictions about the p

# Using this information, demonstrate specific rounds with import_country.

austria <-
  import_country(
    country = "Austria",
    rounds = 1:5
  )
```

```
## Downloading ESS1
##   |                                                                          |
```

```
## Downloading ESS2
```

```
##   |                                                                          |
```

```
## Downloading ESS3
```

```
##   |                                                                          |
```

```
## Downloading ESS4
```

```
##   |                                                                          |
```

```
## Downloading ESS5
```

```
##   |                                                                          |
```

```
# Error message: ESS round 6 not available for Austria

# Then avoiding round 6 try loading from 7 until 9.

austria <-
  import_country(
    country = "Austria",
    rounds = 7:9
  )
```

```
## Downloading ESS7
```

```
##   |                                                                          |
```

```
## Downloading ESS8
```

```
##   |                                                                          |
```

```
## Downloading ESS9
```

```
##   |                                                                          |
```

```
## Warning: Round 8 for Austria was read with the ‘foreign‘ package rather than with  the ‘haven‘ packag
##  Please report any issues at https://github.com/ropensci/essurvey/issues
```

```
## Warning: Round 9 for Austria was read with the ‘foreign‘ package rather than with  the ‘haven‘ packag
##  Please report any issues at https://github.com/ropensci/essurvey/issues
```

```
# Another way to produce the same result would be to download all rounds for a country automatically.

import_all_cntrounds("Austria")
```

```
## Downloading ESS1

##   |                                                                              |

## Downloading ESS2

##   |                                                                              |

## Downloading ESS3

##   |                                                                              |

## Downloading ESS4

##   |                                                                              |

## Downloading ESS5

##   |                                                                              |
##  8 ESS1e06_6        1 6.6     01.12.2018 AT       10 3 [Mor~     2 [0,5~ 4 [Mor~
##  9 ESS1e06_6        1 6.6     01.12.2018 AT       12 2 [0,5~     2 [0,5~ 1 [Les~
## 10 ESS1e06_6        1 6.6     01.12.2018 AT       14 7 [Mor~     3 [Mor~ 0 [No ~
## # ... with 2,247 more rows, and 557 more variables: rdpol <dbl+lbl>,
## #   nwsptot <dbl+lbl>, nwsppol <dbl+lbl>, netuse <dbl+lbl>, ppltrst <dbl+lbl>,
## #   pplfair <dbl+lbl>, pplhlp <dbl+lbl>, polintr <dbl+lbl>, polcmpl <dbl+lbl>,
## #   polactiv <dbl+lbl>, poldcs <dbl+lbl>, pltcare <dbl+lbl>, pltinvt <dbl+lbl>,
## #   trstprl <dbl+lbl>, trstlgl <dbl+lbl>, trstplc <dbl+lbl>, trstplt <dbl+lbl>,
## #   trstep <dbl+lbl>, trstun <dbl+lbl>, vote <dbl+lbl>, prtvtat <dbl+lbl>,
## #   prtvtbe <dbl+lbl>, prtvtch <dbl+lbl>, prtvtcz <dbl+lbl>, ...
##
## [[2]]
## # A tibble: 2,256 x 604
##    name      essround edition proddate    idno cntry     tvtot    tvpol    rdtot
##    <chr>        <dbl> <chr>   <chr>      <dbl> <chr> <dbl+lbl> <dbl+lb> <dbl+lb>
##  1 ESS2e03_6        2 3.6     01.12.2018     1 AT    3 [More ~ 2 [0,5 ~ 0 [No t~
##  2 ESS2e03_6        2 3.6     01.12.2018     2 AT    7 [More ~ 2 [0,5 ~ 3 [More~
##  3 ESS2e03_6        2 3.6     01.12.2018     3 AT    6 [More ~ 2 [0,5 ~ 1 [Less~
##  4 ESS2e03_6        2 3.6     01.12.2018     5 AT    3 [More ~ 1 [Less~ 2 [0,5 ~
##  5 ESS2e03_6        2 3.6     01.12.2018     7 AT    2 [0,5 h~ 1 [Less~ 1 [Less~
##  6 ESS2e03_6        2 3.6     01.12.2018     8 AT    2 [0,5 h~ 1 [Less~ 0 [No t~
##  7 ESS2e03_6        2 3.6     01.12.2018     9 AT    7 [More ~ 1 [Less~ 0 [No t~
##  8 ESS2e03_6        2 3.6     01.12.2018    13 AT    1 [Less ~ 1 [Less~ 7 [More~
##  9 ESS2e03_6        2 3.6     01.12.2018    18 AT    7 [More ~ 2 [0,5 ~ 7 [More~
## 10 ESS2e03_6        2 3.6     01.12.2018    20 AT    4 [More ~ 0 [No t~ 7 [More~
## # ... with 2,246 more rows, and 595 more variables: rdpol <dbl+lbl>,
## #   nwsptot <dbl+lbl>, nwsppol <dbl+lbl>, netuse <dbl+lbl>, ppltrst <dbl+lbl>,
## #   pplfair <dbl+lbl>, pplhlp <dbl+lbl>, polintr <dbl+lbl>, polcmpl <dbl+lbl>,
## #   poldcs <dbl+lbl>, trstprl <dbl+lbl>, trstlgl <dbl+lbl>, trstplc <dbl+lbl>,
## #   trstplt <dbl+lbl>, trstprt <dbl+lbl>, trstep <dbl+lbl>, trstun <dbl+lbl>,
## #   vote <dbl+lbl>, prtvtat <dbl+lbl>, prtvtabe <dbl+lbl>, prtvtch <dbl+lbl>,
## #   prtvtcz <dbl+lbl>, prtvade1 <dbl+lbl>, prtvade2 <dbl+lbl>, ...
##
## [[3]]
## # A tibble: 2,405 x 519
##    name      essround edition proddate    idno cntry     tvtot    tvpol    rdtot
##    <chr>        <dbl> <chr>   <chr>      <dbl> <chr> <dbl+lbl> <dbl+lb> <dbl+lb>
##  1 ESS3e03_7        3 3.7     01.12.2018     3 AT    5 [More ~ 1 [Less~ 7 [More~
##  2 ESS3e03_7        3 3.7     01.12.2018     6 AT    3 [More ~ 1 [Less~ 2 [0,5 ~
##  3 ESS3e03_7        3 3.7     01.12.2018     8 AT    1 [Less ~ 1 [Less~ 7 [More~
##  4 ESS3e03_7        3 3.7     01.12.2018     9 AT    4 [More ~ 1 [Less~ 7 [More~
##  5 ESS3e03_7        3 3.7     01.12.2018    11 AT    6 [More ~ 2 [0,5 ~ 6 [More~
##  6 ESS3e03_7        3 3.7     01.12.2018    12 AT    7 [More ~ 2 [0,5 ~ 7 [More~
##  7 ESS3e03_7        3 3.7     01.12.2018    14 AT    1 [Less ~ 1 [Less~ 7 [More~
##  8 ESS3e03_7        3 3.7     01.12.2018    15 AT    7 [More ~ 2 [0,5 ~ 3 [More~
##  9 ESS3e03_7        3 3.7     01.12.2018    17 AT    3 [More ~ 1 [Less~ 7 [More~
## 10 ESS3e03_7        3 3.7     01.12.2018    18 AT    7 [More ~ 3 [More~ 0 [No t~
## # ... with 2,395 more rows, and 510 more variables: rdpol <dbl+lbl>,
## #   nwsptot <dbl+lbl>, nwsppol <dbl+lbl>, netuse <dbl+lbl>, ppltrst <dbl+lbl>,
## #   pplfair <dbl+lbl>, pplhlp <dbl+lbl>, polintr <dbl+lbl>, polcmpl <dbl+lbl>,
## #   poldcs <dbl+lbl>, trstprl <dbl+lbl>, trstlgl <dbl+lbl>, trstplc <dbl+lbl>,
## #   trstplt <dbl+lbl>, trstprt <dbl+lbl>, trstep <dbl+lbl>, trstun <dbl+lbl>,
## #   vote <dbl+lbl>, prtvtaat <dbl+lbl>, prtvtabe <dbl+lbl>, prtvtbg <dbl+lbl>,
## #   prtvtach <dbl+lbl>, prtvtcy <dbl+lbl>, prtvbde1 <dbl+lbl>, ...
```

```
##
## [[4]]
## # A tibble: 2,255 x 673
##    name        essround edition proddate  idno cntry   tvtot       tvpol   rdtot
##    <chr>           <dbl> <chr>   <chr>    <dbl> <chr> <dbl+l>   <dbl+lbl> <dbl+l>
##  1 ESS4ATe01_3        4 1.3     01.12.2~     2 AT    2 [0,5~     1 [Les~ 2 [0,5~
##  2 ESS4ATe01_3        4 1.3     01.12.2~     3 AT    7 [Mor~     1 [Les~ 4 [Mor~
##  3 ESS4ATe01_3        4 1.3     01.12.2~     5 AT    6 [Mor~     1 [Les~ 7 [Mor~
##  4 ESS4ATe01_3        4 1.3     01.12.2~     9 AT    0 [No ~ NA(a) [Not~ 2 [0,5~
##  5 ESS4ATe01_3        4 1.3     01.12.2~    12 AT    2 [0,5~     1 [Les~ 5 [Mor~
##  6 ESS4ATe01_3        4 1.3     01.12.2~    15 AT    6 [Mor~     2 [0,5~ 2 [0,5~
##  7 ESS4ATe01_3        4 1.3     01.12.2~    17 AT    7 [Mor~     5 [Mor~ 2 [0,5~
##  8 ESS4ATe01_3        4 1.3     01.12.2~    18 AT    5 [Mor~     2 [0,5~ 5 [Mor~
##  9 ESS4ATe01_3        4 1.3     01.12.2~    20 AT    7 [Mor~     2 [0,5~ 5 [Mor~
## 10 ESS4ATe01_3        4 1.3     01.12.2~    23 AT    3 [Mor~     2 [0,5~ 0 [No ~
## # ... with 2,245 more rows, and 664 more variables: rdpol <dbl+lbl>,
## #   nwsptot <dbl+lbl>, nwsppol <dbl+lbl>, netuse <dbl+lbl>, ppltrst <dbl+lbl>,
## #   pplfair <dbl+lbl>, pplhlp <dbl+lbl>, polintr <dbl+lbl>, polcmpl <dbl+lbl>,
## #   poldcs <dbl+lbl>, trstprl <dbl+lbl>, trstlgl <dbl+lbl>, trstplc <dbl+lbl>,
## #   trstplt <dbl+lbl>, trstprt <dbl+lbl>, trstep <dbl+lbl>, trstun <dbl+lbl>,
## #   vote <dbl+lbl>, prtvtaat <dbl+lbl>, prtvtbbe <dbl+lbl>, prtvtabg <dbl+lbl>,
## #   prtvtbch <dbl+lbl>, prtvtcy <dbl+lbl>, prtvtacz <dbl+lbl>, ...
##
## [[5]]
## # A tibble: 2,259 x 686
##    name   essround edition proddate  idno cntry   tvtot   tvpol   rdtot    rdpol
##    <chr>     <dbl> <chr>   <chr>    <dbl> <chr> <dbl+l> <dbl+l> <dbl+l> <dbl+lb>
##  1 ESS5A~        5 1.1     09.02.2~     1 AT    4 [Mor~ 2 [0,5~ 3 [Mor~  0 [No ~
##  2 ESS5A~        5 1.1     09.02.2~     4 AT    3 [Mor~ 1 [Les~ 3 [Mor~  0 [No ~
##  3 ESS5A~        5 1.1     09.02.2~     5 AT    6 [Mor~ 3 [Mor~ 0 [No ~ 66 [Not~
##  4 ESS5A~        5 1.1     09.02.2~     7 AT    4 [Mor~ 0 [No ~ 3 [Mor~  0 [No ~
##  5 ESS5A~        5 1.1     09.02.2~     8 AT    5 [Mor~ 0 [No ~ 4 [Mor~  0 [No ~
##  6 ESS5A~        5 1.1     09.02.2~    10 AT    4 [Mor~ 1 [Les~ 3 [Mor~  1 [Les~
##  7 ESS5A~        5 1.1     09.02.2~    11 AT    1 [Les~ 1 [Les~ 1 [Les~  1 [Les~
##  8 ESS5A~        5 1.1     09.02.2~    13 AT    5 [Mor~ 2 [0,5~ 4 [Mor~  1 [Les~
##  9 ESS5A~        5 1.1     09.02.2~    14 AT    5 [Mor~ 2 [0,5~ 2 [0,5~  1 [Les~
## 10 ESS5A~        5 1.1     09.02.2~    16 AT    1 [Les~ 1 [Les~ 2 [0,5~  1 [Les~
## # ... with 2,249 more rows, and 676 more variables: nwsptot <dbl+lbl>,
## #   nwsppol <dbl+lbl>, netuse <dbl+lbl>, ppltrst <dbl+lbl>, pplfair <dbl+lbl>,
## #   pplhlp <dbl+lbl>, polintr <dbl+lbl>, trstprl <dbl+lbl>, trstlgl <dbl+lbl>,
## #   trstplc <dbl+lbl>, trstplt <dbl+lbl>, trstprt <dbl+lbl>, trstep <dbl+lbl>,
## #   trstun <dbl+lbl>, vote <dbl+lbl>, prtvtaat <dbl+lbl>, prtvtcbe <dbl+lbl>,
## #   prtvtbbg <dbl+lbl>, prtvtcch <dbl+lbl>, prtvthr <dbl+lbl>,
## #   prtvtcy <dbl+lbl>, prtvtbcz <dbl+lbl>, prtvcde1 <dbl+lbl>, ...
##
## [[6]]
## # A tibble: 1,795 x 601
##    name   essround edition proddate  idno cntry   tvtot   tvpol pplltrst  pplfair
##    <chr>     <dbl> <chr>   <chr>    <dbl> <chr> <dbl+l> <dbl+l> <dbl+l> <dbl+lb>
##  1 ESS7e~        7 2.2     01.12.2~     1 AT    4 [Mor~ 1 [Les~ 7 [7]    7 [7]
##  2 ESS7e~        7 2.2     01.12.2~     2 AT    7 [Mor~ 3 [Mor~ 5 [5]    5 [5]
##  3 ESS7e~        7 2.2     01.12.2~     3 AT    6 [Mor~ 2 [0,5~ 6 [6]    8 [8]
##  4 ESS7e~        7 2.2     01.12.2~     4 AT    3 [Mor~ 1 [Les~ 5 [5]    3 [3]
##  5 ESS7e~        7 2.2     01.12.2~     5 AT    2 [0,5~ 2 [0,5~ 3 [3]    7 [7]
##  6 ESS7e~        7 2.2     01.12.2~     6 AT    2 [0,5~ 2 [0,5~ 0 [You~ 10 [Mos~
##  7 ESS7e~        7 2.2     01.12.2~     7 AT    7 [Mor~ 5 [Mor~ 5 [5]    6 [6]
##  8 ESS7e~        7 2.2     01.12.2~    13 AT    3 [Mor~ 1 [Les~ 5 [5]    7 [7]
##  9 ESS7e~        7 2.2     01.12.2~    14 AT    4 [Mor~ 1 [Les~ 9 [9]    6 [6]
## 10 ESS7e~        7 2.2     01.12.2~    21 AT    5 [Mor~ 2 [0,5~ 5 [5]    4 [4]
## # ... with 1,785 more rows, and 591 more variables: pplhlp <dbl+lbl>,
## #   polintr <dbl+lbl>, psppsgv <dbl+lbl>, actrolg <dbl+lbl>, psppipl <dbl+lbl>,
## #   cptppol <dbl+lbl>, ptcpplt <dbl+lbl>, etapapl <dbl+lbl>, trstprl <dbl+lbl>,
## #   trstlgl <dbl+lbl>, trstplc <dbl+lbl>, trstplt <dbl+lbl>, trstprt <dbl+lbl>,
## #   trstep <dbl+lbl>, trstun <dbl+lbl>, vote <dbl+lbl>, prtvtbat <dbl+lbl>,
## #   prtvtcbe <dbl+lbl>, prtvtech <dbl+lbl>, prtvtdcz <dbl+lbl>,
## #   prtvede1 <dbl+lbl>, prtvede2 <dbl+lbl>, prtvtcdk <dbl+lbl>, ...
##
## [[7]]
## # A tibble: 2,010 x 535
##    name   essround edition proddate  idno cntry nwspol netusoft  netustm ppltrst
##    <chr>     <int> <chr>   <chr>    <int> <chr>  <int> <fct>       <int> <fct>
##  1 ESS8e~        8 2.2     10.12.2~     1 AT       120 Most days     180 8
##  2 ESS8e~        8 2.2     10.12.2~     2 AT       120 Every day     120 6
##  3 ESS8e~        8 2.2     10.12.2~     4 AT        30 Only occ~      NA 5
##  4 ESS8e~        8 2.2     10.12.2~     6 AT        30 Every day     120 6
##  5 ESS8e~        8 2.2     10.12.2~    10 AT        30 Every day     180 5
##  6 ESS8e~        8 2.2     10.12.2~    11 AT        60 Every day     120 3
##  7 ESS8e~        8 2.2     10.12.2~    12 AT        15 Only occ~      NA 7
##  8 ESS8e~        8 2.2     10.12.2~    13 AT        45 Most days      30 7
##  9 ESS8e~        8 2.2     10.12.2~    14 AT        10 Every day     120 9
## 10 ESS8e~        8 2.2     10.12.2~    15 AT        60 Most days     120 5
## # ... with 2,000 more rows, and 525 more variables: pplfair <fct>,
## #   pplhlp <fct>, polintr <fct>, psppsgva <fct>, actrolga <fct>,
## #   psppipla <fct>, cptppola <fct>, trstprl <fct>, trstlgl <fct>,
## #   trstplc <fct>, trstplt <fct>, trstprt <fct>, trstep <fct>, trstun <fct>,
## #   vote <fct>, prtvtbat <fct>, prtvtcbe <fct>, prtvtfch <fct>, prtvtdcz <fct>,
## #   prtvede1 <fct>, prtvede2 <fct>, prtvtfee <fct>, prtvtdes <fct>,
## #   prtvtdfi <fct>, prtvtcfr <fct>, prtvtbgb <fct>, prtvtehu <fct>, ...
##
## [[8]]
## # A tibble: 2,499 x 572
##    name   essround edition proddate  idno cntry nwspol netusoft  netustm ppltrst
##    <chr>     <int> <chr>   <chr>    <int> <chr>  <int> <fct>       <int> <fct>
##  1 ESS9e~        9 3.1     17.02.2~    27 AT        60 Every day     180 2
##  2 ESS9e~        9 3.1     17.02.2~   137 AT        10 Every day      20 7
##  3 ESS9e~        9 3.1     17.02.2~   194 AT        60 Most days     180 5
##  4 ESS9e~        9 3.1     17.02.2~   208 AT        45 Every day     120 3
##  5 ESS9e~        9 3.1     17.02.2~   220 AT        30 Never          NA 5
##  6 ESS9e~        9 3.1     17.02.2~   254 AT        45 Only occ~      NA 8
##  7 ESS9e~        9 3.1     17.02.2~   290 AT        60 Never          NA 6
##  8 ESS9e~        9 3.1     17.02.2~   301 AT        30 Never          NA 7
##  9 ESS9e~        9 3.1     17.02.2~   305 AT        30 Every day     120 2
## 10 ESS9e~        9 3.1     17.02.2~   400 AT        25 Most days     360 7
## # ... with 2,489 more rows, and 562 more variables: pplfair <fct>,
## #   pplhlp <fct>, polintr <fct>, psppsgva <fct>, actrolga <fct>,
## #   psppipla <fct>, cptppola <fct>, trstprl <fct>, trstlgl <fct>,
## #   trstplc <fct>, trstplt <fct>, trstprt <fct>, trstep <fct>, trstun <fct>,
## #   vote <fct>, prtvtcat <fct>, prtvtdbe <fct>, prtvtdbg <fct>, prtvtgch <fct>,
## #   prtvtbcy <fct>, prtvtecz <fct>, prtvede1 <fct>, prtvede2 <fct>,
## #   prtvtddk <fct>, prtvtgee <fct>, prtvtees <fct>, prtvtdfi <fct>, ...
```

```
# ESS datasets flag missing values differently between questions. For example,
# questions with possible answers ranging from 0 through 5 have missing categories
# such as "Don't know" and "Refusal" coded as 7 and 8 and 9.

# For questions with possible answers ranging from 0 through 10 missing values are coded as 77, 88 and

# Must recognise importance of these categories before applying record_missings

?recode_missings
# i.e. recode_missings(ess_data, missing_codes)

#Result: "Data from the European Social Survey is always accompanied by a script that recodes the categ

# "The European Social Survey now provides these values recoded automatically in Stata data files. Thes
```

```
# Count all observations in 'austria':
library(dplyr)
typeof(austria) # Returned as class "list".
```

```
## [1] "list"
```

```
length(austria) # Count number of list elements in a list.
```

```
## [1] 3
```

```
nrow(austria) # NULL
```

```
## NULL
```

```
ncol(austria) # NULL
```

```
## NULL
```

```
# Try this as discovered completing sample mean

austria_sample.n <- length(austria)
  print(austria_sample.n)
```

```
## [1] 3
```

```
  # No, it is still the way it was before, 3.
```

```
# Attempt different method as struggling with finding a way to count the observations

library(haven)
ESS9e03_1 <- read_sav("ESS9e03_1.sav")
View(ESS9e03_1)
typeof(ESS9e03_1)
```

```
## [1] "list"
```

```
# Interesting that this is also "list'
```

```
set.seed(5)
```

```
# Find number of observations regarding austria using loaded file instead of through original method

austria_data <- ESS9e03_1 %>%
  filter(cntry == "AT")

# The specific population that I am interested in here are voting age citizens in Austria.

austria_voters <- austria_data %>%
  filter(agea > 15)
# So the number of observations for the sample austrian_voters is 2483 obs. of 572 variables.

table(austria_voters$agea)
```

```
##
## 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41
## 27 12 13 10 13 16 28 22 38 28 48 30 41 38 28 24 38 27 32 26 37 45 44 48 36 39
## 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67
## 38 32 41 31 38 30 54 62 56 45 56 46 51 49 48 43 48 37 50 38 44 48 30 42 26 46
## 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90
## 40 41 45 32 37 31 35 35 34 36 47 28 24 13 14 19  7 14 14  5  7  2  6
```

Disposable income (30 points) Find the variable netinum which measures monthly income from payed work, pensions, and social benefits AFTER tax deductions. The variable is based on survey questions G11a, G11b, and G11c, which you can find on page 77-85 of the codebook: See script. • Describe in a few sentences how the variable was measured (question wording, answer options, range, unit, measurement scale) (10 pt): The variable is based on three survey questions (G11a, G11b, G11c), “G11a And what is your usual weekly /monthly/annual net pay after tax and compulsory deduction?,”G11b What is your usual weekly, monthly, annual net income from pensions after tax and compulsory deductions“?,”G11c What is your usual weekly/monthly/annual net income from social benefits and/or grants after tax and compulsory deductions?" The wording suggests that researchers wished to gather data for the purposes of measuring income disparity as well as differences and similarities. It is interesting to not that each country’s representatives can choose whether to include weekly, monthly or annual amounts. As we are dealing with a numerical variable, it is quantitative and continuous type of data, and is measured on an “ratio scale”. Disposable income could also be adapted as part of an ordinal measurement scale if there were categories with varying values, such as between 10,000-25,000 EUROS. As a result of this measurement scale it is possible to do examples of the following statistical procedures such as ANOVA, regression, correlation and t-tests. • Calculate the 95 % confidence interval for the mean (10 pt) This indicates that at the 95% confidence interval, the true mean of monthly income after tax deductions in Austria is likely to be between 1765.277 and 2102.072 EUROS. However, there is a 5% chance that it will not be. The One Sample t-test estimates a mean of x, 1931.422. • Calculate the 90 % confidence interval for the mean (10 pt) This indicates that the 90% confidence interval, the true mean of monthly income after tax deductions in Austria is likely to fall between 1792.293 and 2074.056 EUROS. Similarly, the One Sample t-test estimates a mean of x, 1933.174 which agrees as it is the same sample from which the calculations have been made.

For both CI questions I also tried to use the linear regression method as a shortcut from this tutorial: (“https://bookdown.org/logan_kelly/r_practice/p09.html#directions-8”) but I could not get it to work and it then changed CI percentages which I did not understand.

```
# Find the variable 'netinum':

austria_monthly_income <- austria_voters$netinum
print(austria_monthly_income)
```

```
## <labelled<double>[2483]>: Your usual [weekly/monthly/annual] net [pay/pensions/social benefits]
##    [1]  1700  1500  1800  2000  1100  2000  1350  1300    NA  1500  2000   800
##   [13]  1500  2410  1345  1100  1500  1400  1500  1200  1600  2400   925    NA
##   [25]  2500    NA    NA    NA  1000 42000  2100  1700    NA    NA   970  1800
##   [37]    NA    NA  2000  1800    NA  1000    NA    NA  2100  1300  3000  1540
##   [49]  1400  1600  2200  1246  1700  1200  1350  1550    NA    NA    NA    NA
##   [61]  1400  1899    NA    NA  1518    NA   870  4300    NA    NA  1800    NA
##   [73]  1680  1050   650  1300    NA    NA  1796  2400  1200  1580  1400  1500
##   [85]    NA  1850  1600    NA    NA    NA    NA  1800  3000  1090  1500    NA
##   [97]  1850    NA  1900  1540  2200  1080  1800    NA  2300  1450    NA  1150
##  [109]  1320    NA  1900    NA   890    NA  1800    NA  2200  1800  1900  1200
##  [121]    NA    NA  2100    NA  1700  1500  2300  1908  1100    NA   800  2400
##  [133]  1700   727    NA   590    NA    NA   900  1600    NA  1800  2700  1200
##  [145]  1000    NA  2500  2400   720  1800  1500  2400    NA  1390  1870   820
##  [157]  1650  1450  1900  1200  1100  2970  1400   540   787    NA   920  1458
##  [169]  2200    NA    NA  1600    NA  1960    NA  2300    NA    NA  2000  1800
##  [181]  1700    NA    NA  1500  1248  2500  1900    NA    NA   750  1768  1350
##  [193]  1100   840  2500  1500  2100    NA  1050    NA   870  1750  1500  2000
##  [205]  2500   640  1120  1700  1290  1200  2300    NA   979  1300    NA  3000
##  [217]    NA    NA  1500    NA  2300  1100    NA  1256    NA  1350  1800  1900
##  [229]  1200  1800    NA  3000  1800  2000  1300    NA   620  1400  2000  1700
##  [241]  2300    NA   900  2000   850    NA  2000    NA    NA  1270   930  1200
##  [253]  1500   800  2600  1700  1200    NA   840  1400  2100  2400    NA    NA
##  [265]  1350   780  1200  2200  1030    NA    NA  1600    NA  1100  1600   400
##  [277]  1050   850  1995    NA    NA    NA  2700    NA  1400    NA    NA  2100
##  [289]   350  2600   950  2500  1510  2300    NA  1700    NA 26000    NA  1200
##  [301]    NA  1500   834    NA   850  2160    NA   800    NA    NA  1200  1300
##  [313]  1900  1647  2100  1050    NA  1900    NA  2200  1950  1049    NA    NA
##  [325]    NA  1300    NA  2100    NA    NA  3300    NA   700  1300  1430  1500
##  [337]    NA  2100  1500    NA  2900  1500    NA  1800  2100    NA    NA  1800
##  [349]  1800  1500  2050   750    NA  2000    NA    NA  1320  1800  2500    NA
##  [361]    NA  1900    NA   830  1650  1300  1322  1320  1615  1750  1800  1620
##  [373]    NA  1500  1650  1300   830  3300  1400  1000  1800   477  1580    NA
##  [385]  2130   950  2300  1670  1300  1520    NA  1950    NA  1200  1255    NA
##  [397]  1350    NA   459    NA  1050  1890  4500  1500    NA  1100  2100    NA
##  [409]  1600  2000  1800    NA  1000  1700  2000    NA  1800  1650  1890  1700
##  [421]    NA  2200    NA  1800  1699  1250  1482  1466  1550  1700    NA  1500
##  [433]   930    NA   840  1900  1500  1800    NA  1400    NA  1000    NA    NA
##  [445]  1500    NA  1200  1500  1600  4900  3000  1260    NA  1600    NA  1071
##  [457]   780  1400  2000  2250   250    NA  2000    NA  1800    NA 48000    NA
##  [469]  2450 17000  1080  1300  2800   978  1600  1700    NA    NA  1000    NA
##  [481]  2200    NA  3900    NA  2700  1100    NA  1263  2800   700    NA  1400
##  [493]    NA    NA  3000  1050    NA  2200  3600    NA  1150   720   931  4500
##  [505]  2100    NA   900  2200  2100   855   940  1000  2200  1500  2100   775
##  [517]  1800    NA  2500  1670   660    NA  1750    NA    NA  1130    NA  1600
##  [529]   700    NA  2300   400  1650  1300  2500    NA  1000  1150  2600    NA
##  [541]  1600  1400  3300    NA  1790  1200  1200  1800  1600  1500  1390  2200
##  [553]    NA    NA  1870  2500    NA  1020  1490  1200    NA  2200  1190  1800
##  [565]   870   930  4350  1200  2000  1150    NA  2300  1280  1000  2200  1826
##  [577]    NA  2200  1900   950    NA    NA    NA  2250  1900    NA    NA    NA
##  [589]  1500  1750  1200  2000  2000  1230    NA  1700  1560  1200    NA    NA
##  [601]  1200  1317  1600  1700 45000   800    NA  2500    NA   830  2500  1800
##  [613]   900    NA  2100  1900    NA  1850   600    NA  1800   400    NA  1800
##  [625]  1600    NA    NA  1420    NA  1360  1170  1800    NA  1350  2000  2000
##  [637]  1700  1387  2100  1000    NA  1500  1320    NA    NA    NA    NA    NA
##  [649]  1860  1300  1330   960    NA    NA  2110   650  1800  2000  1600  1500
##  [661]    NA  1800    NA  1167    NA  3000    NA  2400   700    NA  1700  2399
##  [673]  1100  1900    NA  1300  2700    NA    NA  1800  2400 14000    NA  1200
##  [685]  1900  1100    NA    NA   300    NA  1500    NA  2000  1800  2100    NA
##  [697]  1250   900  1389    NA  1700    NA  1300    NA  1800  1760  1900  1320
##  [709]   890  2300  1400  2200  2200  2000  1240  2500   800  2000  1800    NA
##  [721]  2000  2600  1100  1600    NA   800   600    NA    NA 32500    NA   980
##  [733]  1250  1200   465  2000  1470    NA  1800   900   750  1400    NA    NA
##  [745]    NA   420  1700  1050    NA  1800  1100  1700  1500  2700  1550    NA
##  [757]  1298  1700  2600  1270   998   920  1400  1500  2400   900  1200    NA
##  [769]  1000  2000    NA  2330    NA  1111  1872  1730   800  1412  2100    NA
##  [781]  1700  1500  1200  1100   800  1300  1087  1900    NA  1100  1200  1500
##  [793]    NA  2000    NA  1700  1700  1537    NA  1600  1324  3100    NA  1600
##  [805]    NA   900  3400  1400  1960    NA  1800  2100    NA  1300  1800  3000
##  [817]    NA 30000    NA   998   970    NA  1344   950  2000    NA    NA  1180
##  [829]    NA   900    NA  1432    NA    NA  1000  2335  1800  2800  1240  1600
##  [841]  1800    NA  1300    NA  1247  1200    NA  1500  2000  1200  1600    NA
##  [853]   748  1500  1350  3500  1200  1200    NA   850    NA   500    NA  1900
##  [865]    NA  1600  1400  3000  1100    NA    NA    NA  1300    NA  2020 50000
##  [877]  2500  1100  1300  1630   850    NA  1200    NA    NA  1750  2700    NA
##  [889]    NA  1200  1800  3400  2000   950   800   400   530    NA  1700  5000
##  [901]    NA  1300  1300  1890  1800  1350    NA  1400   650    NA  1700    NA
##  [913]  1500    NA    NA  1320  1251  1620    NA  3100    NA    NA  1900  2500
##  [925]  2200  2380  2700    NA  2200  1560  3100   900  2000    NA  1200  1750
##  [937]  1250  1950    NA  1920  1760    NA  1500  2000  2600    NA    NA  1800
##  [949]  1870  2000  1165  1800  2800  1300   900  1100    NA    NA   900    NA
##  [961]  1600    NA  2400  2200    NA  1500  1000    NA 21000  1900  1800  2300
##  [973]  1220  1682  1800   500  1288  1000  1300  1380  1900   950   970  1190
##  [985]  2100    NA    NA  2000  1800  1409    NA  1480  3200   950  1400  1100
##  [997]  1300  2500    NA   920  1300  1800    NA  2100  2400    NA  1000  1500
## [1009]    NA    NA    NA    NA    NA  1800  1600  1700  1280  1072    NA  1280
## [1021]    NA  1600  2500    NA  2000  1400   875  1300  1500  1800  1700    NA
## [1033]    NA  1900  1450  1100    NA  2200  2200 55000  1500  4500  2000  1300
## [1045]  2670  1230    NA  1400    NA  2200   870  1500  2400  1300    NA    NA
## [1057]  1500   843  1600    NA    NA  1510  1450    NA    NA  1300  1345    NA
## [1069]    NA    NA  2400  1990    NA  2200  1700    NA  1100  1140  3700    NA
## [1081]  1300    NA   708  1050  1800  1950   700    NA  2200  3080    NA  1300
## [1093]  1500  1550    NA  1300    NA  3000  1200  2823  3900  1461  2240   400
## [1105]  2300    NA    NA  1400  1900    NA  1080  1800  1550  3400  1200  2400
## [1117]    NA   350    NA  1800  2800   890   700  1200  2200  2200  1100   630
## [1129]  1700    NA    NA    NA   400  1800    NA  1350  1920  1100  1350  2900
## [1141]    NA    NA   635   900    NA  2100  2000  1800    NA    NA    NA    NA
## [1153]  1980  1700    NA    NA  1600  1570    NA  1980   850  1700   500   560
## [1165]  2300    NA   800    NA  2800    NA  1500  1790    NA  1700    NA  2100
## [1177]    NA  1450  1480    NA   800    NA  1330   870  1270  2200    NA    NA
## [1189]  4000    NA  2000    NA  1800    NA   560  1870    NA  1800  2500  2200
## [1201]  1800  1400  1500   645    NA  2100    NA  1360  1900  1900    NA  1800
## [1213]  2020  1780  1800   870  1950  3000  1500  2000    NA    NA  1600    NA
## [1225]  1800  1150   869    NA    NA    NA    NA  2800  1680  1500   880  1690
## [1237]  1280  1100    NA  1600  1009  3300    NA  1560  3500    NA  1300    NA
## [1249]  1100   980  1800  2000  1130  1000  4500  2000   870  1000    NA    NA
## [1261]    NA  1400    NA    NA    NA  1100    NA    NA  1450  1700   680    NA
## [1273]   830  1510    NA    NA    NA    NA  1400  1930  1500  1900  2700    NA
## [1285]  1850   700  1500  2900  1750  2200  3900  1412  1600  1800  1870  1799
## [1297]  1500   700  1550  2380  1900    NA    NA  2600    NA  2260  1950  1400
## [1309]  1350  2200  1760   838  1200  1300  2300  1100    NA  2220  1610  1700
## [1321]    NA  1800  1800   590  1300  2100   900  2700    NA   870  1150    NA
## [1333]   850  2700    NA  1500    NA  2500    NA  2900    NA  1800  1100    NA
## [1345]  1450  2300   600    NA    NA    NA   375  1050    NA   900  2000  1970
## [1357]  1200  3446  1400    NA    NA  1700   870    NA    NA    NA    NA  2800
## [1369]  1033    NA    NA  1900  1800    NA  3500   900  2000  1828  2500   900
## [1381]  1600  1370  1361    NA   820  1370  1800  1050  1500  1266    NA  1230
## [1393]  2500  3100    NA   850  1850    NA    NA    NA  1000    NA  2800  1800
## [1405]  1800    NA    NA   600  1450 18000    NA    NA  1950  3000  1279  2300
## [1417]  2000  1500  1230  1800  1950    NA   600  1100   500  2180   900   980
## [1429]    NA    NA  1900    NA  2700  1200    NA    NA   700   850  1200  1300
## [1441]  1900  2200  1800  1000  2200  1300  1100   830  1000  1250  2600  1500
## [1453]  2300  2100  3000  1300    NA  1200  1212    NA  1850  3000    NA  1140
## [1465]  1250  1600  1460   950  1350 25000    NA  1780  3200    NA   520  1000
## [1477]  1700  1970   800  1290    NA  1400  1400  1100    NA    NA  3000  1800
## [1489]   700  1000  1700    NA    NA  1279   860  1950  1290  1250  3100   967
## [1501]  1200  2200  1850 10000  1300  2100    NA  1280    NA    NA  1800  1951
## [1513]    NA    NA  1282  1700  1800   900  2200  1800 30000  1810    NA  3500
## [1525]    NA  2200  1350  1900  1430  2100    NA    NA   870    NA    NA   900
## [1537]  1380  1300    NA  1700  1540  1460    NA   900   530  1310  1500  1600
## [1549]  1500  1500   800    NA    NA    NA  2000  1350  1150    NA  1300  1700
## [1561]  1450    NA  1800    NA    NA  1450  1359  1300  1492    NA  1900  1100
## [1573]    NA    NA    NA    NA  1300   800  1500  2050  1600    NA  1100    NA
## [1585]  1300   330  2200   935  2700    NA    NA  1600  3900    NA   360  1600
## [1597]  2100   850   850  1400  1200  1400  1500  4500    NA  1100   860  1500
## [1609]  1180    NA  2530  1200  3000  2700  1700   850  1270  1600    NA  1800
## [1621]    NA  1760    NA    NA    NA  1360  1100  1320  1150    NA  1250  4000
## [1633]  1038    NA  1100  2300  2100  1800  1540  2350  1800  1800  1400  1200
## [1645]  1400  2200   900  1680    NA    NA  2100    NA  1600  1100  2000    NA
## [1657]  1200    NA    NA  1200    NA   600  2100  3800   500 23000    NA  1353
## [1669]    NA  1900  1070    NA  2300   970    NA    NA  1150  2600    NA  3300
## [1681]  1320  2500 20000    NA    NA  1800  1920  1200   880  2200    NA   800
## [1693]  1200  1200    NA    NA    NA  2600  2000    NA  1190  1300    NA    NA
## [1705]  1000   900    NA    NA   800    NA  1500   945  1400    NA  2300  1580
## [1717]  2000  1750   790   700    NA  1900  1300    NA  1390    NA    NA  1342
## [1729]  2600  2100    NA  2200   400  2500  1250    NA  1000  1200  1700    NA
## [1741]  2700    NA    NA  2200  1097  1900  1500  2000  1100  1850  1120  2200
## [1753]   890  2700  1600   640  1450   700    NA  2800  2200    NA  2000   970
## [1765]  1100  1200  1480  2400  1400  1280  1070    NA    NA  1850  2200  5000
## [1777]   300    NA    NA   420  1780  1350    NA  1800    NA  1500    NA   650
## [1789]    NA  1050  1600    NA  1600    NA  1290  1970    NA  2400  1500  1450
## [1801]  3000   980  2000  1600    NA  1640  2000  2200  2890  1950    NA  1170
## [1813]  1600  1600  1100  1200   520  1450   960  1011    NA  1100  1800  1320
## [1825]  1700  1200  1200 40000   425   750    NA  1500  1900  1300    NA  3000
## [1837]   420    NA  2200  3000  2900  2000    NA  1900  2360    NA    NA    NA
## [1849]   863    NA  2100  1550    NA  1140  1300  1800    NA  2100   900  1600
## [1861]  1850    NA  1650    NA    NA  1400    NA    NA  1390  1050    NA  1800
## [1873]   900  2200    NA  2100  2500    NA  1850  1450  1100    NA  1100  2150
## [1885]  2600    NA    NA  1290    NA  1050  1000    NA  1300   400    NA  2200
## [1897]   800  2000   900  1800  2300  1800  1300  1870  1200   890  1300  2200
## [1909]  1850  2100    NA  1754  1200    NA   500    NA  1670  4500    NA    NA
## [1921]   750  1450  2400   700  2000  1250  2000   950  1800    NA  1500  1747
## [1933]  1750  2200  1640  1800  1745    NA  1220  1250  2400    NA   550  2800
## [1945]    NA    NA  1900    NA  1050  1350  1800  1260  1800  2300  2400  6000
## [1957]    NA   998    NA  2500  2000  2200  1200    NA  1510    NA  1270   840
## [1969]  1400    NA  2500    NA  1400    NA    NA  2200   700  1240    NA  1300
## [1981]  1350  1500  1600  2200  1150   980    NA  1000    NA  1380  1080  2000
## [1993]  1450    NA  1050   400    NA  1600  1300  1800  1300    NA  1380  1800
## [2005]    NA  1540  1200  2200  2100   150  1500  3200   650  1800    NA  2000
## [2017]   440  3000  1800    NA    NA  2200   750  2080  2200  1560  1400  2240
## [2029]  1300  1850   905  1400  1600    NA   720    NA  1780  2650  1200  1900
## [2041]  1100  1600   900    NA    NA  1889  2000    NA  1037  1900    NA    NA
## [2053]    NA  1867   750  2500  1250  1500  1700    NA  2000  1200  1305  1100
## [2065]  1440   850  1600  1650    NA  1600    NA    NA    NA  2500   485  2400
## [2077]  1200  1900   860   400    NA    NA  1700   400  3100    NA    NA    NA
## [2089]   860  1760  2400  1800  1522    NA  2050  1200  1600  2000   700    NA
## [2101]    NA  1800  1700    NA   760   670  2000  1700    NA    NA  2500  2900
## [2113]  1500   939   960  5400  1800    NA  1300  1530   680    NA  2000    NA
## [2125]  1800  1300  1800   870    NA  1200    NA  2100  2100  2230   650    NA
## [2137]  1750    NA  2100    NA   820   640    NA  1200    NA    NA   900    NA
## [2149]  1000  2600    NA  1900    NA  1376    NA    NA 70000  1560  1400  1050
## [2161]    NA  2390  2000    NA    NA   980   780    NA  2000  1900   900    NA
## [2173]    NA  1600  1700  1277  2000  2200  2000  2800  1850  2000  1300  1800
## [2185]  1250   700  1720  2100    NA  2500  2400    NA  1780  1460    NA  1300
## [2197]    NA    NA   800  1200  1400   850  1700  1500  1700  1100  1500  1500
## [2209]  2200  1030  1317    NA  2000  1500    NA    NA   653    NA   890  1350
## [2221]  3500  1500  1750    NA    NA  1500    NA    NA  1500  3100  1900   460
## [2233]    NA  1300    NA  1350    NA  1600   400   600  1100  1200    NA    NA
## [2245]    NA  1600    NA  1000    NA   860    NA  2300  2500    NA  2000   890
## [2257]  1920   830  1200    NA  2000  1350  1520  2000    NA  2500  1500  1400
## [2269]    NA  1050    NA    NA  1300    NA  1800  1300  2400  1514  1800  1280
## [2281]   750  1855  1400  1100   800    NA    NA  1400  1300  1270   900    NA
## [2293]   700  2900  1150  3000   780  2100   750   800  1600  1600    NA    NA
## [2305]   930    NA  1400    NA  1500  1700  1150    NA  1900  1950  1500  2800
## [2317]  1100   840  1345  2200   900  1500  1600  1200   400  1850    NA    NA
## [2329]  1020  2600    NA    NA  1300   460  2000    NA    NA  2000    NA   900
## [2341]  1400  1500  2200  1600  1490  3500   900    NA  1480  1400    NA    NA
## [2353]   800    NA  1750    NA   800  1760  2377    NA   950  1300  2148  1500
## [2365]    NA    NA  1500  1800  1650  1800    NA  2000  1000  1750   870  1900
## [2377]  1150  1800  2100    NA  2000  1100  2300  2350  2560  1400   900  1800
## [2389]  2500    NA    NA  2200  1200  3900  1900   850   820    NA  1300   891
## [2401]  2400    NA    NA    NA    NA    NA   920   990    NA   400  1500    NA
## [2413]  1020  1800  1530    NA    NA    NA  1400  1240   900    NA  2300  1350
## [2425]  1180  1100  1986    NA    NA  1378  2100  1700   900  1050  2500  1500
## [2437]   640  1550  1500    NA   840  1800   980    NA  1700  2700  1500  1060
## [2449]    NA  1100  1500   250  1104    NA    NA   500    NA    NA    NA   950
## [2461]  1200  1300    NA   900    NA    NA  1800   600   800  1460    NA   400
## [2473]  3100    NA  1580  1385  1900  2000  1500  1450  1400  1100  1100
##
## Labels:
```

```
##      value          label
##  666666666 Not applicable
##  777777777        Refusal
##  888888888     Don’t know
##  999999999      No answer
```

```
table(austria_monthly_income)
```

```
## austria_monthly_income
##   150   250   300   330   350   360   375   400   420   425   440   459   460
##     1     2     2     1     2     1     1    15     3     1     1     1     2
##   465   477   485   500   520   530   540   550   560   590   600   620   630
##     1     1     1     7     2     2     1     1     2     2     8     1     1
##   635   640   645   650   653   660   670   680   700   708   720   727   748
##     1     4     1     6     1     1     1     2    17     1     3     1     1
##   750   760   775   780   787   790   800   820   830   834   838   840   843
##     9     1     1     4     1     1    24     4     6     1     1     6     1
##   850   855   860   863   869   870   875   880   890   891   900   905   920
##    15     1     5     1     1    12     1     2     7     1    37     1     4
##   925   930   931   935   939   940   945   950   960   967   970   978   979
##     1     4     1     1     1     1     1    11     3     1     5     1     1
##   980   990   998  1000  1009  1011  1020  1030  1033  1037  1038  1049  1050
##     7     1     3    30     1     1     3     2     1     1     1     1    18
##  1060  1070  1071  1072  1080  1087  1090  1097  1100  1104  1111  1120  1130
##     1     2     1     1     4     1     1     1    54     1     1     2     2
##  1140  1150  1165  1167  1170  1180  1190  1200  1212  1220  1230  1240  1246
##     3    13     1     1     2     3     3    72     1     2     4     4     1
##  1247  1248  1250  1251  1255  1256  1260  1263  1266  1270  1277  1279  1280
##     1     1    13     1     1     1     2     1     1     6     1     2     7
##  1282  1288  1290  1298  1300  1305  1310  1317  1320  1322  1324  1330  1342
##     1     1     5     1    69     1     1     2     9     1     1     2     1
##  1344  1345  1350  1353  1359  1360  1361  1370  1376  1378  1380  1385  1387
##     1     3    22     1     1     3     1     2     1     1     4     1     1
##  1389  1390  1400  1409  1412  1420  1430  1432  1440  1450  1458  1460  1461
##     1     4    52     1     2     1     2     1     1    17     1     4     1
##  1466  1470  1480  1482  1490  1492  1500  1510  1514  1518  1520  1522  1530
##     1     1     4     1     2     1    93     4     1     1     2     1     2
##  1537  1540  1550  1560  1570  1580  1600  1610  1615  1620  1630  1640  1647
##     1     5     8     5     1     4    60     1     1     2     1     2     1
##  1650  1670  1680  1682  1690  1699  1700  1720  1730  1745  1747  1750  1754
##     8     3     3     1     1     1    55     1     1     1     1    13     1
##  1760  1768  1780  1790  1796  1799  1800  1810  1826  1828  1850  1855  1860
##     6     1     5     2     1     1   115     1     1     1    15     1     1
##  1867  1870  1872  1889  1890  1899  1900  1908  1920  1930  1950  1951  1960
##     1     6     1     1     3     1    48     1     4     1    11     1     2
##  1970  1980  1986  1990  1995  2000  2020  2050  2080  2100  2110  2130  2148
##     3     2     1     1     1    79     2     3     1    45     1     1     1
##  2150  2160  2180  2200  2220  2230  2240  2250  2260  2300  2330  2335  2350
##     1     1     1    61     1     1     2     2     1    26     1     1     2
##  2360  2377  2380  2390  2399  2400  2410  2450  2500  2530  2560  2600  2650
##     1     1     2     1     1    24     1     1    34     1     1    14     1
##  2670  2700  2800  2823  2890  2900  2970  3000  3080  3100  3200  3300  3400
##     1    16    13     1     1     7     1    21     1     8     3     5     3
##  3446  3500  3600  3700  3800  3900  4000  4300  4350  4500  4900  5000  5400
##     1     6     1     1     1     5     2     1     1     6     1     2     1
##  6000 10000 14000 17000 18000 20000 21000 23000 25000 26000 30000 32500 40000
##     1     1     1     1     1     1     1     1     1     1     2     1     1
## 42000 45000 48000 50000 55000 70000
##     1     1     1     1     1     1
```

```
# Calculating a Confidence Interval using t-distribution, which is how much uncertainty there is with a

# Method one for 95%CI:
austria_monthly_income <- austria_voters$netinum
  sample.mean <-
    mean(austria_monthly_income, na.rm =  TRUE)
    #sample.mean = 1933.174
  print(sample.mean)
```

```
## [1] 1933.174
```

```
# Now find the number of values in a dataset.
 sample.n <- length(austria_monthly_income)
  print(sample.n) # 2483L
```

```
## [1] 2483
```

```
  # Standard deviation which describes how spread out the data is. It is a measure of how far each obse
  sample.sd <- sd(austria_monthly_income, na.rm = TRUE)
  print(sample.sd)
```

```
## [1] 3612.706
```

```
  # 3612.706

# Use sample standard deviation in order to estimate the standard error of the mean.
  sample.se <- sample.sd/sqrt(sample.n)
  print(sample.se) # 72.50104
```

```
## [1] 72.50104
```

```
# Calculate the t-scores
  alpha = 0.05
  degrees.freedom = sample.n-1 # for t-distribution.
  # Number of standard errors above or below the mean in order to be within the confidence interval.

   t.score = qt(p=alpha/2, df=degrees.freedom, lower.tail = FALSE) # Upper tail
  print(t.score) # 1.96092
```

```
## [1] 1.96092
```

```
# So the result shows that we need to be approximately 2 standard errors above and below the mean in or

# Calculate the 95 % confidence interval for the mean
margin.error = t.score * sample.se
print(margin.error)
```

```
## [1] 142.1688
```

```
# 141.1688

lower.bound <- sample.mean - margin.error
print(lower.bound) # 1791.005
```

```
## [1] 1791.005
```

```
upper.bound <- sample.mean + margin.error
print(upper.bound) # 2075.343
```

```
## [1] 2075.343
```

```
print(c(lower.bound,upper.bound))
```

```
## [1] 1791.005 2075.343
```

```
#Results: 1791.005 2075.343

# The 95% confidence interval is between  1791.005 and 2075.343

# Method 2 95%CI:
t.test(austria_monthly_income, conf.level = 0.95)
```

```
##
##  One Sample t-test
##
## data:  austria_monthly_income
## t = 22.582, df = 1780, p-value < 2.2e-16
## alternative hypothesis: true mean is not equal to 0
## 95 percent confidence interval:
##  1765.277 2101.072
## sample estimates:
## mean of x
##  1933.174
```

```
# One Sample t-test
# data:  austria_monthly_income
# t = 22.598, df = 1783, p-value < 2.2e-16
# alternative hypothesis: true mean is not equal to 0
# 95 percent confidence interval:
# 1763.793 2099.050
# sample estimates:
# mean of x
# 1931.422

# The 95% confidence interval is between 1763.793 and 2099.050 according to method 2.

# The 90% confidence interval (using method 2)

t.test(austria_monthly_income, conf.level = 0.90)
```

```
##
##  One Sample t-test
##
## data:  austria_monthly_income
## t = 22.582, df = 1780, p-value < 2.2e-16
## alternative hypothesis: true mean is not equal to 0
## 90 percent confidence interval:
##  1792.293 2074.056
## sample estimates:
## mean of x
##  1933.174
```

```
# Mean 1933.174
# The mean income falls between 1792.293 2074.056.
```

Gender (30 points) Find the variable gndr, which measures the respondents gender. page 46-47 of the codebook. The variable is based on question F2 on • Describe in a few sentences how the variable was measured (question wording, answer options, range, unit, measurement scale) (10 pt) The variable is based on the survey question (F2) which gathers details about the respondent and other household members, the reference to sex refers to information regarding the members. The wording suggests that researchers wished to gather data for the purposes of assessing the make up of the household. This includes information regarding the name, sex, year and relationship that these members have to the respondent. As we are dealing with a qualitative variable, particularly, sex, it measured as a nominal variable.

- Calculate the 95 % confidence interval for the proportion of women (10 pt) Results: 0.5194139 0.5589976

1-sample proportions test with continuity correction

data: 1339 out of 1144 + 1339, null probability 0.5 X-squared = 15.157, df = 1, p-value = 9.891e-05 alternative hypothesis: true p is not equal to 0.5 95 percent confidence interval: 0.5194139 0.5589976 sample estimates: p 0.539267

- Calculate the 90 % confidence interval for the proportion of women (10 pt) Results: 0.5225777 0.5558698

```
1-sample proportions test with continuity
correction
```

data: 1339 out of 1144 + 1339, null probability 0.5 X-squared = 15.157, df = 1, p-value = 9.891e-05 alternative hypothesis: true p is not equal to 0.5 90 percent confidence interval: 0.5225777 0.5558698 sample estimates: p 0.539267

In R, prop.test() can be used when your sample siye is large (n>30). It uses a normal approximation to the binomial distribution. By using a a proportion test, it is possible to examine what proportion of voting age women make up the total of Austrian voters. We can compare our observed ration (males:females) of 88:103 (where 13 is the greatest common factor and then divide both by 13, 1144/13=88 and 1339/13=103) to the theoretical (or expected) ratio say of equality, 1:1.

austria_gender

1 2

1144 1339

In our examples here, the p-value is greater than the usual alpha of 0.05 which suggests that there is no difference in the sample from the expected ratio of 1:1.

```
austria_gender <- austria_voters$gndr
print(austria_gender)
```

```
## <labelled<double>[2483]>: Gender
##    [1] 1 1 2 1 2 1 1 2 1 2 1 2 1 2 1 1 1 2 1 1 1 1 2 2 1 1 2 1 1 1 1 1 2 1 2 1 2
##   [38] 2 1 1 2 1 2 1 2 2 1 1 2 2 1 2 1 2 2 2 2 2 2 2 2 1 2 2 1 2 2 2 2 1 2 1 2 2
##   [75] 2 1 2 2 2 2 2 1 1 2 2 1 2 2 1 2 1 2 2 2 1 2 2 1 2 1 2 2 2 2 1 1 1 2 2 1 1
##  [112] 2 1 2 2 1 1 2 2 2 1 2 1 1 1 1 2 2 2 1 1 1 2 1 1 2 1 1 2 2 2 2 1 1 1 1 2 2
##  [149] 2 1 2 2 1 2 1 1 2 2 2 2 2 1 2 1 1 1 1 1 2 1 2 2 2 1 2 2 2 2 1 2 1 2 1 2 2
##  [186] 1 2 2 1 2 1 2 2 2 2 2 2 1 2 1 2 2 2 1 1 2 1 1 2 1 2 2 2 2 2 2 1 2 2 2 1 2
##  [223] 1 1 2 1 1 2 2 2 2 1 2 2 2 2 2 1 1 2 1 2 1 1 2 2 1 2 2 2 1 2 1 1 2 2 1 2 2
##  [260] 2 1 1 2 2 2 1 2 1 2 2 2 1 1 1 1 1 2 2 1 1 2 1 2 2 2 2 2 1 2 2 1 1 1 1 1 2
##  [297] 2 2 1 1 2 1 2 2 1 1 1 1 1 2 2 2 1 1 1 2 2 1 1 1 1 2 2 1 1 2 1 1 1 2 1 1 2
##  [334] 1 1 2 2 1 1 2 1 2 2 1 2 1 2 1 2 1 1 1 2 1 2 2 1 2 2 2 1 1 2 2 1 2 1 2 1 1
##  [371] 1 1 2 2 1 2 2 1 1 2 2 2 1 2 2 2 1 1 2 2 1 1 2 2 2 2 2 2 2 2 2 1 1 1 2 1 1
##  [408] 2 2 2 2 1 1 1 1 1 2 2 2 2 2 1 2 1 1 2 2 1 2 1 1 1 2 2 1 1 2 1 1 2 2 2 2 1
##  [445] 1 2 1 1 1 1 1 2 1 2 2 1 2 2 2 1 1 2 1 1 1 2 1 2 1 1 2 2 2 2 1 1 1 1 2 1 1
##  [482] 2 1 2 1 2 2 2 1 2 1 1 1 2 1 2 2 2 1 2 2 1 2 1 1 2 2 1 1 2 1 2 2 1 1 2 2 2
##  [519] 2 1 2 2 1 1 2 2 2 1 2 2 2 2 1 1 1 1 2 2 1 1 2 2 1 1 1 2 1 2 2 2 2 1 1 1 2
##  [556] 2 1 2 1 2 1 1 2 1 2 1 2 1 2 2 1 1 2 2 2 1 2 1 2 2 1 2 2 1 2 2 2 1 1 1 1 2
##  [593] 2 2 1 2 2 2 2 2 2 2 2 2 2 2 1 1 2 1 1 1 2 2 1 1 2 1 1 2 2 2 2 1 2 2 1 1 2
##  [630] 2 2 2 1 2 1 1 2 2 1 2 2 1 1 2 2 2 2 1 1 2 1 2 2 2 1 2 2 1 2 2 2 1 1 2 2 1
##  [667] 2 1 2 2 1 1 2 2 2 2 1 1 1 2 1 1 1 1 2 2 1 1 2 1 1 1 1 1 2 2 2 2 2 1 1 2 1
##  [704] 2 1 2 2 2 2 1 1 1 1 1 2 2 2 1 2 2 1 1 1 1 1 2 2 2 2 1 1 2 2 1 1 1 1 2 1 2
##  [741] 1 1 2 2 2 2 1 1 2 2 2 1 1 2 2 2 2 1 1 1 2 2 1 2 2 2 2 1 2 1 2 2 1 2 1 2 2
##  [778] 1 1 2 1 1 2 2 1 2 2 1 2 2 1 1 2 1 2 2 1 1 1 2 2 1 1 1 2 1 1 1 1 1 1 2 2 2
##  [815] 1 2 2 2 1 2 2 2 2 2 1 1 2 2 2 2 2 2 2 2 1 1 1 1 2 1 2 1 2 1 2 2 2 2 1 2 2
##  [852] 2 2 1 1 1 2 1 2 1 1 1 2 2 2 2 1 2 2 2 1 2 2 2 2 1 2 1 2 1 1 1 2 2 1 2 1 2
##  [889] 2 2 1 1 1 2 2 2 1 2 1 1 2 2 1 1 2 1 2 1 2 2 2 2 2 1 1 1 2 2 1 1 1 2 2 1 2
##  [926] 1 2 1 2 1 1 2 1 1 2 1 1 2 2 2 2 1 2 1 1 2 1 2 1 1 2 2 1 1 2 2 1 2 1 1 1 1
##  [963] 2 2 1 1 2 2 1 1 1 2 1 2 2 2 2 2 1 2 2 1 2 2 1 2 1 1 1 1 2 2 1 2 2 2 2 1 1
## [1000] 2 2 2 2 1 1 1 1 2 2 2 1 2 2 1 2 2 2 2 2 1 2 2 1 2 1 2 2 2 1 2 1 1 2 2 1 2
## [1037] 1 1 2 1 1 1 1 2 1 2 2 1 2 1 1 1 1 2 1 1 1 1 1 2 2 1 1 1 2 1 1 2 2 1 1 2 1
## [1074] 1 2 2 1 2 1 1 2 1 2 2 1 1 1 2 2 1 2 1 2 2 1 2 1 1 1 2 1 2 1 1 2 2 2 2 2 1
## [1111] 2 1 1 1 1 1 1 1 2 2 1 2 2 1 1 2 1 2 1 1 2 1 2 1 1 1 1 2 1 1 1 1 2 2 2 1 1
## [1148] 2 2 2 2 2 1 1 1 1 1 2 2 1 2 1 2 2 2 1 1 1 1 2 1 1 2 1 2 1 1 2 1 1 2 2 2 2
## [1185] 2 2 2 1 2 2 1 2 2 1 2 1 1 1 1 2 1 1 2 2 1 1 2 2 1 2 2 1 1 1 2 2 1 1 1 1 1
## [1222] 2 1 1 2 1 2 2 1 1 1 1 1 2 2 2 2 2 2 2 2 1 2 2 2 1 1 2 1 2 1 1 2 2 2 1 1 2
## [1259] 2 2 1 1 2 2 1 1 1 1 1 1 2 1 2 1 1 2 1 2 2 1 1 1 1 2 1 2 1 1 1 1 1 1 2 2 1
## [1296] 1 2 2 1 1 2 2 2 1 1 2 2 2 1 1 1 2 2 2 2 2 2 1 1 2 2 1 2 2 2 1 2 1 1 1 1 1
## [1333] 1 1 2 1 1 2 2 1 2 1 1 1 1 1 2 2 1 2 2 2 2 2 1 1 2 2 2 1 2 2 1 2 1 1 1 1 2
## [1370] 2 2 1 1 2 2 2 2 2 2 1 1 2 2 1 2 2 2 1 2 2 1 2 1 2 1 2 1 1 2 2 1 1 1 2 1 2
## [1407] 2 1 2 2 1 2 1 1 2 2 2 1 2 2 1 1 1 1 2 1 2 2 2 2 2 2 2 1 2 2 2 2 2 2 2 1 2
## [1444] 2 2 1 1 2 2 2 1 2 1 1 1 2 2 2 2 1 1 2 2 2 2 1 2 2 2 1 2 1 2 2 2 2 2 2 2 2
## [1481] 1 2 2 1 2 1 1 2 1 2 2 2 2 2 2 2 2 2 2 1 2 2 1 1 1 2 2 2 2 1 1 1 2 1 2 2 2
## [1518] 1 2 1 2 1 2 1 1 1 2 2 2 1 2 1 2 2 2 2 2 2 2 1 1 1 2 2 1 2 1 1 2 1 2 2 2 1
## [1555] 2 1 1 1 2 1 2 2 2 2 1 2 2 2 2 1 1 1 1 2 2 2 2 2 1 1 1 2 2 2 2 2 1 2 1 1 2
## [1592] 1 1 1 1 1 1 1 2 2 2 2 2 1 2 1 2 2 2 2 1 2 1 2 2 2 2 2 1 2 1 2 2 1 1 2 2 2
## [1629] 2 1 1 2 2 2 2 1 1 1 2 1 2 1 2 2 1 1 1 2 2 1 1 2 1 2 2 2 1 2 2 2 1 2 1 2 2
## [1666] 1 1 1 1 2 2 2 1 1 2 1 2 1 1 1 2 1 2 1 1 2 2 2 1 2 1 2 1 2 2 2 2 1 1 1 2 2
## [1703] 2 2 2 2 2 1 2 2 2 2 2 1 2 1 1 2 2 1 1 2 1 2 2 1 1 1 1 2 1 1 2 2 2 1 1 1 2
## [1740] 2 1 2 2 2 2 1 2 2 2 2 2 2 1 1 2 2 1 1 1 2 1 2 1 2 2 2 2 1 2 2 2 2 1 1 1 1
## [1777] 2 2 1 2 2 2 1 1 1 1 1 1 2 2 2 1 1 1 2 1 1 1 2 2 2 1 1 2 1 2 1 2 2 1 2 2 2
## [1814] 1 2 2 2 2 2 2 1 2 2 2 1 2 2 1 1 2 2 1 1 2 2 1 2 1 1 1 1 2 2 1 1 1 2 2 2 2
## [1851] 1 1 1 2 2 1 2 2 2 2 1 2 1 2 2 2 2 2 1 2 2 2 2 1 2 2 1 1 2 2 2 1 2 1 1 1 2
## [1888] 2 1 2 1 1 1 2 2 2 1 1 1 1 1 1 2 1 2 2 2 2 2 2 2 1 2 1 2 2 2 1 2 2 1 1 1 1
## [1925] 1 1 1 1 1 2 1 1 1 1 1 2 1 2 2 1 2 1 2 2 2 2 1 2 2 1 2 2 1 1 2 1 2 2 2 2 1
## [1962] 1 1 1 2 1 2 2 2 1 1 1 2 2 2 1 2 2 1 1 1 2 2 1 2 2 2 2 1 1 2 1 2 1 2 2 1 1
## [1999] 1 1 1 1 2 2 2 1 2 1 2 2 1 1 2 2 2 1 2 2 2 1 2 1 2 1 2 2 2 1 2 2 2 2 1 2 2
## [2036] 1 2 1 2 1 2 2 2 1 1 1 2 1 2 1 1 1 1 1 2 1 1 1 1 1 1 2 2 2 1 1 2 2 1 2 1 1
## [2073] 2 1 2 1 1 1 2 2 2 1 1 2 1 2 1 2 2 1 2 2 1 2 1 1 1 1 2 2 2 2 1 1 2 1 1 2 1
## [2110] 2 2 1 1 1 1 1 2 2 2 1 1 2 2 1 2 2 1 1 1 2 2 1 1 2 2 2 1 1 2 1 2 2 1 1 1 1
## [2147] 1 2 2 1 2 2 2 1 2 2 1 1 2 2 1 1 1 2 2 1 2 1 1 1 2 1 2 2 1 2 2 1 1 1 2 1 2
## [2184] 1 1 2 1 1 2 1 1 2 1 2 2 2 2 2 2 2 2 2 1 2 1 2 1 2 1 1 2 2 2 2 2 1 1 2 2 1
## [2221] 2 2 1 2 1 1 2 2 1 2 2 2 2 1 2 2 2 1 1 1 2 2 1 2 1 2 1 2 1 2 1 1 1 1 1 2 2
## [2258] 2 2 2 2 1 1 1 2 1 2 1 2 1 2 2 2 2 1 1 1 2 2 2 1 1 2 2 1 1 2 1 2 2 1 1 1 2
## [2295] 2 1 1 1 2 2 2 2 2 2 1 1 1 2 1 2 1 2 2 1 2 2 2 2 1 1 2 2 2 1 2 2 2 1 2 1 2
## [2332] 1 2 2 1 2 2 2 1 2 2 2 1 1 1 1 2 2 1 2 1 2 1 2 1 2 2 1 1 2 2 2 1 2 2 1 2 1
## [2369] 1 1 2 2 1 2 2 2 1 2 1 1 1 2 1 2 1 2 2 1 1 1 2 1 2 2 2 1 2 2 2 2 1 2 1 2 1
## [2406] 2 1 2 1 1 2 2 2 1 1 2 2 2 1 2 2 1 1 1 2 1 1 2 1 1 2 1 2 2 1 1 2 1 2 1 1 2
## [2443] 2 2 1 1 1 2 2 1 1 1 2 2 2 2 1 1 1 1 2 1 1 2 2 1 2 2 1 1 1 2 2 2 1 1 2 2 2
## [2480] 2 1 1 2
##
## Labels:
##  value     label
##      1      Male
##      2    Female
##      9 No answer
```

```
# Describe variable:
# As referred to in the cookbook and in the following code:
# Values    Categories
# 1       Male

# 2       Female

# 3       No answer

table(austria_gender)
```

```
## austria_gender
##    1    2
## 1144 1339
```

```
# austria_gender
#   1    2
# 1144 1339

str(austria_gender)
```

```
##  dbl+lbl [1:2483] 1, 1, 2, 1, 2, 1, 1, 2, 1, 2, 1, 2, 1, 2, 1, 1, 1, 2, 1, ...
##  @ label        : chr "Gender"
##  @ format.spss  : chr "F1.0"
##  @ display_width: int 6
##  @ labels       : Named num [1:3] 1 2 9
##   ..- attr(*, "names")= chr [1:3] "Male" "Female" "No answer"
```

```
view(austria_gender)

# Calculate the 95% confidence interval for the proportion of women.
prop.test(x=1339, n=1144 + 1339, conf.level =0.95, alternative = 'two.sided')
```

```
##
##  1-sample proportions test with continuity correction
##
## data:  1339 out of 1144 + 1339, null probability 0.5
## X-squared = 15.157, df = 1, p-value = 9.891e-05
## alternative hypothesis: true p is not equal to 0.5
## 95 percent confidence interval:
##  0.5194139 0.5589976
## sample estimates:
##        p
## 0.539267
```

```
# Calculate the 90% confidence interval for the proportion of women.
prop.test(x=1339, n=1144 + 1339, conf.level =0.90, alternative = 'two.sided')
```

```
##
##  1-sample proportions test with continuity correction
##
## data:  1339 out of 1144 + 1339, null probability 0.5
## X-squared = 15.157, df = 1, p-value = 9.891e-05
## alternative hypothesis: true p is not equal to 0.5
## 90 percent confidence interval:
##  0.5225777 0.5558698
## sample estimates:
##        p
## 0.539267
```

Produce a scatterplot (30 point) Find the variable lrscale which measured the ideological self-placement of respondents. The variable is based on survey question B26, which you can find on page 11 of the codebook. This will be your dependent variable (y-axis). • Create a scatterplot of net income and ideology (remember to label axes) (10 pt) • To your existing scatterplot, add colors or shapes to the points according to their value of the gender variable (remember to label legend) (10 pt) • Interpret the plot (10 pt) In the scatterplot ideological neutrality (value 5) has a relationship to those with a higher income compared to those with little or no ideological self-identification (value 0) or those with a very high ideological self-identification (value 10). There are some male respondents with an income in the range of 40-70K, however, these are mostly located within the upper middle range between 5 and 8. However, there is a noticeable difference between those who self-identify as highly and not as ideological. There is evidence that participants with a lower "ideology value" simultaneously have very high income. However, it is shown that there are no Austrian respondents with a "very high ideology value (above 8)" and a higher income which tails to the right of the x-axis. Overall, those respondents with who have lower ideological self- identification (>5) have on average higher incomes than people with greater ideological sympathies (<5).

```
# This is the dependent variable (y-axis)
austria_voters$lrscale
```

```
## <labelled<double>[2483]>: Placement on left right scale
##    [1]  9  5  5 NA  5  3  3  7  4  5  2  3  5  5  4  1  6  5  3  7  5  6  3  5
##   [25]  3  3  3  5  5  7  9  8  5  7  5  5  4  5  2  9  5  8  1  5  5  6  4  7
##   [49]  0 NA  4  4 10  5  0  1  5 NA NA  5  1  3  5  5  4  7  5  5  5  6  4  7
##   [73]  6  4  3  5  3  3  5  6  6  5 NA  5  6 NA  4  5 NA NA 10  5  5  5  5  5
##   [97]  4  4  0  7  5  5  5 NA  0  3 NA  7  1  5  8  6  0 NA  2  3  5  5  5  3
##  [121]  7  7  4  5  6  7  5  0  6  5 NA  3  3  8  7  3  5  5 NA  0  2  5  2  4
##  [145]  5  5  5  3  7  5  3  5  5  5  7  0  5  5 10  5  5  2  4  6  5  7  1  8
##  [169]  5  5  1  5 NA  5  5  5  6 NA  7  4  4  5  4  5  1  0  5 NA  3  0  4  5
##  [193]  2  8  5  2  5  4  4  3  3  5  0  5  2  3  6  4  5  7  2  2  5 10  1  5
##  [217] NA  3  5  5 NA  5  6  5  0  4  3  5 NA  6  5  3  2  5  8 NA NA  5  5  3
##  [241]  2  3  5  5  3  5  2  4  4  5  6 NA  2  2  6  5  5  2 NA  5  5  2  5  3
##  [265] NA  7  5  5  5  6  4  5  5 NA  5  5  6  2 NA  6  5  4  9  8  6  5 NA  7
##  [289]  3  5  3  3  4  6  3  7  6 NA  7  5  4  7  5 NA  4  5  5  7 NA  6  9  8
##  [313]  5  6  6  6  5  6  0  0  3  6  5  5  6  5  2  5  3  4  2  5  6  3  5  3
##  [337]  8  2  8  6  2  6  7  6  6  6  3  7  5  3  3  1  3  2  5  8  5  5  4  5
##  [361]  6  5  0  5  5  8  5  6  5  5  4  5  6 NA  8 NA  3  5 NA  2  5  8  4  7
##  [385]  7  5  5  2  5  5 NA  5  5  4  3  3  7  5  8  5  5  5  2  6  5  6  5  5
##  [409]  4  2  5  5  5  5 NA  2  5  6  5  6  5  3  5  6  7  6  3  8  3  4  2  4
##  [433]  5  5 NA NA  4  5  5  7  5  2  4  8  5  5  5  6  7  5  3 10 10  5  2  6
##  [457]  3  8  0  5  5  1  5  5  5  5  0  2  9  0  5  3  3  5 NA  6  3  5  5  4
##  [481]  1  5  1  5  0  4  5  5  6  7  7  6  8  7  4  6  5  6  5 NA  5  7  8  5
##  [505]  6  4  5  8  3  7  5 NA  7  5  1  2  5  3  7  4  8  3  9  5  3  5 NA  0
##  [529]  5  7  5 NA  7  6  3  7  5  5  3  4  6  5  5  6  4  0  5  0  4  4  5  7
##  [553]  7  5 NA  4  2 NA  5  5  5  5  5  7 NA  5  2  4  5  4  3  4  5  6  3  9
##  [577] NA  4  5  5 NA NA  3  3  3  3 NA  5  4  9  8  5  5 NA  5 NA  4  5  1  5
##  [601]  4  8  5  7  3  7  5 10  5  5  5  5  5  5  7  3  6  5  8 NA  2  8  5  0
##  [625]  4  5  5  5  5  1  4  4  4  8  4  5  5  6  5 NA  7  8  5  5  5  5  5  5
##  [649]  7  5  6  5  4 NA  5 10 NA  5  3  3 NA  8  5  6  5  0 NA  5  8  5 NA  0
##  [673]  8  4  3  5  7  5  6  5  5  4  5  2  6  5  4  6  3  1  4  8  5  8  6  3
##  [697] NA  0  5  6  3 NA  6  5  5  4 NA  6  5  3  7  8  7  5  3  5  5  6 NA  5
##  [721]  4  8  0  8  5  3 NA NA  1 NA  6  5  6  7  5  7  6  2  5  6  5  5  0 NA
##  [745]  6  5  7  1 NA  6  0  4  1  5  5  6  5  5  5  5  3  4  7  5  5  5 NA  7
##  [769]  5  5 NA  3  1  7  5  8 NA  5  5  0  6 NA  3  5  2  8  1  5 NA  7  5  5
##  [793]  0  4  6  6 NA  8  5  8  6  6  5  3  3  4  5  3  8  6  5  5  5  5 NA  8
##  [817]  5  0  6  5  5  9  4  5  3  5  5  4  4  5  2  4  9  2  1  5  0  3  6  0
##  [841]  3 10  5 10  5  6  3  5  8  6  5  5  5  5  5  2  5  8  5  5  5  5  5  5
##  [865]  5  5  5  4  5  8  6 NA  7  2  7  8  7  9  4  3 NA  7  4  4  5  3  8  5
##  [889]  0  5  7  5  4  3  5  7  6 NA  6  3 NA  7  7  4  4  5  9  5 NA NA  5  6
##  [913]  7  5  8  5  1 NA  7  1  7  5  3 10  6  5  6  5  5  6  5 NA  5  3  3  6
##  [937] NA  5  5  5  1  5  4  5  2  5  3  5  7  3  5  5  3  6 NA  5  4  6  7  6
##  [961]  0  1  5  5  5  7  2  4  5  5  2  5  7  2  4  2  5  5  5  7  5  5  5  5
##  [985]  5  5  5  5  5  5  7  1 NA  3  2  5 NA  2  3  4 NA  7  5  6  5  7 NA  6
## [1009]  5  3  7 NA  5 NA 10 NA  5  5  5  6  5  8  3  5  3 10  5  4  5  3  0  5
## [1033]  6  3  6  5  6  3  5  7  9  5 NA  5  1 NA  5  5  6  4  3  0  5  5  5  5
## [1057]  2  3  5  2  5  5  5  6  5  7  7  3  8  7  5 10  2  5  5  4  4  6  3  6
## [1081]  6  6  2  8  3  5  4  3  5  5  3  5  7  1  5  6  8  7  2  3  5  5  5  2
## [1105]  2 NA  5  5  3  7  6 NA  5  3  6  5  5  5  4  9  6  5  5  7  5  3  5  5
## [1129]  6 NA  6  2  5  5  7  8  1  6  5  4  2  5  3  5  5  4  5  4  4 NA  5  5
## [1153] 10  4  4  5  5  5  5  1 NA  5  5  4  8  5  4  5  4  5  7  5  5  5  5  5
## [1177]  4  7  5  5  7 NA  5  6  3  3  2 NA  4  5 NA  5  4  8  6  0  7  8  5  5
## [1201]  7  5  5  6  4  3  4  6  3  3  3  6  7  6  5  8  6  6  1  8  5  3  4  2
## [1225]  2  8  3  6  8  5  4  7  2  5  9  6  5  8  3  5  5  7  3  5  5  2  1  5
## [1249]  8  7  5  6  7  5  3  5  8  5  5  5  2  8  5  8 NA  3  1  6  7  7  4  3
## [1273]  6  5 NA  1  6  3  6  4  1 NA  3  4  1  5  4  5  5  3  5  5  5  5  4  6
## [1297]  4  8  5  5  4  4 NA  2  6  2  3  0  5  7  1  5  5  6  5  5  7  1  5  3
## [1321] NA  6  4 NA NA  5  3  5  8  6  5  3 NA  5  2 NA NA  2 NA  4  5  0  5  5
## [1345]  5  5  5  3  3  6  3  4  7  2  1  2  5  3  4  6  6  5  7 NA  7  3  5  5
## [1369]  2  5  3  5 NA NA  4  8  5  0  3  2  5  3  1  4  4  7 10  1  3  5  5  3
## [1393] 10  7  5  6  5 NA  0  3 10 10  3  0 NA  7  2  6  2  5  4  2  8  3  5  4
## [1417]  5  8  5  7  5  5  4  2  5  0  5  5  5  5  7  2  5  4  6  5  5  3 NA  4
## [1441]  5  3  5 NA  8  5 NA  7  6  2  6  4  6  5  5  5  7  5  5  5  2  2  9  5
## [1465]  3  7  1  6  4  5  6  2  3  1  6  4 10  5  5  5  5  4  4  5  6  4  4  5
## [1489]  3  8  4  5  2  6  5  5  5  5  2  7  7  0  3  5  6  5  5  5  6  5  7  5
## [1513]  6  5 NA  5  6 NA  5  4 NA  5  2  5 NA  5  4  5  6  5  5  5  8  5  5  5
## [1537]  5  1 NA  6  5  8  4  7  7  5  5  5  4  7  5  5  5  3  5  2  5 NA  6  7
## [1561]  7  5  4  8  0  3 NA NA  8  2  2  5  5  6 NA  5  9 NA  5  6  5 NA  2  2
## [1585] NA NA  7  5  5  2  2 NA  4  5  3  3  8  7  5 10  5  4  6  5  4  5  5  5
## [1609]  5  5  8  6  3  7  9  7  1  5  3  5  8  6  2  1  5  6  3  8  5  3 10  6
## [1633]  4 NA NA  7  9 10  5  5  5  6  2  5  1  7  5  3  7  5  5  5  2  5  8 NA
## [1657]  5  5  5  5  3  4  4  6  5  1  4  5  6  3  5  6  6 NA  5  3  8  1 NA  5
## [1681]  8  4  5  3  4  7  5  5  2  5  6  5  5  3  3  7 NA  7  0 NA  5  5  3  0
## [1705]  7 NA NA  3  4  3 NA  2  5  5  5  8  1  4  8  5  5  8  4  6 NA  7  5  6
## [1729]  4  5  6  5  6  5  4  6 NA  5  3  5  6  6  3  5  9  4  3  3  7  1  4  4
## [1753]  3  4  6  3  4  4  3  6  5  5  5  5  5 NA  5  5 NA  3  5  5  6  5  2  2
## [1777] NA  3  5  5  5  7 NA  9  8  2  4 NA  5  2  3  5  7 NA  6  5  3  7  5  4
## [1801]  7  5  6 NA  0  9  8  2  5  7  4 NA  6  5 NA NA  8  7  5  3 NA  5  2  5
## [1825]  6  5  3  3  5  7  5  5  6  2  5  3  5  5  8  6  6 NA  7  5  7  4 NA NA
## [1849]  1  5  6  6  2  5  4  5  6 NA  5  3  5  4  6  3 NA  0  2  1  6  3  5  4
## [1873]  8  7  3 NA  7  2  3 NA  5  7  3  5  7  6  3  3  7  6  5  4  5  5  2  2
## [1897]  0  8  5  3  7  3  3  4  2 NA  6  4  3  5  6  7  2  7  5  5  7  3  5 NA
## [1921]  2  5  3  0  5  6  5  6  0  0  4  3  5  5  5  5  4  1  3  4  3  5  7  4
## [1945]  6  5  5  5 10  5  7  5  7  9  5  5  6  5  1  2  6  5  3  5  5  5  4  5
## [1969]  5  3  4  5  6 NA  6  8  6  5  5  7  6 NA  6 NA 10  3  6  5 NA NA 10  6
## [1993]  6  6 NA  7  7  6  3 10  5  1  4  5  6  5  0  3  4  2  8  5  5  5  5  5
## [2017]  2  5  5  8  3  5 NA  5  2  4  3  5  6  5  5  8  5 NA  5  6  4  7  3  5
## [2041]  5  4  2  5  6  6  8  3  3  5  8  5 NA  4  5  9  7 NA  5  5  4  5  3  5
## [2065]  6  7  7  3  7  7  6  6  5  6  5 NA  5  3  8  3 NA  5  5 10  5  7  5  5
## [2089]  5  3  5  4  6  1  5  5  5  8  5  5 NA  2 NA  5  5 NA  3  7 NA  3  5  5
## [2113]  5  7 NA  6  6 NA  4  1 NA  5  5 NA  6  4  5  7 NA  7 NA  5  5  5  2  5
## [2137]  5  6  5  5  7  5  5  8  6  3  0  5 NA  2  5  5  0  5  5  5  6  5  4  5
## [2161]  5 NA  3  5  6  6 NA  5  5  4  5  4  5  5  6  5  3  4  6  1  4 10  5  7
## [2185]  3  2  6  2  3  4  8 NA  3  5  5  5 NA  4 NA  7 NA  2  6 NA  2  2  5  4
## [2209] 10  3  5  7  6  3  3  7 NA  5  7  8  3 NA  4  2  8  4  5  5  4  5  7 NA
## [2233] NA  5  0  3  4 NA  5  4  2 NA  7  5  3  4  3  6  5  5 NA  7  3 NA  7  5
## [2257]  7  4  5 NA  5 10  5  7  2  7  5  5  3  5 NA  5  1  5  7  5  6  4  5  5
## [2281]  3  7  5  5  4 NA  5  3  5  1  7  8  5  5  5  6  4 NA NA  5  5  5  1  3
## [2305]  5  7  5  5 NA  5  2  4  3  8  5  5  4  0  5 10 NA  5  5  5  6  5  3  6
## [2329]  5  7  4  5  7  9  8  0  0  5  6  5  5  6  4  2  5  8  5 NA  5  5  4  6
## [2353]  5  6  3  5 NA  2  4  5  4  6  3  5  6  5  4  2  0  7  2  5  5  5 NA  5
## [2377]  5  7  5  8  5 NA  5  7  5  5  6  3  5  5  0  6  5  4  4 NA  5 NA  6  5
## [2401]  6  5  5  6 10  5  6  5  5  5  2  5  3  5  6 NA NA  8  2  5  3  5  8  3
## [2425]  6  3  4 NA  7  5  5  6  3  6  5  1 NA  3  6  5  7 NA  5  8  5  5  3  3
## [2449]  5  7  7  4 10  8  5  5  5  5 NA 10  2  5  6  7  3  5 10  2  6  5  2  4
## [2473]  5  3  6  4  7  6  5  5  5 NA  7
##
## Labels:
##  value      label
##      0       Left
##      1          1
##      2          2
##      3          3
##      4          4
##      5          5
##      6          6
##      7          7
##      8          8
##      9          9
##     10      Right
##     77    Refusal
##     88 Don't know
##     99  No answer
```

```
summary(austria_voters$lrscale)
```

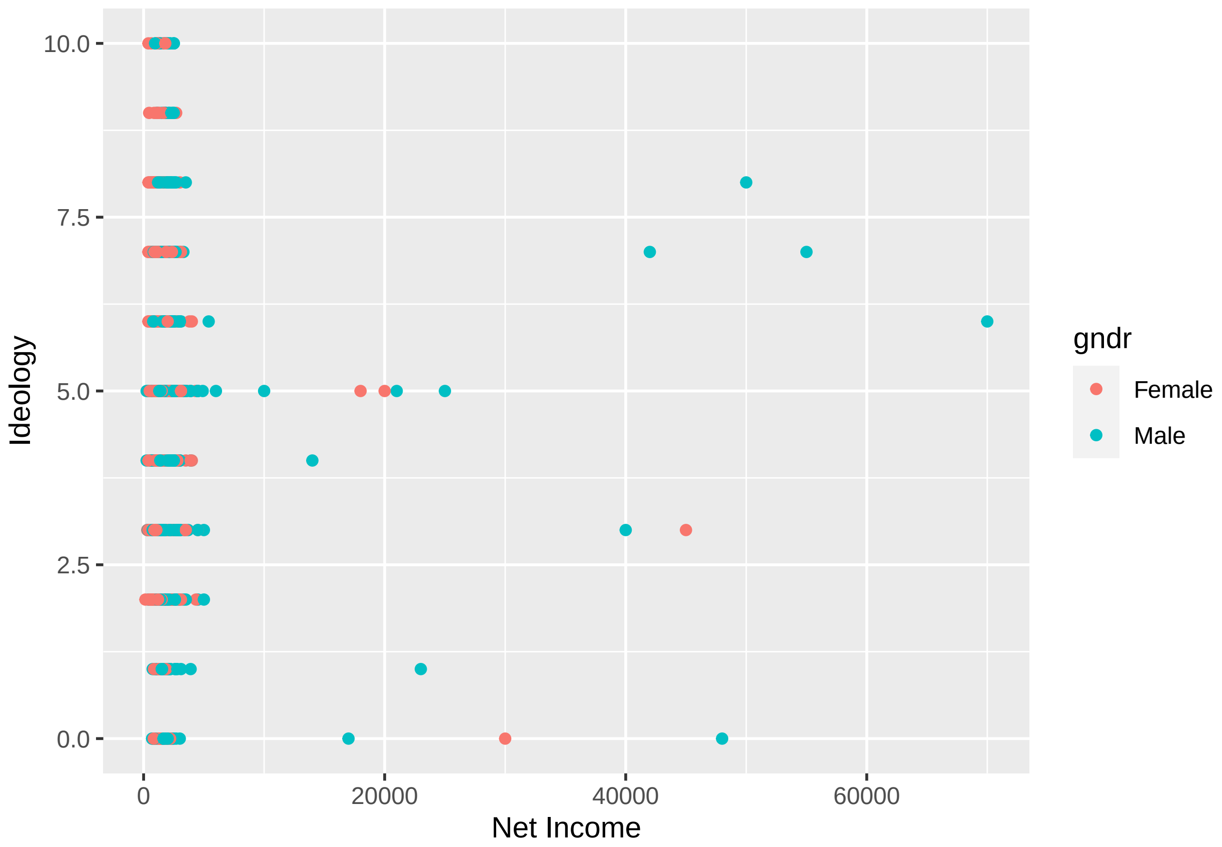
```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.    NA's
##   0.000   4.000   5.000   4.803   6.000  10.000     224
```

```
austrian_gender_new <- austria_voters %>%
  mutate(gndr = case_when(
    gndr == 1 ~ "Male",
    gndr == 2 ~ "Female"
  ))
```

```
ggplot(data = austrian_gender_new, mapping = aes (x=netinum, y=lrscale, color = gndr)) +
  geom_point() +
  labs(Titel = "Scatterplot", x = "Net Income", y= "Ideology")
```

```
## Don't know how to automatically pick scale for object of type haven_labelled/vctrs_vctr/double. Defau
## Don't know how to automatically pick scale for object of type haven_labelled/vctrs_vctr/double. Defa
```

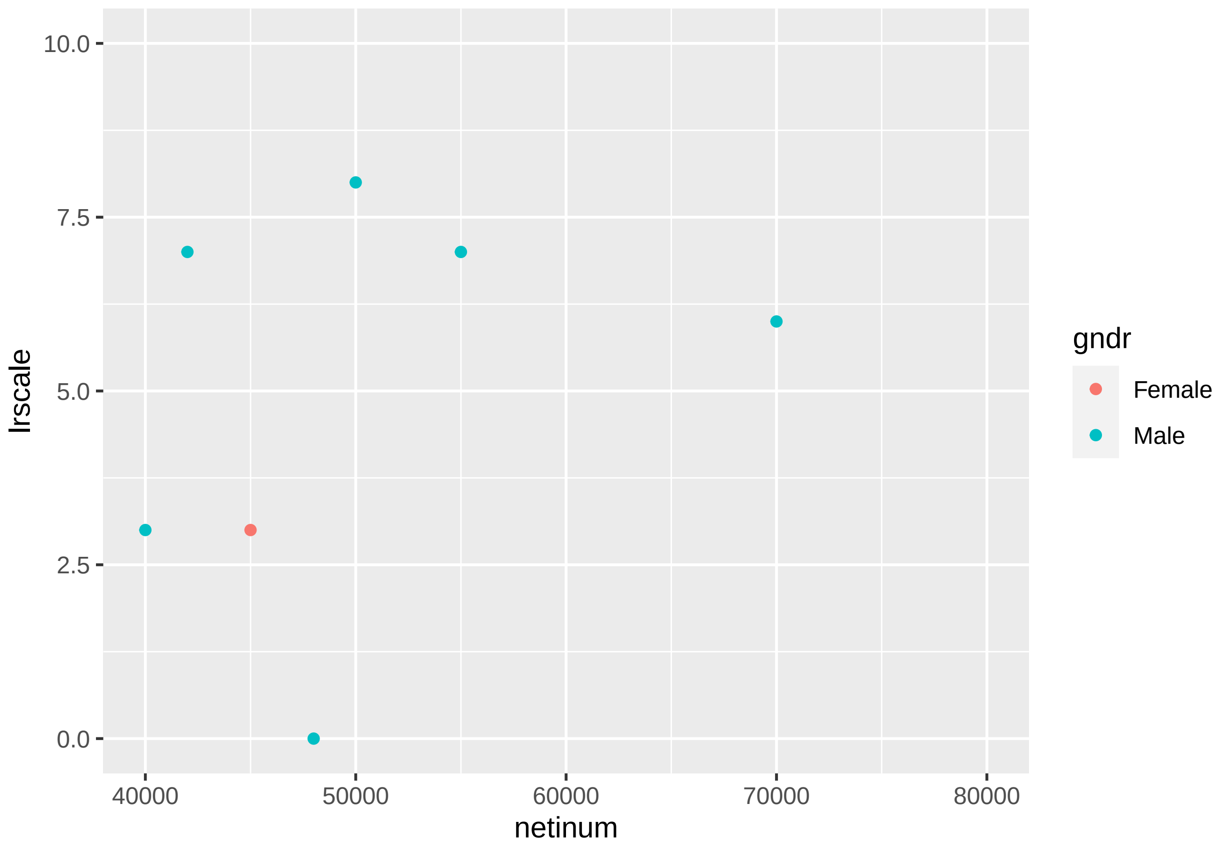
```
## Warning: Removed 832 rows containing missing values (geom_point).
```



```
# Zoom into a specified area
ggplot(austrian_gender_new, aes(netinum, lrscale, color = gndr)) +
  geom_point() +
  xlim(40000, 80000)
```

```
## Don't know how to automatically pick scale for object of type haven_labelled/vctrs_vctr/double. Defau
```

```
## Warning: Removed 2476 rows containing missing values (geom_point).
```



```
ylim (5.0, 8.75)
```

```
## <ScaleContinuousPosition>
##  Range:
##  Limits:    5 -- 8.75
```