Individual_work.R

ASUS

2024-01-25

```
setwd("C:/Users/ASUS/Desktop/2nd-trimester/R")
std_data=read.csv("13-Influence of AI TOOLS on Student's Learning Process.csv",header=T)

#Dropping unwanted columns and cleaning the dataset
drop=c("Timestamp","Username","Any.Comments..Review")
std_data= std_data[,!(names(std_data) %in% drop)]

#change column_names
colnames(std_data)=c("ar","g","e","freq","access","sat_per","impt","recall","mot_ler","sat_info","sat",
str(std_data)
```

```
## 'data.frame':    158 obs. of  22 variables:
##  $ ar      : chr  "18-24" "18-24" "18-24" "18-24" ...
##  $ g       : chr  "Male" "Male" "Male" "Male" ...
##  $ e       : chr  "Postgraduate" "Postgraduate" "Postgraduate" "Undergraduate" ...
##  $ freq    : chr  "Strongly agree" "Agree" "Strongly agree" "Agree" ...
##  $ access  : chr  "Strongly agree" "Agree" "Strongly agree" "Agree" ...
##  $ sat_per : chr  "Strongly agree" "Agree" "Strongly agree" "Strongly agree" ...
##  $ impt    : chr  "Strongly Agree" "Agree" "Agree" "Neutral" ...
##  $ recall  : chr  "Strongly Agree" "Agree" "Agree" "Agree" ...
##  $ mot_ler : chr  "Strongly Agree" "Agree" "Neutral" "Neutral" ...
##  $ sat_info: chr  "Strongly Agree" "Agree" "Disagree" "Agree" ...
##  $ sat     : chr  "Strongly Agree" "Agree" "Strongly Agree" "Agree" ...
##  $ anx     : chr  "Strongly Agree" "Agree" "Strongly Agree" "Agree" ...
##  $ prcy    : chr  "Neutral" "Agree" "Disagree" "Disagree" ...
##  $ saw     : chr  "Agree" "Agree" "Neutral" "Agree" ...
##  $ p_att   : chr  "Neutral" "Agree" "Agree" "Neutral" ...
##  $ flex    : chr  "Disagree" "Agree" "Disagree" "Agree" ...
##  $ under   : chr  "Agree" "Agree" "Strongly Disagree" "Agree" ...
##  $ i_feed  : chr  "Strongly Agree" "Agree" "Disagree" "Agree" ...
##  $ m_obj   : chr  "Strongly Agree" "Agree" "Strongly Agree" "Agree" ...
##  $ p_alter : chr  "Strongly Agree" "Agree" "Strongly Agree" "Agree" ...
##  $ add_s   : chr  "Strongly Agree" "Agree" "Disagree" "Agree" ...
##  $ l_exp   : chr  "Strongly Agree" "Agree" "Agree" "Agree" ...
```

```
summary(std_data)
```

```
##       ar                  g                   e                  freq
##  Length:158         Length:158         Length:158         Length:158
##  Class :character   Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character   Mode  :character
##     access            sat_per              impt              recall
##  Length:158         Length:158         Length:158         Length:158
```

```
##  Class :character   Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character   Mode  :character
##    mot_ler            sat_info           sat                anx
##  Length:158         Length:158         Length:158         Length:158
##  Class :character   Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character   Mode  :character
##      prcy               saw                p_att              flex
##  Length:158         Length:158         Length:158         Length:158
##  Class :character   Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character   Mode  :character
##     under              i_feed             m_obj              p_alter
##  Length:158         Length:158         Length:158         Length:158
##  Class :character   Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character   Mode  :character
##     add_s              l_exp
##  Length:158         Length:158
##  Class :character   Class :character
##  Mode  :character   Mode  :character
```

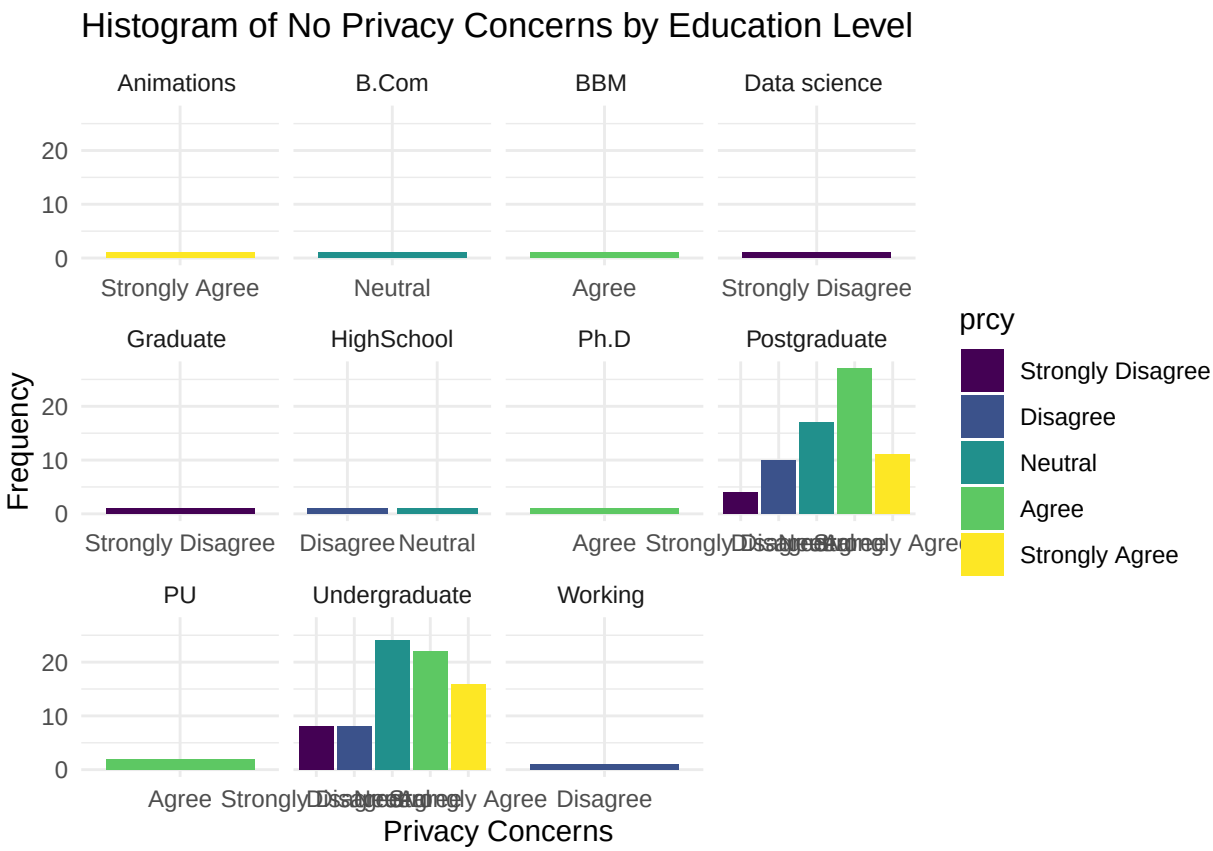
```
ar=factor(std_data$ar)
g=factor(std_data$g)
e=factor(std_data$e)

#Graph-1
library(ggplot2)
library(dplyr)
```

```
##
## Attaching package: 'dplyr'
```

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

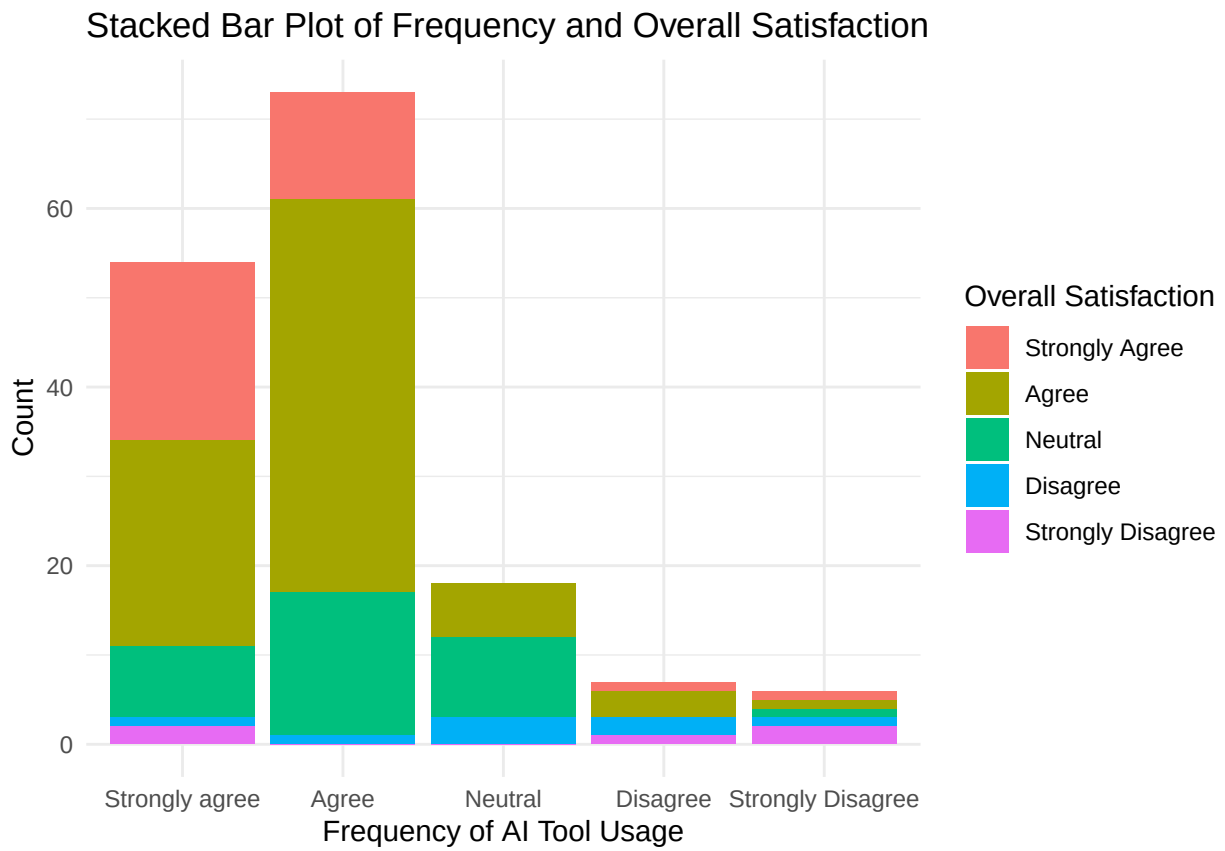
```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
std_data$prcy <- factor(std_data$prcy, ordered = TRUE,
                        levels = c("Strongly Disagree", "Disagree", "Neutral", "Agree", "Strongly Agree
ggplot(std_data, aes(x = prcy, fill = prcy)) +
  geom_bar(position = "stack") +
  facet_wrap(~ e, scales = "free_x") +
  labs(title = "Histogram of No Privacy Concerns by Education Level",
       x = "Privacy Concerns",
       y = "Frequency") +
  theme_minimal()
```

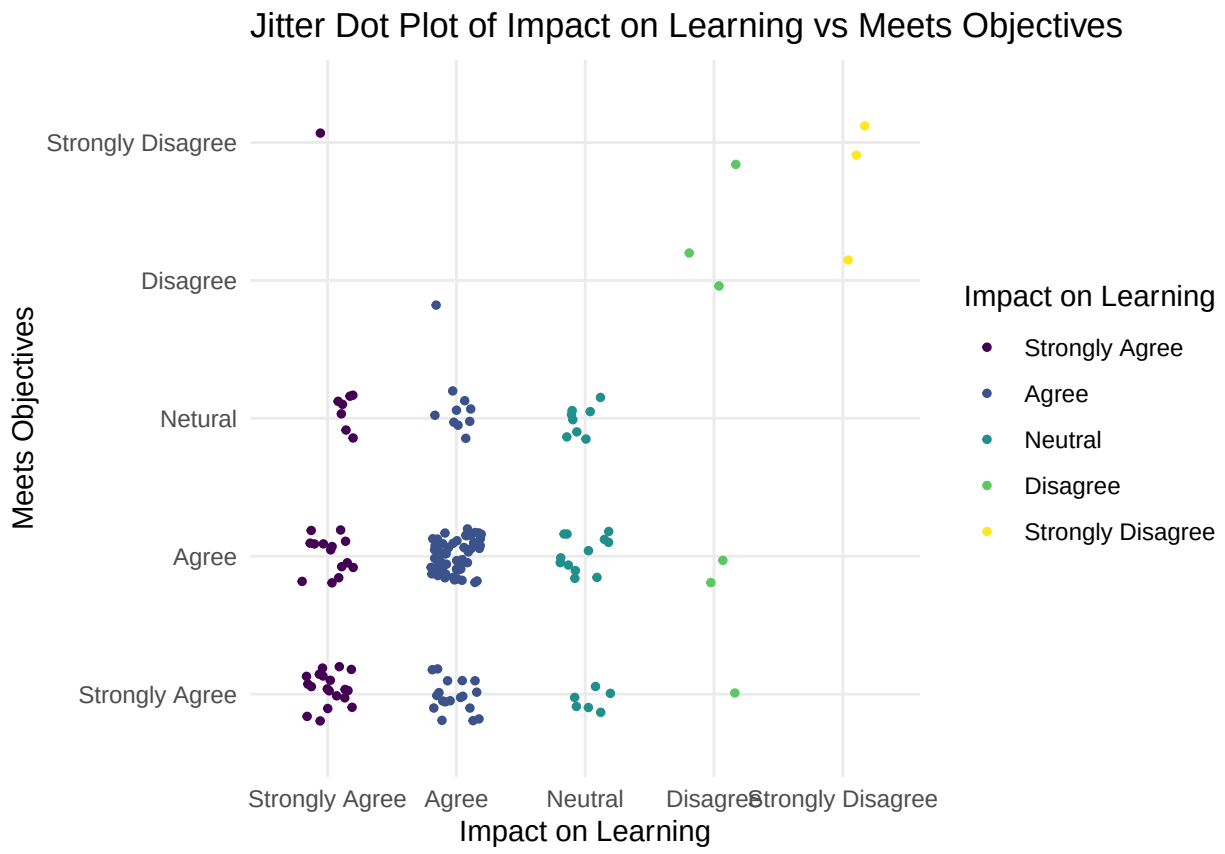



```
#UNDERSTANDING THE GRAPH - 1
# The maximum number of responses are from respondents who are Undergraduates or Postgraduates.
# Most of the respondants who frequently use AI Tools have less privacy concerns(Agree), whereas few ha
```

```
#Graph-2
std_data$freq <- factor(std_data$freq, ordered = TRUE, levels = c("Strongly agree", "Agree", "Neutral",
std_data$sat <- factor(std_data$sat, ordered = TRUE, levels = c("Strongly Agree", "Agree", "Neutral", "
count_data <- as.data.frame(table(std_data$freq, std_data$sat))
colnames(count_data) <- c("Frequency", "Overall_Satisfaction", "Count")
ggplot(count_data, aes(x = Frequency, y = Count, fill = Overall_Satisfaction)) +
  geom_bar(stat = "identity", position = "stack") +
  labs(title = "Stacked Bar Plot of Frequency and Overall Satisfaction",
       x = "Frequency of AI Tool Usage",
       y = "Count",
       fill = "Overall Satisfaction") +
  theme_minimal()
```

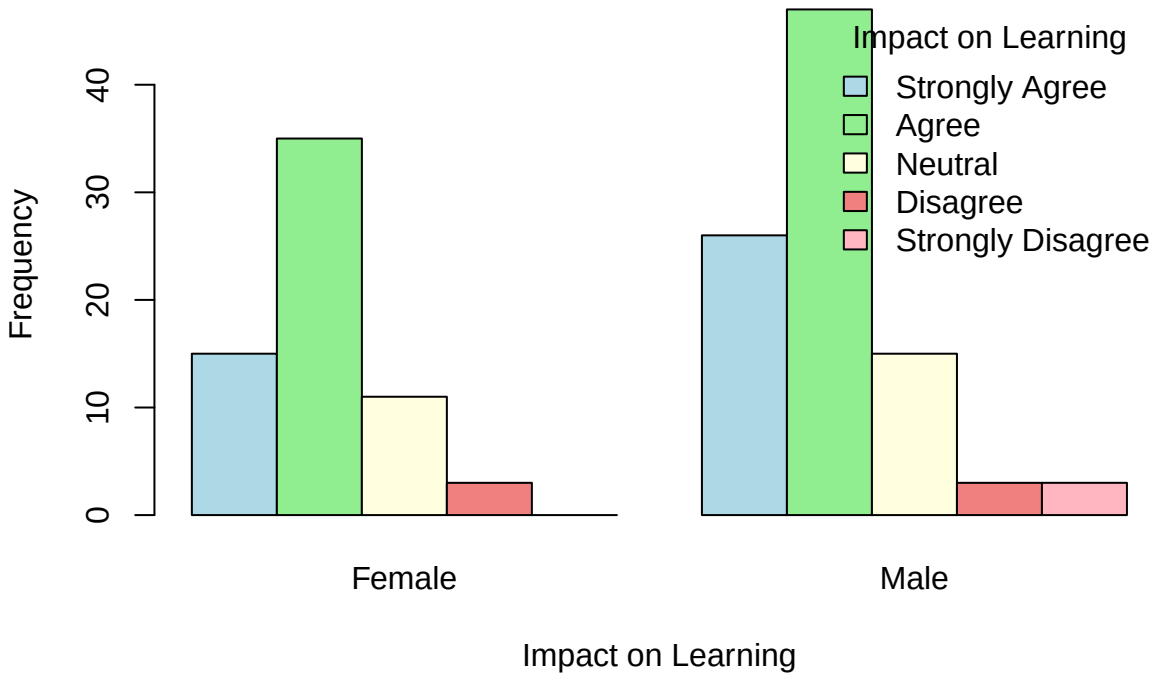



```
#UNDERSTANDING THE GRAPH - 2
#Most users who use Ai Tools Frequently are overall satisfied with the services provided
#Anyhow very few who use the AI tools are not satisfied



#Graph-3
std_data$impt <- factor(std_data$impt, ordered = TRUE, levels =c("Strongly Agree", "Agree", "Neutral",
std_data$m_obj <- factor(std_data$m_obj, ordered = TRUE, levels =  c("Strongly Agree", "Agree", "Netura
ggplot(std_data, aes(x = impt, y = m_obj, color = impt)) +
  geom_jitter(position = position_jitter(width = 0.2, height = 0.2), size = 1) +
  labs(title = "Jitter Dot Plot of Impact on Learning vs Meets Objectives",
       x = "Impact on Learning",
       y = "Meets Objectives",
       color = "Impact on Learning") +
  theme_minimal()
```




```
#UNDERSTANDING THE GRAPH - 3
#Meeting the objectives of the query plays a important role in impacting the user learning experience
#Better the Response of the AI Tools leads to Better Learning experience of the User
```

```
#Graph-4
barplot(t(table(std_data$g, std_data$impt)), beside = TRUE,
        col = c("lightblue", "lightgreen", "lightyellow", "lightcoral", "lightpink"),
        main = "Comparison of Gender and Impact on Learning",
        xlab = "Impact on Learning",
        ylab = "Frequency",
        names.arg = levels(std_data$g),
        legend.text = levels(std_data$impt),
        args.legend = list(x = "topright", bty = "n", title = "Impact on Learning")) +
  theme(legend.position = "bottom")  # Adjust legend position
```

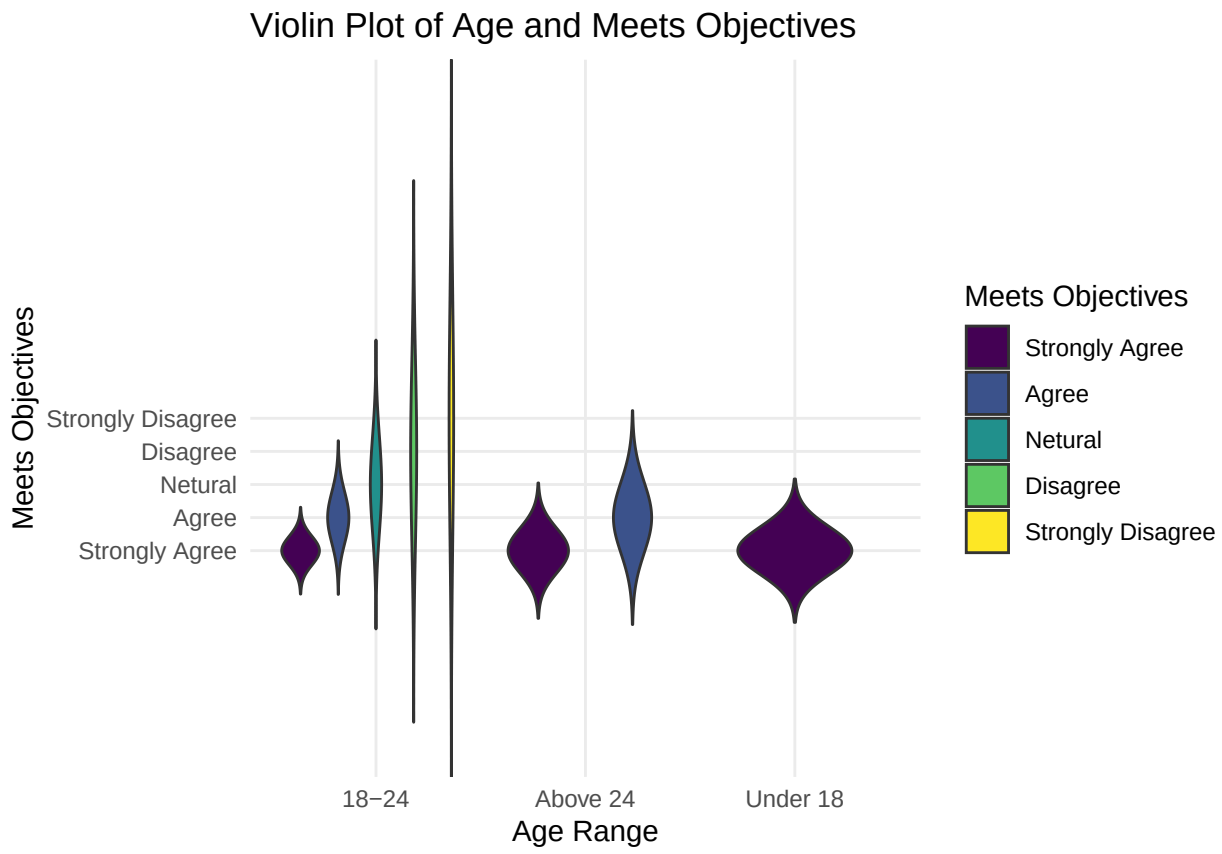



```
## NULL
```

```
#UNDERSTANDING THE GRAPH - 4
#The respondents have a positive impact on their learning by using AI tool
#Very few respondents disagree that the AI tools impact their learning
```

```
#Graph-5
std_data$ar <- factor(std_data$ar)
std_data$m_obj <- factor(std_data$m_obj, ordered = TRUE, levels = c("Strongly Agree", "Agree", "Netural
ggplot(std_data, aes(x = ar, y = m_obj, fill = m_obj)) +
  geom_violin(trim = FALSE) +
  labs(title = "Violin Plot of Age and Meets Objectives",
       x = "Age Range",
       y = "Meets Objectives",
       fill = "Meets Objectives") +
  theme_minimal()
```

```
## Warning: Groups with fewer than two data points have been dropped.
## Groups with fewer than two data points have been dropped.
## Groups with fewer than two data points have been dropped.
## Groups with fewer than two data points have been dropped.
```




```
#UNDERSTANDING THE GRAPH - 5
#Teenagers(Under-18) and above-24 aged people who use AI tools gets their responses which meets the obj
#For the people who are aged between 18-24 AI have met most of the objectives but still few people are



#converting the columns into relevant datatype
std_data$g<-factor(std_data$g)
std_data$ar<-factor(std_data$ar)
std_data$e<-factor(std_data$e)

library(dplyr)

map_scale_values <- function(value) {
  case_when(
    as.character(value) %in% c("Strongly Agree", "Strongly agree") ~ 5,
    as.character(value) %in% c("Agree") ~ 4,
    as.character(value) %in% c("Neutral","Netural") ~ 3,
    as.character(value) %in% c("Disagree") ~ 2,
    as.character(value) %in% c("Strongly Disagree") ~ 1,
    TRUE ~ NA_real_  # for any other cases
  )
}
convert_columns=c("freq","access","sat_per","impt","recall","mot_ler","sat_info","sat","anx","prcy","sa

# Apply the mapping function to specified columns
```

```r
std_data <- std_data %>%
  mutate_at(vars(convert_columns), ~map_scale_values(.))
```

```
## Warning: Using an external vector in selections was deprecated in tidyselect 1.1.0.
## i Please use `all_of()` or `any_of()` instead.
##   # Was:
##   data %>% select(convert_columns)
##
##   # Now:
##   data %>% select(all_of(convert_columns))
##
## See <https://tidyselect.r-lib.org/reference/faq-external-vector.html>.
## This warning is displayed once every 8 hours.
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was
## generated.
```

```r
std_data
```

```
##           ar      g             e freq access sat_per impt recall mot_ler
## 1      18-24   Male  Postgraduate    5      5       5    5      5       5
## 2      18-24   Male  Postgraduate    4      4       4    4      4       4
## 3      18-24   Male  Postgraduate    5      5       5    4      4       3
## 4      18-24   Male Undergraduate    4      4       5    3      4       3
## 5      18-24   Male Undergraduate    5      5       4    4      4       4
## 6      18-24   Male Undergraduate    4      4       4    4      3       4
## 7      18-24   Male  Postgraduate    3      3       3    3      3       3
## 8      18-24 Female  Postgraduate    4      4       4    3      3       2
## 9      18-24 Female Undergraduate    5      5       5    5      5       5
## 10  Under 18   Male Undergraduate    5      5       5    5      5       4
## 11     18-24   Male Undergraduate    4      5       5    4      3       4
## 12     18-24   Male Undergraduate    5      5       4    4      3       4
## 13     18-24   Male  Postgraduate    5      5       1    4      3       3
## 14     18-24   Male Undergraduate    3      5       5    4      3       4
## 15     18-24   Male Undergraduate    5      5       5    5      4       5
## 16     18-24   Male Undergraduate    5      4       2    4      5       5
## 17  Above 24   Male  Postgraduate    4      4       5    4      4       4
## 18     18-24 Female Undergraduate    5      5       5    4      4       4
## 19     18-24 Female  Postgraduate    5      5       5    5      5       5
## 20     18-24   Male Undergraduate    1      3       1    1      1       1
## 21  Above 24 Female  Postgraduate    4      4       3    4      4       4
## 22     18-24 Female Undergraduate    4      4       3    4      3       4
## 23     18-24 Female Undergraduate    5      5       5    5      5       5
## 24     18-24 Female Undergraduate    2      3       3    2      2       2
## 25     18-24   Male Data science     5      4       4    3      3       3
## 26     18-24   Male  Postgraduate    4      4       4    3      3       2
## 27     18-24   Male Undergraduate    4      4       4    4      4       4
## 28     18-24   Male  Postgraduate    4      3       4    4      3       4
## 29     18-24   Male Undergraduate    4      3       3    4      4       3
## 30     18-24   Male Undergraduate    4      5       5    5      5       4
## 31     18-24   Male Undergraduate    5      3       5    5      5       5
## 32     18-24 Female Undergraduate    5      4       4    5      4       5
## 33     18-24   Male          B.Com   3      3       3    3      3       3
## 34     18-24   Male Undergraduate    5      5       3    4      4       3
## 35     18-24 Female Undergraduate    4      5       4    4      4       4
```

```
## 36     18-24   Male Undergraduate    4      4       4    4      4       3
## 37     18-24   Male Undergraduate    4      4       4    4      4       4
## 38     18-24 Female  Postgraduate    4      5       4    5      4       3
## 39     18-24   Male Undergraduate    4      4       3    4      4       4
## 40     18-24 Female Undergraduate    4      3       4    3      3       2
## 41     18-24   Male  Postgraduate    4      3       3    4      3       3
## 42  Under 18   Male  Postgraduate    5      3       4    5      2       4
## 43     18-24 Female  Postgraduate    2      2       2    3      3       3
## 44     18-24   Male Undergraduate    4      4       4    5      4       5
## 45  Above 24   Male  Postgraduate    3      5       5    5      4       4
## 46     18-24 Female  Postgraduate    4      4       4    5      5       5
## 47     18-24 Female Undergraduate    4      3       3    4      5       4
## 48     18-24 Female  Postgraduate    3      3       4    5      4       4
## 49  Above 24 Female Undergraduate    4      4       4    4      3       4
## 50     18-24 Female  Postgraduate    4      4       4    4      3       4
## 51     18-24 Female Undergraduate    5      5       5    5      5       5
## 52     18-24 Female Undergraduate    4      5       4    4      3       3
## 53  Under 18   Male            PU    4      5       4    3      4       5
## 54  Above 24 Female Undergraduate    4      4       3    4      3       3
## 55     18-24 Female Undergraduate    3      4       4    4      4       4
## 56  Above 24   Male     Graduate     3      4       4    4      5       3
## 57     18-24 Female Undergraduate    3      4       4    4      4       4
## 58     18-24   Male Undergraduate    4      4       3    3      2       3
## 59  Above 24 Female          Ph.D    3      4       2    4      3       2
## 60  Above 24   Male   Animations     4      4       4    4      5       3
## 61     18-24   Male Undergraduate    5      4       4    4      5       4
## 62  Above 24 Female  Postgraduate    3      4       4    4      3       3
## 63     18-24 Female Undergraduate    5      5       5    4      5       5
## 64     18-24   Male Undergraduate    5      5       4    4      4       4
## 65     18-24 Female Undergraduate    4      3       5    2      3       1
## 66     18-24   Male  Postgraduate    1      2       2    5      5       5
## 67     18-24 Female  Postgraduate    5      4       3    5      4       5
## 68     18-24   Male  Postgraduate    4      4       4    4      4       4
## 69  Above 24   Male  Postgraduate    2      4       4    5      5       5
## 70     18-24 Female Undergraduate    4      3       4    4      3       4
## 71     18-24   Male  Postgraduate    5      4       3    5      4       3
## 72  Above 24 Female          BBM     4      3       4    4      5       4
## 73     18-24 Female Undergraduate    5      4       5    4      5       3
## 74     18-24 Female  Postgraduate    4      4       4    4      4       4
## 75     18-24   Male Undergraduate    4      4       1    4      3       2
## 76     18-24 Female Undergraduate    4      4       4    4      4       4
## 77     18-24   Male Undergraduate    5      5       5    5      5       5
## 78     18-24   Male Undergraduate    4      4       3    5      4       3
## 79     18-24   Male Undergraduate    5      4       3    5      4       5
## 80     18-24   Male Undergraduate    4      3       3    4      4       4
## 81     18-24 Female Undergraduate    3      4       3    3      3       3
## 82     18-24   Male Undergraduate    5      5       5    5      5       5
## 83  Under 18   Male            PU    5      5       5    4      3       3
## 84     18-24   Male Undergraduate    4      5       4    5      5       5
## 85     18-24   Male  Postgraduate    5      5       3    4      5       3
## 86     18-24 Female  Postgraduate    2      4       3    4      3       4
## 87     18-24 Female Undergraduate    5      4       4    4      5       4
## 88     18-24 Female  Postgraduate    4      5       4    4      4       4
## 89     18-24 Female  Postgraduate    5      5       4    5      3       4
```

```
## 90     18-24 Female Undergraduate    4      4       2    3      4       4
## 91  Above 24   Male  Postgraduate    5      5       5    4      4       5
## 92  Above 24   Male  Postgraduate    4      4       4    5      5       4
## 93  Above 24 Female Undergraduate    3      5       4    4      2       3
## 94     18-24 Female Undergraduate    4      4       4    5      3       4
## 95     18-24   Male  Postgraduate    4      4       4    4      4       4
## 96     18-24   Male Undergraduate    1      5       5    3      3       3
## 97     18-24   Male  Postgraduate    4      3       5    4      3       4
## 98     18-24   Male  Postgraduate    5      4       3    2      3       4
## 99     18-24 Female  Postgraduate    4      5       4    5      4       5
## 100    18-24   Male  Postgraduate    4      4       4    4      4       4
## 101    18-24   Male  Postgraduate    5      4       3    4      3       3
## 102    18-24   Male  Postgraduate    5      4       3    3      2       1
## 103    18-24   Male  Postgraduate    4      5       4    3      4       3
## 104    18-24   Male  Postgraduate    2      1       3    2      1       3
## 105    18-24 Female  Postgraduate    4      3       5    4      3       2
## 106    18-24   Male Undergraduate    1      4       4    5      4       3
## 107    18-24 Female Undergraduate    1      3       1    3      1       2
## 108 Above 24   Male       Working    4      5       4    5      4       4
## 109 Under 18 Female    HighSchool    5      5       3    4      4       4
## 110    18-24 Female Undergraduate    3      3       3    3      3       2
## 111 Above 24   Male  Postgraduate    2      4       3    4      3       4
## 112    18-24 Female    HighSchool    5      5       3    4      4       4
## 113    18-24 Female Undergraduate    4      5       5    5      4       5
## 114    18-24 Female Undergraduate    3      3       3    4      3       4
## 115    18-24   Male  Postgraduate    5      4       4    4      3       3
## 116    18-24 Female Undergraduate    5      5       4    4      3       3
## 117    18-24 Female  Postgraduate    5      5       4    5      5       3
## 118    18-24   Male Undergraduate    4      4       4    4      2       3
## 119    18-24   Male Undergraduate    5      5       5    5      5       5
## 120    18-24 Female Undergraduate    4      4       3    4      4       5
## 121    18-24   Male Undergraduate    5      5       5    5      5       5
## 122    18-24   Male  Postgraduate    5      5       4    4      5       4
## 123    18-24   Male  Postgraduate    5      5       5    5      5       5
## 124    18-24   Male Undergraduate    5      5       5    5      5       5
## 125    18-24 Female Undergraduate    4      4       4    4      4       4
## 126    18-24 Female  Postgraduate    4      4       4    4      4       4
## 127    18-24 Female Undergraduate    4      4       4    3      3       4
## 128    18-24   Male  Postgraduate    4      4       4    4      4       4
## 129    18-24 Female Undergraduate    4      4       4    4      4       3
## 130    18-24 Female Undergraduate    3      3       3    3      3       3
## 131    18-24   Male Undergraduate    5      4       3    1      2       3
## 132    18-24 Female Undergraduate    4      5       4    4      4       3
## 133    18-24 Female Undergraduate    2      2       2    2      2       2
## 134    18-24   Male  Postgraduate    5      5       5    5      5       5
## 135    18-24   Male Undergraduate    5      5       4    3      4       5
## 136    18-24   Male Undergraduate    4      4       4    4      4       4
## 137    18-24   Male  Postgraduate    4      4       4    4      4       4
## 138    18-24 Female Undergraduate    5      5       3    5      3       5
## 139 Above 24   Male  Postgraduate    5      4       5    4      4       4
## 140 Above 24   Male Undergraduate    1      1       1    1      1       1
## 141    18-24   Male  Postgraduate    4      4       3    3      4       4
## 142 Above 24   Male  Postgraduate    4      5       4    5      4       5
## 143    18-24   Male  Postgraduate    3      3       3    3      4       2
```

```
## 144    18-24 Female  Postgraduate    4      4       4    4      4       3
## 145    18-24 Female  Postgraduate    4      3       4    3      4       3
## 146    18-24   Male  Postgraduate    4      4       4    4      4       3
## 147    18-24   Male  Postgraduate    5      4       4    4      3       3
## 148    18-24   Male  Postgraduate    4      4       2    4      3       4
## 149    18-24   Male  Postgraduate    5      4       5    4      5       4
## 150    18-24   Male  Postgraduate    4      5       4    4      5       4
## 151    18-24   Male  Postgraduate    4      4       4    3      2       2
## 152    18-24 Female  Postgraduate    4      4       4    3      3       2
## 153    18-24 Female  Postgraduate    3      3       3    4      3       3
## 154    18-24   Male  Postgraduate    3      4       3    2      2       2
## 155    18-24   Male  Postgraduate    5      5       2    4      1       5
## 156    18-24   Male  Postgraduate    4      5       4    4      2       3
## 157    18-24   Male  Postgraduate    4      5       5    3      3       4
## 158    18-24   Male Undergraduate    5      5       5    5      3       3
##     sat_info sat anx prcy saw p_att flex under i_feed m_obj p_alter add_s l_exp
## 1          5   5   5    3   4     3    2     4       5     5       5     5     5
## 2          4   4   4    4   4     4    4     4       4     4       4     4     4
## 3          2   5   5    2   3     4    2     1       2     5       5     2     4
## 4          4   4   4    2   4     3    4     4       4     4       4     4     4
## 5          5   5   5    5   4     3    2     4       3     4       5     4     3
## 6          4   4   4    5   5     3    4     4       3     4       4     3     4
## 7          3   3   5    3   1     3    3     3       3     3       3     4     3
## 8          3   3   4    3   2     3    1     2       2     4       3     2     3
## 9          5   5   5    5   5     5    5     5       5     5       5     5     5
## 10         4   5   4    5   4     4    4     4       5     5       4     3     5
## 11         4   4   4    4   4     4    3     4       4     4       4     3     4
## 12         4   4   4    3   3     5    3     4       4     4       4     4     4
## 13         4   4   4    4   3     4    2     1       3     5       3     4     3
## 14         3   4   4    2   3     4    4     4       4     5       5     5     4
## 15         5   5   5    1   4     4    3     4       4     5       5     5     5
## 16         4   4   4    4   4     4    4     4       4     4       4     4     4
## 17         4   4   5    4   4     4    4     4       4     5       5     5     4
## 18         4   3   4    3   3     4    4     4       4     4       4     4     4
## 19         4   3   3    3   3     4    3     3       3     3       3     3     3
## 20         1   1   1    1   1     1    1     1       1     1       1     1     1
## 21         4   4   4    4   4     4    4     4       4     4       4     4     4
## 22         3   3   4    3   4     4    4     4       4     4       4     4     4
## 23         5   5   5    5   5     5    5     5       5     5       5     5     5
## 24         5   2   2    2   2     3    4     2       2     4       2     4     3
## 25         2   2   3    1   2     3    4     2       1     5       4     5     4
## 26         2   4   2    2   2     2    2     2       2     4       4     2     5
## 27         4   5   5    4   5     4    4     5       4     5       4     4     4
## 28         3   4   4    2   2     3    2     3       4     4       4     5     4
## 29         4   4   4    3   3     3    4     4       4     4       4     4     4
## 30         4   5   5    2   5     5    4     5       5     3       5     5     4
## 31         5   4   3    3   5     4    4     5       4     3       4     5     5
## 32         5   4   4    4   5     4    4     4       5     4       5     5     4
## 33         3   3   3    3   3     3    3     3       3     3       3     3     3
## 34         4   3   3    4   5     5    4     4       3     4       4     4     4
## 35         4   4   4    4   4     4    4     4       4     4       4     4     4
## 36         4   5   3    4   4     4    3     4       4     4       5     4     4
## 37         4   4   4    4   4     4    4     4       4     4       4     4     4
## 38         2   4   2    2   3     4    2     4       2     4       4     4     4
```

```
## 39      3  3  3  3  3  3  3  3  3  3  3  3  3
## 40      3  4  3  2  2  3  2  4  3  4  4  4  4
## 41      5  5  4  4  3  5  4  4  5  4  5  4  4
## 42      5  3  4  3  2  5  3  4  3  3  4  1  3
## 43      3  4  2  2  4  3  3  4  3  4  3  4  4
## 44      4  4  4  3  4  4  3  4  4  4  4  3  4
## 45      4  4  4  3  3  4  4  4  4  4  4  4  4
## 46      4  4  4  4  4  4  4  4  4  3  3  4  4
## 47      4  4  3  4  4  4  5  5  5  4  4  5  4
## 48      5  4  3  4  4  5  4  5  4  4  3  5  4
## 49      4  4  3  4  4  4  4  4  4  4  4  3  4
## 50      4  4  4  4  4  4  3  4  4  4  4  4  4
## 51      5  5  5  5  5  5  5  5  5  5  5  5  5
## 52      3  2  3  4  3  4  4  3  4  3  4  5  4
## 53      5  4  5  4  4  5  5  5  4  5  4  5  5
## 54      4  3  4  1  4  4  4  4  4  4  4  3  4
## 55      3  4  3  3  3  4  3  4  4  3  4  4  4
## 56      2  2  2  1  1  2  3  3  3  4  4  4  3
## 57      3  3  3  3  3  4  4  4  4  4  4  4  4
## 58      3  3  3  1  1  3  3  3  4  4  3  3  3
## 59      5  3  3  4  3  4  4  5  5  3  4  4  3
## 60      4  4  4  5  5  5  5  4  5  4  4  4  4
## 61      5  4  3  4  4  5  4  4  5  4  4  4  4
## 62      4  3  3  3  4  4  4  3  4  4  4  5  4
## 63      5  5  4  5  4  5  5  5  5  5  5  5  5
## 64      4  5  5  4  3  3  2  5  5  5  4  4  5
## 65      3  3  4  2  2  4  1  4  3  4  4  3  5
## 66      4  5  5  4  5  5  4  5  4  5  5  4  4
## 67      4  4  5  5  4  4  5  1  4  1  3  5  4
## 68      4  4  3  3  3  3  3  4  4  4  4  3  4
## 69      4  5  4  3  3  2  4  5  4  4  4  4  4
## 70      4  4  3  3  3  3  3  4  3  4  3  3  3
## 71      5  4  3  4  5  4  3  5  3  5  4  3  4
## 72      4  3  5  4  4  5  4  4  5  5  5  4  4
## 73      3  3  4  4  4  4  3  4  5  5  4  5  4
## 74      3  4  4  3  4  4  3  5  4  4  4  3  4
## 75      4  4  3  3  4  3  4  3  4  3  4  3  4
## 76      4  4  4  4  4  4  4  4  4  4  4  4  4
## 77      5  5  5  5  5  5  5  5  5  5  5  5  5
## 78      2  4  3  5  4  4  5  4  4  4  4  5  3
## 79      3  4  4  3  4  5  4  4  4  4  4  5  4
## 80      4  4  4  4  4  4  4  4  4  4  4  4  4
## 81      4  3  3  3  3  3  3  3  3  3  3  3  3
## 82      5  5  5  3  4  5  3  5  5  5  5  5  5
## 83      3  4  5  4  5  4  3  3  4  5  5  5  5
## 84      4  4  5  4  4  5  3  4  2  3  4  4  4
## 85      3  4  5  5  4  3  3  4  3  5  5  4  3
## 86      4  4  3  4  4  4  4  4  4  4  3  3  4
## 87      5  5  4  5  4  4  4  4  5  4  5  4  4
## 88      4  4  5  5  5  5  5  5  5  4  4  4  4
## 89      2  4  3  4  3  3  3  4  5  4  4  5  4
## 90      3  4  4  3  2  4  1  2  3  3  3  3  3
## 91      5  4  4  5  4  5  4  5  5  5  5  4  4
## 92      5  4  5  5  4  4  4  5  5  4  5  5  4
```

```
## 93      3  4  2  4  2  4  4  5  4  4  5  5  4
## 94      5  5  3  1  5  5  5  5  5  5  5  5  5
## 95      4  4  4  4  4  4  4  4  4  4  4  4  4
## 96      3  3  3  3  2  2  2  2  2  3  3  4  3
## 97      4  3  5  3  5  3  4  5  4  4  4  4  5
## 98      5  4  3  3  4  5  4  3  4  5  4  3  4
## 99      3  5  4  4  4  4  5  5  4  5  5  4  4
## 100     4  4  4  4  4  4  4  4  4  4  4  4  4
## 101     2  4  4  4  4  4  4  4  4  5  4  4  4
## 102     5  1  3  4  2  5  3  2  2  4  3  3  1
## 103     4  4  4  3  3  4  3  3  4  4  4  4  4
## 104     2  1  1  1  2  3  2  2  1  1  2  1  2
## 105     4  3  3  1  2  2  1  2  1  4  4  4  4
## 106     3  4  5  5  3  4  4  4  3  4  5  3  4
## 107     4  2  1  1  1  3  4  4  2  3  3  2  2
## 108     4  4  3  2  4  3  4  4  4  4  4  3  4
## 109     4  3  3  3  3  4  3  4  4  4  4  3  4
## 110     4  4  4  3  4  4  3  3  3  4  3  4  4
## 111     5  4  3  2  4  4  4  5  5  4  4  3  4
## 112     3  5  4  2  3  4  4  5  3  5  5  4  4
## 113     5  5  5  2  4  2  2  4  4  4  5  5  5
## 114     3  3  4  3  3  4  3  3  3  3  4  4  4
## 115     4  4  3  2  4  3  3  3  3  5  4  4  3
## 116     3  3  3  3  2  3  2  2  3  4  4  3  3
## 117     5  4  5  3  5  5  5  5  4  5  4  5  4
## 118     3  5  5  3  3  5  4  4  5  4  4  3  4
## 119     5  5  5  5  5  5  5  5  5  5  5  5  5
## 120     5  4  2  1  4  4  4  5  5  4  4  4  5
## 121     5  5  5  5  5  5  5  5  5  5  5  5  5
## 122     3  4  4  4  4  3  3  3  3  4  4  4  5
## 123     5  5  5  5  5  5  5  5  5  5  5  5  5
## 124     5  5  5  5  5  5  5  5  5  5  5  5  5
## 125     4  4  4  4  4  4  4  4  4  4  4  4  4
## 126     2  3  3  2  4  3  3  4  3  4  4  3  3
## 127     3  4  4  3  3  4  3  4  3  4  3  3  3
## 128     4  4  4  5  5  4  4  4  5  4  4  4  4
## 129     3  4  4  4  4  4  4  4  4  4  4  4  4
## 130     3  3  3  3  3  3  3  3  3  3  3  3  3
## 131     3  4  2  5  1  2  2  5  4  2  3  4  1
## 132     4  5  3  3  3  3  3  4  4  5  4  4  4
## 133     2  2  2  2  2  2  2  2  2  2  2  2  2
## 134     5  5  5  5  4  4  4  4  5  5  5  5  5
## 135     4  4  5  5  5  5  3  3  4  5  5  5  5
## 136     4  4  4  4  4  4  4  4  4  4  4  4  4
## 137     4  4  4  4  4  4  4  4  4  4  4  4  4
## 138     2  3  5  3  1  4  3  3  1  3  4  4  3
## 139     4  4  4  4  4  4  4  5  5  5  5  4  4
## 140     1  1  1  1  1  1  1  1  1  1  1  1  1
## 141     3  5  4  3  4  4  4  4  4  5  4  5  4
## 142     5  5  5  5  5  5  5  5  5  4  4  4  4
## 143     4  2  5  4  5  5  4  5  5  5  4  5  5
## 144     2  4  4  4  4  4  3  3  4  4  4  4  4
## 145     4  3  4  4  3  3  4  3  4  4  3  4  3
## 146     4  3  3  4  4  3  3  3  3  3  3  3  3
```

```
## 147        4   4   3    4   4     3    2     3      3     3       4     5     5
## 148        5   3   4    1   3     4    3     4      4     4       4     4     3
## 149        5   4   5    4   5     4    5     4      5     4       5     4     5
## 150        5   5   4    5   4     4    5     4      5     5       4     5     4
## 151        3   3   3    3   3     3    4     3      3     3       4     4     4
## 152        2   3   3    2   4     3    2     3      4     4       3     2     4
## 153        3   3   4    3   4     4    3     3      3     3       4     4     4
## 154        2   2   4    2   2     2    2     2      2     2       2     2     2
## 155        2   1   4    1   1     1    1     4      4     2       4     3     3
## 156        2   3   2    4   4     5    3     5      3     4       4     5     3
## 157        3   4   5    5   4     5    3     5      5     5       5     5     5
## 158        4   5   5    4   5     5    5     5      5     5       5     5     5
```

```
section_2_columns=c("freq", "sat", "sat_per")
section_3_columns=c("impt", "recall", "mot_ler")
section_4_columns=c("sat", "anx", "prcy", "saw", "p_att", "flex")
section_5_columns=c("under", "i_feed", "m_obj", "p_alter", "add_s", "l_exp")
# Summative score calculation
std_data$section_2_score <- rowSums(select(std_data,section_2_columns), na.rm = TRUE)
```

```
## Warning: Using an external vector in selections was deprecated in tidyselect 1.1.0.
## i Please use `all_of()` or `any_of()` instead.
##   # Was:
##   data %>% select(section_2_columns)
##
##   # Now:
##   data %>% select(all_of(section_2_columns))
##
## See <https://tidyselect.r-lib.org/reference/faq-external-vector.html>.
## This warning is displayed once every 8 hours.
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was
## generated.
```

```
std_data$section_3_score <- rowSums(select(std_data,section_3_columns), na.rm = TRUE)
```

```
## Warning: Using an external vector in selections was deprecated in tidyselect 1.1.0.
## i Please use `all_of()` or `any_of()` instead.
##   # Was:
##   data %>% select(section_3_columns)
##
##   # Now:
##   data %>% select(all_of(section_3_columns))
##
## See <https://tidyselect.r-lib.org/reference/faq-external-vector.html>.
## This warning is displayed once every 8 hours.
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was
## generated.
```

```
std_data$section_4_score <- rowSums(select(std_data,section_4_columns), na.rm = TRUE)
```

```
## Warning: Using an external vector in selections was deprecated in tidyselect 1.1.0.
## i Please use `all_of()` or `any_of()` instead.
##   # Was:
##   data %>% select(section_4_columns)
##
##   # Now:
```

```
##   data %>% select(all_of(section_4_columns))
##
## See <https://tidyselect.r-lib.org/reference/faq-external-vector.html>.
## This warning is displayed once every 8 hours.
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was
## generated.
```

```
std_data$section_5_score <- rowSums(select(std_data,section_5_columns), na.rm = TRUE)
```

```
## Warning: Using an external vector in selections was deprecated in tidyselect 1.1.0.
## i Please use `all_of()` or `any_of()` instead.
##   # Was:
##   data %>% select(section_5_columns)
##
##   # Now:
##   data %>% select(all_of(section_5_columns))
##
## See <https://tidyselect.r-lib.org/reference/faq-external-vector.html>.
## This warning is displayed once every 8 hours.
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was
## generated.
```

```
# Display the updated data frame with the summative score
head(std_data)
```

```
##      ar    g             e freq access sat_per impt recall mot_ler sat_info sat
## 1 18-24 Male  Postgraduate    5      5       5    5      5       5        5   5
## 2 18-24 Male  Postgraduate    4      4       4    4      4       4        4   4
## 3 18-24 Male  Postgraduate    5      5       5    4      4       3        2   5
## 4 18-24 Male Undergraduate    4      4       5    3      4       3        4   4
## 5 18-24 Male Undergraduate    5      5       4    4      4       4        5   5
## 6 18-24 Male Undergraduate    4      4       4    4      3       4        4   4
##   anx prcy saw p_att flex under i_feed m_obj p_alter add_s l_exp
## 1   5    3   4     3    2     4      5     5       5     5     5
## 2   4    4   4     4    4     4      4     4       4     4     4
## 3   5    2   3     4    2     1      2     5       5     2     4
## 4   4    2   4     3    4     4      4     4       4     4     4
## 5   5    5   4     3    2     4      3     4       5     4     3
## 6   4    5   5     3    4     4      3     4       4     3     4
##   section_2_score section_3_score section_4_score section_5_score
## 1              15              15              22              29
## 2              12              12              24              24
## 3              15              11              21              19
## 4              13              10              21              24
## 5              14              12              24              23
## 6              12              11              25              22
```

```
#1.One Sample T-Test
df=data.frame(std_data)
prcymean=mean(std_data$prcy)
# Null Hypothesis (HO):
# The mean of the variable 'prcy' in section-4 is equal to the hypothesized population mean.
# Mathematically: ?_prcy = 3.386076 (where ? represents the population mean)

# Alternative Hypothesis (Ha or H1):
# The mean of the variable 'prcy' in section-4 is not equal to the hypothesized population mean.
```

```r
# Mathematically: ?_prcy ??? 3.386076 (where ? represents the population mean)

t.test(std_data$prcy, mu = prcymean)
```

```
##
##  One Sample t-test
##
## data:  std_data$prcy
## t = 0, df = 157, p-value = 1
## alternative hypothesis: true mean is not equal to 3.386076
## 95 percent confidence interval:
##  3.201145 3.571007
## sample estimates:
## mean of x
##  3.386076
```

```r
# The p-value of 1 is greater than any common significance level (e.g., 0.05), indicating that there is
# there is no statistically significant difference between the mean of 'prcy' in the dataset and the hy



#2. Two sample T-test
# Null Hypothesis (H0):
#   There is no significant difference in the mean satisfaction scores (sat_per) between undergraduate
# Mathematically: ?(undergrad)=?(postgrad) (where ?? represents the population mean).
#
# Alternative Hypothesis (Ha or H1):
#   There is a significant difference in the mean satisfaction scores (sat_per) between undergraduate a
# Mathematically: ?(undergrad)????(postgrad) (where ?? represents the population mean).
mean(df$e=="Undergraduate")
```

```
## [1] 0.4936709
```

```r
mean(df$e=="Postgraduate")
```

```
## [1] 0.4367089
```

```r
undergrad_data <- std_data$sat_per[std_data$e == "Undergraduate"]
postgrad_data <- std_data$sat_per[std_data$e == "Postgraduate"]
t_test_result <- t.test(undergrad_data, postgrad_data)
print(t_test_result)
```

```
##
##  Welch Two Sample t-test
##
## data:  undergrad_data and postgrad_data
## t = 0.14766, df = 144.28, p-value = 0.8828
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.2899636  0.3367864
## sample estimates:
## mean of x mean of y
##  3.820513  3.797101
```

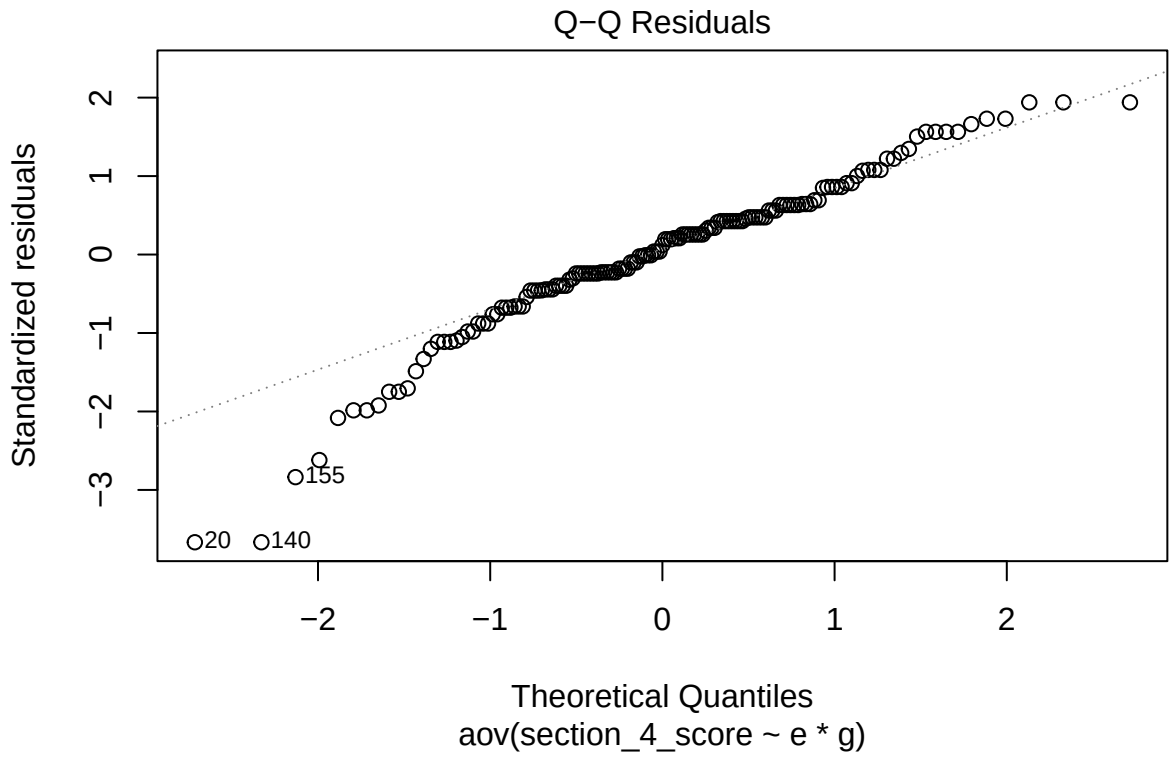
```r
# The p-value of 0.8828 is greater than common significance levels (e.g., 0.05), indicating that there
```

```r
#3. Performing one-way ANOVA
# Null Hypothesis (HO):
#
#   There is no significant difference in the mean satisfaction scores (sat_per) among different educat
# Mathematically: ?1=?2=...=?k (where ?? represents the population mean for each education level, and k
#
# Alternative Hypothesis (Ha or H1):
#
#   There is a significant difference in the mean satisfaction scores (sat_per) among at least two educ
# Mathematically: At least one ?i is different (where ii represents each education level).
anova_result <- aov(sat_per ~ e, data = std_data)
print(anova_result)
```

```
## Call:
##    aov(formula = sat_per ~ e, data = std_data)
##
## Terms:
##                         e Residuals
## Sum of Squares    6.37239 137.14660
## Deg. of Freedom        10       147
##
## Residual standard error: 0.9659038
## Estimated effects may be unbalanced
```

```r
#The p-value associated with the F-statistic from the ANOVA test is not provided in the output.
#Without the exact p-value, it's not possible to determine the statistical significance of the ANOVA te

#4. Two-way ANOVA test
mod <- aov(section_4_score ~ e * g,
           data = std_data)

plot(mod, which = 2)
```

```
## Warning: not plotting observations with leverage one:
##   25, 33, 56, 59, 60, 72, 108
```



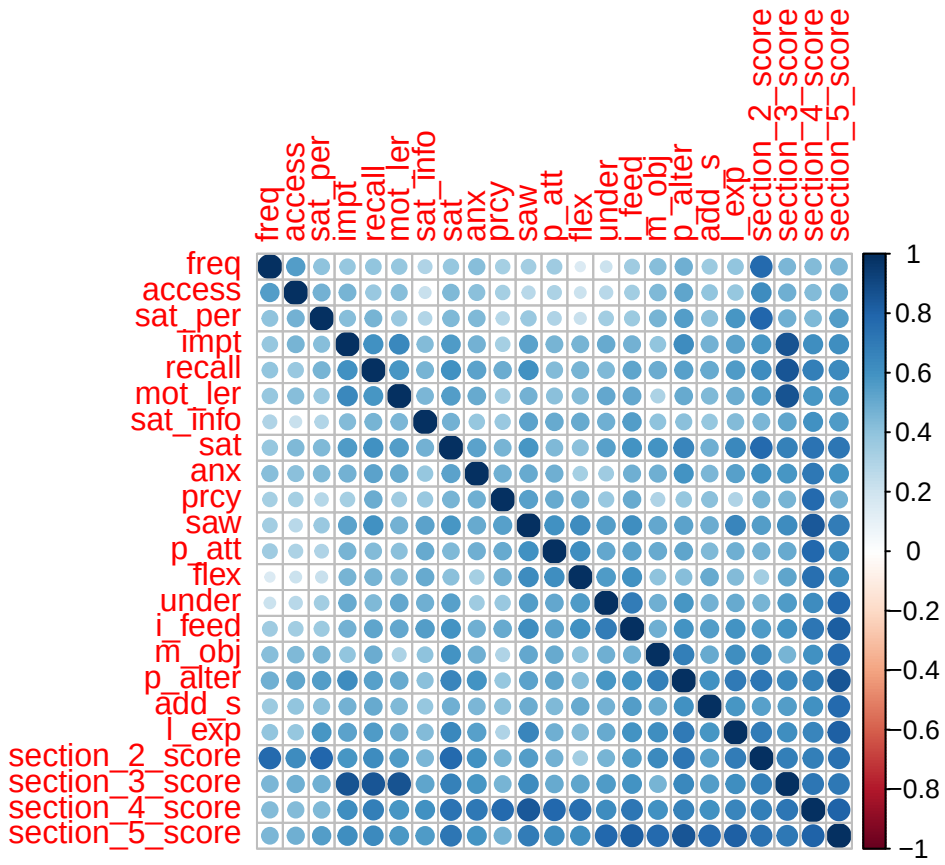

```
summary(mod)
```

```
##              Df Sum Sq Mean Sq F value Pr(>F)
## e            10  270.9   27.09   1.254  0.262
## g             1   52.0   51.96   2.406  0.123
## e:g           1   10.9   10.85   0.502  0.480
## Residuals   145 3131.2   21.59
```

```
#The p-value for 'e' is 0.262, which is greater than the significance level of 0.05. Therefore, we fail
#The p-value for 'g' is 0.123, which is greater than 0.05. We fail to reject the null hypothesis, indic
#The p-value for the interaction term 'e:g' is 0.480, which is greater than 0.05. We fail to reject the
#Based on the analysis, there is no significant evidence to suggest that education level, gender, or th


#5. Corelation plot
library("corrplot")
```

```
## corrplot 0.92 loaded
```

```
d = subset(std_data, select = -c(ar,e,g) )
M=cor(d)
corrplot(M,method="circle")
```




```
#The above corelation plot displays the connection between each column in the dataset.
#There seems to be no negative co-relations in the dataset.
#There is very weak co-relation between many columns in the dataset.
#Each Section summative score seems to have normal positive corelation with each other column

# One-Sample T-Test
t_test_result <- t.test(std_data$sat_per, mu = 4)
print(t_test_result)
```

```
##
##  One Sample t-test
##
## data:  std_data$sat_per
## t = -2.6627, df = 157, p-value = 0.00856
## alternative hypothesis: true mean is not equal to 4
## 95 percent confidence interval:
##  3.647229 3.947708
## sample estimates:
## mean of x
##  3.797468
```

```
# Two-Sample T-Test
undergrad_data <- std_data$sat_per[std_data$e == "Undergraduate"]
postgrad_data <- std_data$sat_per[std_data$e == "Postgraduate"]
t_test_result <- t.test(undergrad_data, postgrad_data)
print(t_test_result)
```

```
##
##  Welch Two Sample t-test
##
## data:  undergrad_data and postgrad_data
## t = 0.14766, df = 144.28, p-value = 0.8828
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.2899636  0.3367864
## sample estimates:
## mean of x mean of y
##  3.820513  3.797101
```

```r
# One-Way ANOVA
anova_result <- aov(sat_per ~ ar, data = std_data)

# Print summary to get the p-value
summary(anova_result)
```

```
##              Df Sum Sq Mean Sq F value Pr(>F)
## ar            2   0.84  0.4186   0.455  0.635
## Residuals   155 142.68  0.9205
```