取消文化之現象分析

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report 的重要頁碼

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處理後資料簡介

原始資料維度: rows×columns = 1004 × 207

原始的資料有 207 個變數，代表問卷中所有的問題選項 (包含複選題以及注意力偵測題等等)。

我們首先移除與分析無關的變數:

8 題: 大部分的人都有透過網路接觸名人的資訊或討論 (只有四個人沒有)，所以決定移除。

9 題: 即時通訊軟體多為聯繫熟人或工作上使用，較難顯現是否有突破同溫層的現象，所以決定移除。

疫情相關題目 (12~15): 關心的題目 (28,29) 時間範圍較廣，並不只局限於疫情期間，所以決定移除。

```
library(haven)          #read sav file
library(labelled)       #remove attribute of sav data
library(Hmisc)          #describe
library(showtext)       #show zw-tw in ggplot2
library(dplyr);library(ggplot2);library(MASS)
library(rlang)          #for building function
```

```
#DB.sav <-read_sav("DisruptiveBehavior.sav")
#write.csv(DB.sav,file= "DisruptiveBehavior.csv", row.names= FALSE)
DB.csv <-read.csv("DisruptiveBehavior.csv")[,-c(1:4)]
showtext_auto() #render 的 ggplot 可以顯示中文

# 移除注意力偵測題
DB.csv[,match("q21a_1", colnames(DB.csv)):match("q21a_6_text", colnames(DB.csv))] <- NULL
DB.csv$q37a <- NULL
DB.csv$rq21a <- NULL
DB.csv$rq37a <- NULL
DB.csv$r <- NULL # 基本資料與第一波網調是否相符

# 移除 q8,q9
DB.csv[, match("q8_1", colnames(DB.csv)):match("q8_90", colnames(DB.csv))] <- NULL
DB.csv[, match("q9_1",colnames(DB.csv)):match("q9_90",colnames(DB.csv))] <- NULL

# 移除疫情相關的問題 (12 題到 15 題)
DB.csv[,match("q12_1", colnames(DB.csv)):match("q15_03_1", colnames(DB.csv))] <- NULL
```

接著在對一些題目進行細部的選項討論:

人口結構變數處理

年齡: 移除出生年的資訊，將 rrq2 的年齡分層變數重新命名”q2_rr”。

出生地: 其他類別歸在一類 (24)。但是類別有點多，考慮對人口結構表格中的分類方式 (北北基宜、桃竹苗等區分)，還沒做。

教育程度: 重新劃分為四個等級 (1: 高中及以下, 2: 專科, 3: 大學, 4: 研究所)，劃分參考人口結構表格的分類方式。

```
# 第二題 (出生年) 改成年齡的區段
DB.csv$q2 <- DB.csv$qrq2
DB.csv$qrq2 <- NULL
DB.csv$q2_rr <- DB.csv$rrq2
DB.csv$rrq2 <- NULL

# 把第三題 (出生地) 的其他類別歸為一類
DB.csv$q3_other <- NULL

# 第四題沒有人選其他
DB.csv$q4_88_text <- NULL

# 教育程度重新劃分為四個等級
DB.csv$q4[DB.csv$q4<=8] <- 1
DB.csv$q4[DB.csv$q4!=1 & DB.csv$q4<=15] <- 2
DB.csv$q4[DB.csv$q4>2 & DB.csv$q4<=19] <- 3
DB.csv$q4[DB.csv$q4>3] <- 4
```

其他變數的更動

6、7 題: 時間統一單位 (分)

10 題: 改成” 使用幾個與 yt 名人討論相關的社群媒體”，因為有些社群媒體不會造成抵制名人行為，例如:Pinterest,Linkedin,+ 其他類 Pixiv,Mobile01,Komica,MeWe 跟名人相關的討論比較少，所以決定簡化選項; 巴哈姆特, 巴哈姆特場外休憩區兩個則要計算。

11 題: 改成” 有無使用 YT, Twitch, 或 bilibili”(1: 有使用,0: 沒有使用)，原因與第十題類似。

```
# 時間統一單位（分）
DB.csv$q6 <- DB.csv$q6_h*60+DB.csv$q6_m
DB.csv$q7 <- DB.csv$q7_h*60+DB.csv$q7_m
DB.csv$q6_h <- NULL; DB.csv$q6_m <- NULL
DB.csv$q7_h <- NULL; DB.csv$q7_m <- NULL

# 整理第十題
DB.csv$q10_4 <- NULL
DB.csv$q10_10 <- NULL
DB.csv$q10_90 <- NULL
DB.csv$q10_88[DB.csv$q10_88_text!=" 巴哈姆特場外休憩區"&DB.csv$q10_88_text!=" 巴哈姆特"] <- NA
DB.csv$q10_88_text <- NULL
DB.csv$q10 <- apply(DB.csv[,c("q10_1", "q10_2", "q10_3", "q10_5", "q10_6", "q10_7", "q10_8", "q10_9","q1
                    1, function(row){sum(!is.na(row))})
DB.csv[,c("q10_1", "q10_2", "q10_3", "q10_5", "q10_6", "q10_7", "q10_8", "q10_9", "q10_88")] <- NULL

# 整理第十一題
DB.csv$q11_2 <- NULL
DB.csv$q11_3 <- NULL
DB.csv$q11_4 <- NULL
DB.csv$q11_5 <- NULL
DB.csv$q11_6 <- NULL
DB.csv$q11_8 <- NULL
DB.csv$q11_90 <- NULL
DB.csv$q11_88[DB.csv$q11_88_text!="bilibili"] <- NA
DB.csv$q11_88_text <- NULL
DB.csv$q11 <- apply(DB.csv[,c("q11_1", "q11_7")],
                    1, function(row){sum(!is.na(row))})
DB.csv[,c("q11_1", "q11_7","q11_88")] <- NULL
```

16 題 ~19 題 (惡搞行為): 將每個類別補 0(變成 1,0)，再創建一個標籤變數 q1719_label(1: 至少有一個惡搞行為,0: 都沒有)。

```
DB.csv$q16 <- NULL
DB.csv$q18 <- NULL
DB.csv$q17_01[is.na(DB.csv$q17_01)|DB.csv$q17_01==2] <- 0
DB.csv$q17_02[is.na(DB.csv$q17_02)|DB.csv$q17_02==2] <- 0

DB.csv$q19_01[is.na(DB.csv$q19_01)|DB.csv$q19_01==2] <- 0
DB.csv$q19_02[is.na(DB.csv$q19_02)|DB.csv$q19_02==2] <- 0

DB.csv$q1719_label <- apply(
  DB.csv[,match("q17_01",colnames(DB.csv)):match("q19_02",colnames(DB.csv))],
  MARGIN = 1,
  function(row){
    return(paste0(row,collapse = ""))
  })
unique(DB.csv$q1719_label)
```

```
[1] "0000" "1101" "1100" "1000" "0100" "1110" "1111" "0101" "0001"
```

```
DB.csv$q1719_label <- ifelse(DB.csv$q1719_label=="0000", 0, 1)
```

第二十二題 ~ 二十六題: 參考碩士論文: 台灣消費者抵制行為之研究 —以台商親中言論衍生之抵制為例

(https://www.airitilibrary.com/Article/Detail/U0004-G0107932056) 之做法，將相同大主題的 ordinal 主觀評分加總作為該主題程度的分數。

這裡的分數要不要用加總的? 跟哪些分數要加在一起要討論一下，我覺得 25 的幾題跟 20 題那邊的蠻像的。

22 題 (看見他人網路攻擊行為 (網路使用環境)): 分數越高越常看到環境中其他人的攻擊。

23 題 (自己的網路攻擊行為): 分數越高代表自己的攻擊性越高

24 題 (回聲室效應): 分數越高則較常突破同溫層或是媒體識讀素養較高

25 題 (網路攻擊接受性): 分數越高越覺得網路上的攻擊行為 OK。但是 25 題的第三題

26 題 (推測對他人之攻擊意圖): 受訪者對網路攻擊行為的看法，分數越高代表受訪者越覺得網路攻擊行為容易引起他人的攻擊性。

```
DB.csv$q20 <- rowSums(DB.csv[,c('q20_01_1','q20_02_1')])
DB.csv$q22 <- rowSums(DB.csv[,c("q22_01_1", "q22_02_1", "q22_03_1", "q22_04_1", "q22_05_1")])
DB.csv$q23 <- rowSums(DB.csv[,c("q23_01_1", "q23_02_1", "q23_03_1", "q23_04_1", "q23_05_1")])
DB.csv$q24 <- rowSums(DB.csv[,c("q24_01_1", "q24_02_1", "q24_03_1", "q24_04_1", "q24_05_1")])
DB.csv$q25 <- rowSums(DB.csv[,c("q25_01_1", "q25_02_1", "q25_03_1", "q25_04_1")])
DB.csv$q26 <- rowSums(DB.csv[,c("q26_01_1", "q26_02_1", "q26_03_1")])
DB.csv[,match("q20_01_1",colnames(DB.csv)):match("q26_03_1",colnames(DB.csv))] <- NULL
```

38 題 ~42 題 (最後一題)

38 題: 心理幸福感（表現自尊）的評分，將 (生活滿意度、社會滿意度) 加總

40 題: 國民黨偏好 $0 \sim 100 \rightarrow 1 \sim 5$

41 題: 民進黨偏好 $0 \sim 100 \rightarrow 1 \sim 5$

42 題: 反台獨程度 $1 \sim 10$

```
DB.csv$q38 <- rowSums(DB.csv[,c("q38_01_1", "q38_02_1")])
DB.csv$q38_01_1 <- NULL
DB.csv$q38_02_1 <- NULL

DB.csv$q40 <- cut(DB.csv$q40_1,
                        breaks = c(0, 20, 40, 60, 80, 100),
                        labels = c(1, 2, 3, 4, 5),
                        right = TRUE)
DB.csv$q40[is.na(DB.csv$q40)] <- 1

DB.csv$q41 <- cut(DB.csv$q41_1,
                       breaks = c(0, 20, 40, 60, 80, 100),
                       labels = c(1, 2, 3, 4, 5),
                       right = TRUE)
DB.csv$q41[is.na(DB.csv$q41)] <- 1

DB.csv$q41_1 <- NULL
DB.csv$q40_1 <- NULL
```

對抵制行為相關問題變數之處理

針對 28,29 進行細部討論後，針對選項進行合理的歸類。

首先對其他類進行歸類:

28 題 (做過的抵制行為): 其他類 (16 個人有填) 分到前三類或是設 0: 沒有抵制行為。

29 題 (抵制原因): 原先將其他類裡面有出現的不當發言歸為第五類，後續覺得”不當發言”可以與”不道德、不正當或不合法行為”合併，“有不同的政治意識型態或價值觀”可以與”不表態支持重要的社會議題”合併，最後 29 題剩下三個類別 + 沒有抵制行為的 000

```
# 處理 28 的選項
DB.csv$q28_5 <- NULL
q28.manipulation <- function(row){
  # 亂回答的要把其他抵制行為的問題回答 (28-36) 也移除
  delete.term <- c(" 會破壞我對他（她）的形象",
                   " 從來都不關注",
                   " 若名人不自我反省就會抵制，但是通常名人都會願意出來面對錯誤",
                   " 未來此人所說的話均會產生疑問",
                   " 用選票來抵制",
                   " 很多時候都是立場不同、換位思考一下後，就可以消弭一些爭議。",
                   " 看看就好",
                   " 沒意見",
                   " 看看就好, 自己會有自己的判斷")
  # 要移除 q28_4 標籤的
  amend.term <- c(" 指正他的錯誤",
                  " 拒買相關商品",
                  " 與親朋好友說明事實真相",
                  " 要看是什麼原因決定一時間這麼做還是永久")
  if(row[5] %in% delete.term){row <- c(rep(NA,4),"",rep(NA,5),"",rep(NA,7))}
  else if(row[5] %in% amend.term){row[4:5] <- c(NA,"")}
  return(row)
}

DB.csv[,match("q28_1",colnames(DB.csv)):match("q36_1",colnames(DB.csv))] <- as.data.frame(
  t(apply(DB.csv[,match("q28_1",colnames(DB.csv)):match("q36_1",colnames(DB.csv))],
        1,
        q28.manipulation))
)
# 要歸類的要一個一個看歸在哪類
DB.csv[DB.csv$q28_4_text==" 每個人有合法的言論自由，我只會拒絕觀看有問題違法的影片，不會一竿子打翻一條船。",
       c('q28_2','q28_4','q28_4_text')] <- c(1,NA,"")

DB.csv[DB.csv$q28_4_text==" 減少看他們的發文或影片",  c('q28_2','q28_4','q28_4_text')] <- c(1,NA,"")

DB.csv[DB.csv$q28_4_text==" 轉發相關的指正或譴責文章",c('q28_3','q28_4','q28_4_text')] <- c(1,NA,"")

DB.csv$q28_4 <- NULL
DB.csv$q28_4_text <- NULL
```

```
# 處理 29 的選項
#29 的第五選項改定義為 錯誤資訊、不當言論
q29.manipulation <- function(row){
  # 亂回答的要把其他抵制行為的問題回答 (28-36) 也移除
  delete.term <- c(" 道不同不相為謀不理他們",
                   " 沒有此情況",
                   " 不會抵制",
                   " 我沒有特別抵制過呢",
                   " 從來沒有",
                   " 不明白指的是什麼",
                   " 已讀",
                   " 不理他們",
```

```
                    "不予置評",
                    "無",
                    "不會做無聊的事情",
                    "目前沒有",
                    "不曾",
                    "沒遇過要抵制的事",
                    "沒有",
                    "沒有抵制過")
  # 要被歸類到第五類（不當發言、錯誤資訊）的
  class5 <- c("錯誤資訊",
               "發表錯誤資訊且不更改",
               "指鹿為馬，不實言論，刻意誤導輿論方向。",
               "不當發言",
               "縵罵",
               "誤導",
               "散播不正確消息且不認錯",
               "對動物議題留下錯誤言論，對疫情走向發出錯誤言論（去年康健發文說嬰幼兒不會染疫，被我指正，卻不改
               "假名人之姿發表利己損害公眾利益的言論，企圖影響他人判斷的言論者。",
               "")
  if(row[9] %in% delete.term){row <- c(rep(NA,8),"",rep(NA,7))}
  else if(row[9] %in% class5){row[9] <- ""}
  return(row)
}

DB.csv[,match("q28_1",colnames(DB.csv)):match("q36_1",colnames(DB.csv))] <- as.data.frame(
  t(apply(DB.csv[,match("q28_1",colnames(DB.csv)):match("q36_1",colnames(DB.csv))],
        1,
        q29.manipulation))
)
# 要歸類的要一個一個看歸在哪類
DB.csv[DB.csv$q29_5_text=="過於私人或主觀意識的回答會讓我反感進而抵制收看",
       c('q29_2','q29_5','q29_5_text')] <- c(1,NA,"")

DB.csv[DB.csv$q29_5_text=="味全黑心油事件",
       c('q29_5','q29_5_text')] <- c(NA,"")

DB.csv[DB.csv$q29_5_text=="說謊話（至少是我覺得他在說謊），做錯事不負責還甩鍋給別人。",
  c('q29_5','q29_5_text')] <- c(NA,"")

DB.csv[DB.csv$q29_5_text=="有些事情的看法 做法不同",
       c('q29_2','q29_5','q29_5_text')] <- c(1,NA,"")

DB.csv[DB.csv$q29_5_text=="違反當初自己宣揚的理念",
       c('q29_4','q29_5','q29_5_text')] <- c(1,NA,"")

DB.csv[
  DB.csv$q29_5_text=="泛指公眾人物沒有責任表態但有義務不支持通稱反人類行為，私領域不要太誇張都沒差",
  c('q29_4','q29_5','q29_5_text')] <- c(1,NA,"")

DB.csv$q29_5_text <- NULL
```

NA 補 0 是在這個階段處理完其他類 (文字) 之後才做。

因為想要做的方向有兩個: “甚麼原因會造成有抵制行為?”, “甚麼原因會影響抵制行為的程度”，所以在最後建

立 q28_YN 的二元變數。

```r
# 處理完其他類之後先把 NA 補 0
DB.csv <- as.data.frame(
  apply(DB.csv,2,function(col){
    col <- as.numeric(col)
    col[is.na(col)] <- 0
    return(col)
}))

DB.csv$q29_2 <- ifelse(DB.csv$q29_2 | DB.csv$q29_3, 1,0)
DB.csv$q29_3 <- ifelse(DB.csv$q29_4 | DB.csv$q29_5, 1,0)
DB.csv$q29_4 <- NULL
DB.csv$q29_5 <- NULL

# 有無抵制行為 (1: 有,0: 沒有)
DB.csv$q28_YN[DB.csv$q28_1 | DB.csv$q28_2 | DB.csv$q28_3] <- 1
DB.csv$q28_YN[!(DB.csv$q28_1 | DB.csv$q28_2 | DB.csv$q28_3)] <- 0

# 重新調整欄位 index
#colnames(DB.csv)
#colnames(DB.csv)[c(1:2,29,3:5,30:33,6:9,34,10:11,35:39,12,43,13:25,40,26,41:42,27,28)]
DB.csv <- DB.csv[,c('q1','q2','q2_rr','q3','q4','q5_1','q6','q7','q10','q11','q17_01','q17_02','q19_01',
for(i in c(1:5,7:42)){
  DB.csv[,i] <- as.integer(DB.csv[,i])
}
```

Table 1: 變數解釋

Variables	Explanation	remark
q1	性別	1: 男性, 2: 女性
q2	年齡	
q2_rr	年齡分層	1:18~29, 2:30~39, 3:40~49, 4:50~59, 5:60~69, 6:70+
q3	出生縣市	1~19: 台灣的縣市 (資料沒有連江、澎湖、金門), 24: 其他
q4	教育程度	1: 高中及以下, 2: 專科, 3: 大學, 4: 研究所
q5_1	週平均上網天數	
q6	上網分鐘 (工作、學習)	
q7	上網分鐘 (娛樂、休閒)	
q10	使用幾個與名人討論相關的社群媒體	
q11	是否使用 YT,Twitch 或 bilibili	
q17_01	是否參與過: 不傷害、騙人	1: 是,0: 否
q17_02	是否參與過: 不傷害、不騙人	1: 是,0: 否
q19_01	是否參與過: 傷害、騙人	1: 是,0: 否
q19_02	是否參與過: 傷害、不騙人	1: 是,0: 否
q1719_label	是否至少有參與過一種網路惡搞	1: 是,0: 否
q20_01_1	主動激化傾向	
q20_02_1	主動激化傾向	
q22	他人攻擊傾向	
q23	自己攻擊傾向	
q24	回聲室效應	
q25	被攻擊的接受度	

Variables	Explanation	remark
q26	推測他人攻擊意圖	
q27_1	抵制意圖	
q28_YN	是否採取過抵制行為	
q28_1	採取過: 取消關注	
q28_2	採取過: 拒絕觀看	
q28_3	採取過: 在網路上留言或發文指責	
q29_1	抵制的原因: 歧視特定國家、種族或性別	
q29_2	抵制的原因: 有不同的政治意識型態或價值觀	
q29_3	抵制的原因: 做出不道德、不正當或不合法行為	
q30_1	抵制行為的有效程度	
q31_1	抵制前的同理心	
q32_1	抵制行為的對名人的傷害程度	
q33_1	抵制行為的對自己的重要程度	
q34_1	抵制成本	
q35_1	抵制規模感知	
q36_1	抵制的社會壓力	
q38	心理幸福感	不滿意 2~5 滿意
q39_1	生活品質	不快樂 1~5 快樂
q40	國民黨喜好程度	不喜歡 0~5 喜歡
q41	民進黨喜好程度	不喜歡 0~5 喜歡
q42_1	意識形態	0~10: 台獨 ~ 統一
weight	人口結構修正權重	

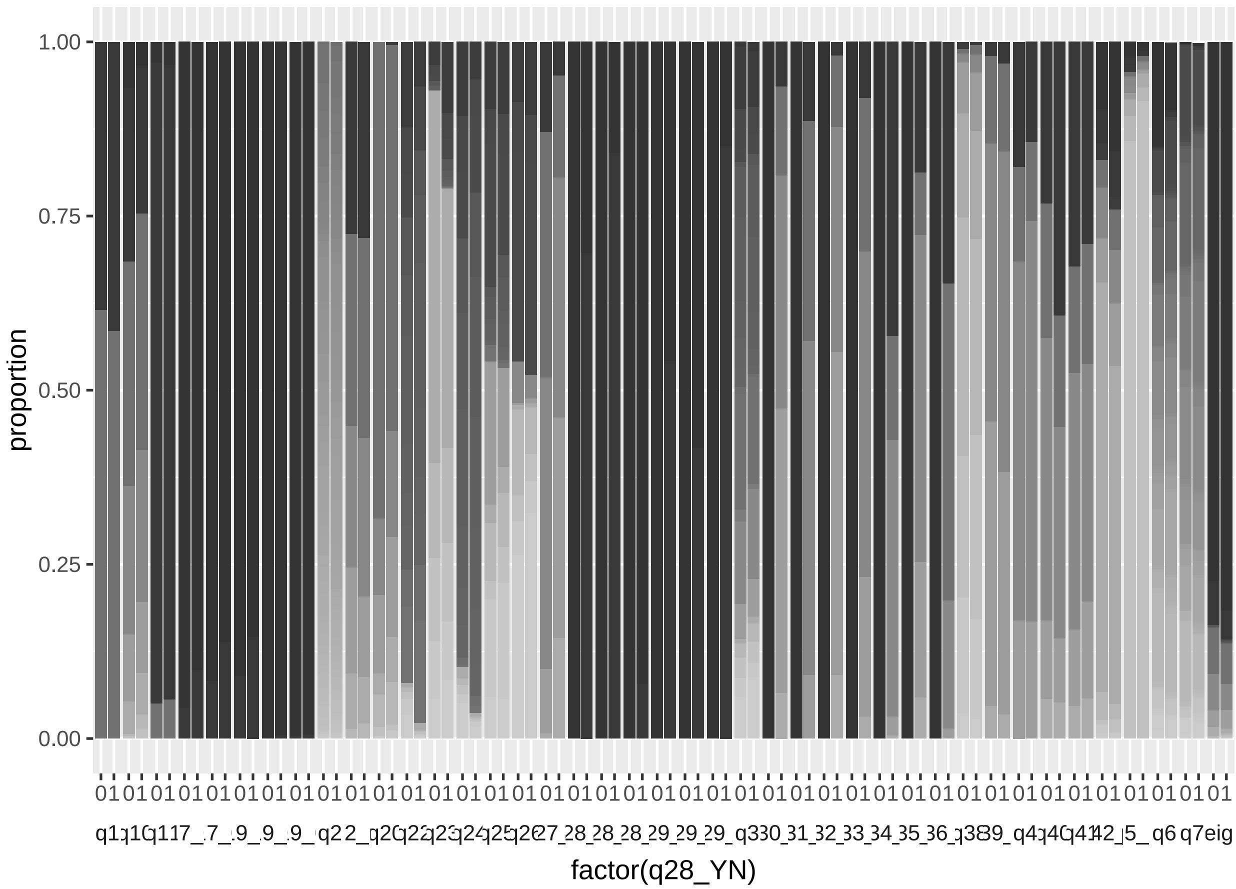
資料視覺化

describe

```
latex(describe(DB.csv),title="",file="")
```

對各變數依 **q28_YN** 二元變數畫比例圖

```
#test code chunk
Barplot.p(myCount_q28(DB.csv, colnames(DB.csv)[-match("q28_YN",colnames(DB.csv))]))
```



Logistic and Decision tree and PCA and XGboost

```
glm_log <- glm(
  factor(q28_YN)~
    factor(q1)+
    factor(q2_rr)+
    factor(q3)+
    factor(q4)+
    q5_1+
    q6+
    q7+
    q10+
    factor(q11)+
    q1719_label+
    q20+
    q22+ q23+ q24+ q25+ q26+
    factor(q27_1), family = binomial, data = DB.csv, weights = weight)
```

```
Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
```

```
summary(stepAIC(glm_log, direction = 'both'))
```

```
Start:  AIC=477.64
factor(q28_YN) ~ factor(q1) + factor(q2_rr) + factor(q3) + factor(q4) +
    q5_1 + q6 + q7 + q10 + factor(q11) + q1719_label + q20 +
```

```
    q22 + q23 + q24 + q25 + q26 + factor(q27_1)
Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

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Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
                Df Deviance    AIC
- factor(q11)    2   386.76 474.76
- factor(q4)     3   389.04 475.04
- q20            1   385.64 475.64
- q1719_label    1   385.64 475.64
- q24            1   385.66 475.66
- q23            1   385.74 475.74
- q25            1   385.99 475.99
- q5_1           1   386.13 476.13
<none>               385.64 477.64
- q6             1   388.60 478.60
- q22            1   389.12 479.12
- q26            1   389.48 479.48
- q7             1   389.53 479.53
- q10            1   390.02 480.02
- factor(q1)     1   390.54 480.54
- factor(q2_rr)  5   400.93 482.93
- factor(q27_1)  4   469.98 553.98
- factor(q3)    19   503.20 557.20
```

```
Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred


Step:  AIC=474.76
factor(q28_YN) ~ factor(q1) + factor(q2_rr) + factor(q3) + factor(q4) +
    q5_1 + q6 + q7 + q10 + q1719_label + q20 + q22 + q23 + q24 +
    q25 + q26 + factor(q27_1)

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

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Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
                Df Deviance    AIC
- q20            1   386.76 472.76
- q1719_label    1   386.76 472.76
- q24            1   386.79 472.79
- q23            1   386.86 472.86
- q25            1   387.05 473.05
- factor(q4)     3   391.15 473.15
- q5_1           1   387.18 473.18
<none>               386.76 474.76
- q6             1   390.15 476.15
- q26            1   390.30 476.30
- q10            1   391.13 477.13
```

```
- q7             1   391.15 477.15
- q22            1   391.36 477.36
- factor(q1)     1   391.53 477.53
+ factor(q11)    2   385.64 477.64
- factor(q2_rr)  5   403.79 481.79
- factor(q27_1)  4   470.87 550.87
- factor(q3)    19   505.87 555.87
```

```
Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
```

```
Step:  AIC=472.76
factor(q28_YN) ~ factor(q1) + factor(q2_rr) + factor(q3) + factor(q4) +
    q5_1 + q6 + q7 + q10 + q1719_label + q22 + q23 + q24 + q25 +
    q26 + factor(q27_1)
```

```
Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

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Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
```

```
                Df Deviance    AIC
- q1719_label    1   386.76 470.76
- q24            1   386.79 470.79
- q23            1   386.86 470.86
```

```
- q25            1   387.05 471.05
- q5_1           1   387.18 471.18
- factor(q4)     3   391.19 471.19
<none>               386.76 472.76
- q6             1   390.15 474.15
- q26            1   390.34 474.34
+ q20            1   386.76 474.76
- q10            1   391.13 475.13
- q7             1   391.26 475.26
- q22            1   391.41 475.41
- factor(q1)     1   391.54 475.54
+ factor(q11)    2   385.64 475.64
- factor(q2_rr)  5   403.92 479.92
- factor(q27_1)  4   471.64 549.64
- factor(q3)    19   506.10 554.10
```

```
Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
```

```
Step:  AIC=470.76
factor(q28_YN) ~ factor(q1) + factor(q2_rr) + factor(q3) + factor(q4) +
    q5_1 + q6 + q7 + q10 + q22 + q23 + q24 + q25 + q26 + factor(q27_1)
```

```
Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
```

```
Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
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```
Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
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Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
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Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
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Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
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Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
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Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
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Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
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Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
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Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
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Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
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Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
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Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

                Df Deviance    AIC
- q24            1   386.79 468.79
- q23            1   386.86 468.86
- q25            1   387.05 469.05
- q5_1           1   387.18 469.18
- factor(q4)     3   391.20 469.20
<none>               386.76 470.76
- q6             1   390.26 472.26
- q26            1   390.36 472.36
+ q1719_label    1   386.76 472.76
+ q20            1   386.76 472.76
- q10            1   391.16 473.16
- q7             1   391.30 473.30
- q22            1   391.43 473.43
- factor(q1)     1   391.55 473.55
+ factor(q11)    2   385.64 473.64
- factor(q2_rr)  5   404.24 478.24
- factor(q27_1)  4   472.23 548.23
- factor(q3)    19   507.96 553.96

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred


Step:  AIC=468.79
factor(q28_YN) ~ factor(q1) + factor(q2_rr) + factor(q3) + factor(q4) +
    q5_1 + q6 + q7 + q10 + q22 + q23 + q25 + q26 + factor(q27_1)

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

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Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
                Df Deviance    AIC
- q23            1   386.88 466.88
- q25            1   387.08 467.08
- q5_1           1   387.19 467.19
- factor(q4)     3   391.24 467.24
<none>               386.79 468.79
- q6             1   390.27 470.27
- q26            1   390.36 470.36
+ q24            1   386.76 470.76
+ q20            1   386.79 470.79
+ q1719_label    1   386.79 470.79
- q10            1   391.26 471.26
- q7             1   391.32 471.32
- q22            1   391.49 471.49
- factor(q1)     1   391.59 471.59
+ factor(q11)    2   385.66 471.66
- factor(q2_rr)  5   404.25 476.25
- factor(q27_1)  4   472.25 546.25
- factor(q3)    19   513.64 557.64

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred


Step:  AIC=466.88
factor(q28_YN) ~ factor(q1) + factor(q2_rr) + factor(q3) + factor(q4) +
    q5_1 + q6 + q7 + q10 + q22 + q25 + q26 + factor(q27_1)

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

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Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
                Df Deviance    AIC
- q25            1   387.16 465.16
- q5_1           1   387.31 465.31
- factor(q4)     3   391.36 465.36
<none>               386.88 466.88
- q6             1   390.32 468.32
- q26            1   390.56 468.56
+ q23            1   386.79 468.79
+ q24            1   386.86 468.86
+ q20            1   386.87 468.87
+ q1719_label    1   386.88 468.88
- q10            1   391.34 469.34
- q7             1   391.35 469.35
- factor(q1)     1   391.68 469.68
+ factor(q11)    2   385.75 469.75
- q22            1   391.84 469.84
- factor(q2_rr)  5   406.50 476.50
- factor(q27_1)  4   474.10 546.10
- factor(q3)    19   513.65 555.65

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred


Step:  AIC=465.16
factor(q28_YN) ~ factor(q1) + factor(q2_rr) + factor(q3) + factor(q4) +
    q5_1 + q6 + q7 + q10 + q22 + q26 + factor(q27_1)

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
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Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

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Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
                Df Deviance    AIC
- factor(q4)     3   391.45 463.45
- q5_1           1   387.51 463.51
<none>               387.16 465.16
- q6             1   390.51 466.51
- q26            1   390.67 466.67
+ q25            1   386.88 466.88
+ q23            1   387.08 467.08
+ q20            1   387.14 467.14
+ q24            1   387.15 467.15
+ q1719_label    1   387.16 467.16
- q10            1   391.35 467.35
- factor(q1)     1   391.68 467.68
- q7             1   391.84 467.84
+ factor(q11)    2   386.09 468.09
- q22            1   392.87 468.87
- factor(q2_rr)  5   406.52 474.52
- factor(q27_1)  4   474.11 544.11
- factor(q3)    19   514.03 554.03

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred


Step:  AIC=463.45
factor(q28_YN) ~ factor(q1) + factor(q2_rr) + factor(q3) + q5_1 +
    q6 + q7 + q10 + q22 + q26 + factor(q27_1)

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
```

```
Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

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Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
                Df Deviance    AIC
- q5_1           1   391.65 461.65
<none>               391.45 463.45
- factor(q1)     1   394.76 464.76
- q6             1   395.10 465.10
+ factor(q4)     3   387.16 465.16
+ q23            1   391.33 465.33
+ q25            1   391.36 465.36
+ q20            1   391.38 465.38
+ factor(q11)    2   389.41 465.41
+ q24            1   391.44 465.44
+ q1719_label    1   391.44 465.44
- q26            1   395.55 465.55
- q10            1   395.84 465.84
- q7             1   396.15 466.15
- q22            1   398.11 468.11
- factor(q2_rr)  5   411.32 473.32
- factor(q27_1)  4   478.47 542.47
- factor(q3)    19   528.99 562.99

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred


Step:  AIC=461.65
factor(q28_YN) ~ factor(q1) + factor(q2_rr) + factor(q3) + q6 +
    q7 + q10 + q22 + q26 + factor(q27_1)

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
```

```
Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

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Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred

Warning: glm.fit: fitted probabilities numerically 0 or 1 occurred
                Df Deviance    AIC
<none>                391.65 461.65
- factor(q1)     1   394.82 462.82
- q6             1   395.25 463.25
+ q5_1           1   391.45 463.45
+ factor(q4)     3   387.51 463.51
+ q23            1   391.52 463.52
+ q20            1   391.57 463.57
+ q25            1   391.59 463.59
+ q1719_label    1   391.65 463.65
+ q24            1   391.65 463.65
- q26            1   395.67 463.67
+ factor(q11)    2   389.75 463.75
- q10            1   395.91 463.91
- q7             1   396.67 464.67
- q22            1   398.42 466.42
- factor(q2_rr)  5   411.32 471.32
- factor(q27_1)  4   481.14 543.14
- factor(q3)    19   528.99 560.99

Call:
glm(formula = factor(q28_YN) ~ factor(q1) + factor(q2_rr) + factor(q3) +
    q6 + q7 + q10 + q22 + q26 + factor(q27_1), family = binomial,
    data = DB.csv, weights = weight)
```

```
Coefficients:
                 Estimate Std. Error z value Pr(>|z|)
(Intercept)     1.797e+01  2.054e+03   0.009 0.993017
factor(q1)2     5.861e-01  3.324e-01   1.763 0.077852 .
factor(q2_rr)2 -2.536e+00  6.831e-01  -3.713 0.000205 ***
factor(q2_rr)3 -2.015e+00  6.550e-01  -3.076 0.002099 **
factor(q2_rr)4 -1.203e+00  6.517e-01  -1.846 0.064881 .
factor(q2_rr)5 -1.332e+00  6.865e-01  -1.940 0.052336 .
factor(q2_rr)6 -8.401e-01  6.759e-01  -1.243 0.213895
factor(q3)2    -1.971e+01  2.054e+03  -0.010 0.992341
factor(q3)3    -2.090e+01  2.054e+03  -0.010 0.991878
factor(q3)4    -1.937e+01  2.054e+03  -0.009 0.992475
factor(q3)5    -2.523e+00  2.839e+03  -0.001 0.999291
factor(q3)6    -1.987e+01  2.054e+03  -0.010 0.992280
factor(q3)7    -1.763e+01  2.054e+03  -0.009 0.993149
factor(q3)8    -1.278e+00  3.100e+03   0.000 0.999671
factor(q3)9    -1.769e+01  2.054e+03  -0.009 0.993128
factor(q3)10   -2.145e+01  2.054e+03  -0.010 0.991668
factor(q3)11   -1.980e+01  2.054e+03  -0.010 0.992306
factor(q3)12   -2.001e+01  2.054e+03  -0.010 0.992225
factor(q3)13    3.928e-01  3.844e+03   0.000 0.999918
factor(q3)14   -1.858e+01  2.054e+03  -0.009 0.992780
factor(q3)15   -1.837e+01  2.054e+03  -0.009 0.992863
factor(q3)16   -2.063e+01  2.054e+03  -0.010 0.991986
factor(q3)17   -2.001e+01  2.054e+03  -0.010 0.992226
factor(q3)18   -2.355e+01  2.054e+03  -0.011 0.990851
factor(q3)19   -2.046e+01  2.054e+03  -0.010 0.992052
factor(q3)24   -1.982e+01  2.054e+03  -0.010 0.992299
q6             -1.653e-03  8.773e-04  -1.884 0.059504 .
q7              2.244e-03  1.027e-03   2.186 0.028814 *
q10            -2.701e-01  1.350e-01  -2.001 0.045401 *
q22             1.390e-01  5.462e-02   2.544 0.010950 *
q26             1.280e-01  6.388e-02   2.004 0.045045 *
factor(q27_1)2 -2.264e-01  5.863e-01  -0.386 0.699401
factor(q27_1)3  1.325e+00  5.683e-01   2.331 0.019763 *
factor(q27_1)4  2.784e+00  6.201e-01   4.489 7.16e-06 ***
factor(q27_1)5  1.872e+01  1.201e+03   0.016 0.987567
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 725.89  on 196  degrees of freedom
Residual deviance: 391.65  on 162  degrees of freedom
AIC: 461.65

Number of Fisher Scoring iterations: 17
```

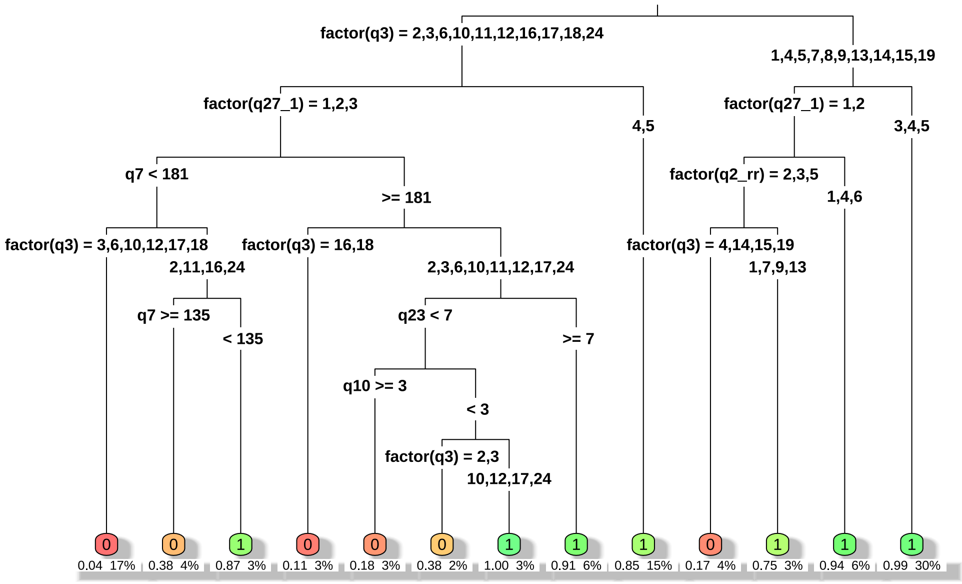
```r
summary(glm_log)
```

```
Call:
glm(formula = factor(q28_YN) ~ factor(q1) + factor(q2_rr) + factor(q3) +
    factor(q4) + q5_1 + q6 + q7 + q10 + factor(q11) + q1719_label +
```

```
    q20 + q22 + q23 + q24 + q25 + q26 + factor(q27_1), family = binomial,
    data = DB.csv, weights = weight)

Coefficients:
                 Estimate Std. Error z value Pr(>|z|)
(Intercept)     1.758e+01  2.032e+03   0.009  0.99310
factor(q1)2     7.702e-01  3.528e-01   2.183  0.02901 *
factor(q2_rr)2 -2.292e+00  7.623e-01  -3.007  0.00264 **
factor(q2_rr)3 -1.872e+00  7.413e-01  -2.526  0.01154 *
factor(q2_rr)4 -9.433e-01  7.676e-01  -1.229  0.21911
factor(q2_rr)5 -1.110e+00  7.929e-01  -1.400  0.16146
factor(q2_rr)6 -1.005e+00  8.192e-01  -1.227  0.21994
factor(q3)2    -1.952e+01  2.032e+03  -0.010  0.99234
factor(q3)3    -2.083e+01  2.032e+03  -0.010  0.99182
factor(q3)4    -1.923e+01  2.032e+03  -0.009  0.99245
factor(q3)5    -2.449e+00  2.815e+03  -0.001  0.99931
factor(q3)6    -1.968e+01  2.032e+03  -0.010  0.99227
factor(q3)7    -1.795e+01  2.032e+03  -0.009  0.99295
factor(q3)8    -1.119e+00  3.082e+03   0.000  0.99971
factor(q3)9    -1.757e+01  2.032e+03  -0.009  0.99310
factor(q3)10   -2.113e+01  2.032e+03  -0.010  0.99170
factor(q3)11   -1.981e+01  2.032e+03  -0.010  0.99222
factor(q3)12   -1.947e+01  2.032e+03  -0.010  0.99235
factor(q3)13    5.614e-01  3.838e+03   0.000  0.99988
factor(q3)14   -1.837e+01  2.032e+03  -0.009  0.99279
factor(q3)15   -1.838e+01  2.032e+03  -0.009  0.99278
factor(q3)16   -2.061e+01  2.032e+03  -0.010  0.99191
factor(q3)17   -1.971e+01  2.032e+03  -0.010  0.99226
factor(q3)18   -2.353e+01  2.032e+03  -0.012  0.99076
factor(q3)19   -2.055e+01  2.032e+03  -0.010  0.99193
factor(q3)24   -1.974e+01  2.032e+03  -0.010  0.99225
factor(q4)2     6.319e-01  6.312e-01   1.001  0.31677
factor(q4)3     3.666e-01  7.891e-01   0.465  0.64220
factor(q4)4     1.745e+01  2.396e+03   0.007  0.99419
q5_1            5.371e-02  7.666e-02   0.701  0.48359
q6             -1.624e-03  9.530e-04  -1.704  0.08838 .
q7              2.052e-03  1.060e-03   1.936  0.05290 .
q10            -2.972e-01  1.471e-01  -2.021  0.04331 *
factor(q11)1   -4.335e-01  6.887e-01  -0.629  0.52907
factor(q11)2    1.621e+01  3.608e+03   0.004  0.99642
q1719_label     6.929e-03  8.330e-01   0.008  0.99336
q20             1.506e-04  1.113e-01   0.001  0.99892
q22             1.153e-01  6.242e-02   1.847  0.06479 .
q23             2.843e-02  8.976e-02   0.317  0.75144
q24            -9.947e-03  6.527e-02  -0.152  0.87888
q25             2.617e-02  4.389e-02   0.596  0.55100
q26             1.358e-01  6.951e-02   1.954  0.05069 .
factor(q27_1)2 -2.017e-01  6.323e-01  -0.319  0.74970
factor(q27_1)3  1.409e+00  6.119e-01   2.302  0.02132 *
factor(q27_1)4  2.838e+00  6.616e-01   4.290 1.79e-05 ***
factor(q27_1)5  1.883e+01  1.190e+03   0.016  0.98737
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
(Dispersion parameter for binomial family taken to be 1)

    Null deviance: 725.89  on 196  degrees of freedom
Residual deviance: 385.64  on 151  degrees of freedom
AIC: 477.64

Number of Fisher Scoring iterations: 17
```

```r
#Decision tree
library(rpart)
library(rpart.plot)

tree_model <- rpart(
  factor(q28_YN)~
    factor(q1)+
    factor(q2_rr)+
    factor(q3)+
    factor(q4)+
    q5_1+
    q6+
    q7+
    q10+
    factor(q11)+
    q1719_label+
    q20+
    q22+ q23+ q24+ q25+ q26+
    factor(q27_1),data = DB.csv, method = "class",weights = weight)

rpart.plot(tree_model,
           type = 3,
           extra = 106,
           under = TRUE,
           faclen = 0,
           fallen.leaves = TRUE,
           box.palette = "RdYlGn",
           shadow.col = "gray",
           cex = 0.5)
```




```r
# glmnet and xgboost
library(glmnet)
```

```
Loading required package: Matrix
```

```
Loaded glmnet 4.1-8
```

```r
x <- model.matrix(factor(q28_YN)~
    factor(q1)+
    factor(q2_rr)+
    factor(q3)+
    factor(q4)+
    q5_1+
    q6+
    q7+
    q10+
    factor(q11)+
    q1719_label+
    q20+
    q22+ q23+ q24+ q25+ q26+
    factor(q27_1), data = DB.csv)[, -1]
y <- as.factor(DB.csv$q28_YN)
glmnet_model <- cv.glmnet(x, y, family = "binomial", alpha = 1)
glmnet_model
```

```
Call:  cv.glmnet(x = x, y = y, family = "binomial", alpha = 1)

Measure: Binomial Deviance

     Lambda Index Measure       SE Nonzero
min 0.01856    20   1.067 0.03106      12
1se 0.04287    11   1.095 0.02501       5
```

```r
library(xgboost)
```

```

Attaching package: 'xgboost'

The following object is masked from 'package:dplyr':

    slice
```

```r
xgb_data <- xgb.DMatrix(data = x, label = as.numeric(y) - 1, weight = DB.csv$weight)
xgb_model <- xgboost(data = xgb_data, objective = "binary:logistic", nrounds = 100)
```

```
[1] train-logloss:0.539179
[2] train-logloss:0.446868
[3] train-logloss:0.356501
[4] train-logloss:0.312915
[5] train-logloss:0.260324
[6] train-logloss:0.227397
[7] train-logloss:0.204813
[8] train-logloss:0.183880
[9] train-logloss:0.167727
[10]    train-logloss:0.147810
[11]    train-logloss:0.141517
[12]    train-logloss:0.129310
[13]    train-logloss:0.115569
[14]    train-logloss:0.106285
[15]    train-logloss:0.096666
[16]    train-logloss:0.090032
[17]    train-logloss:0.079723
[18]    train-logloss:0.074775
[19]    train-logloss:0.070098
[20]    train-logloss:0.065889
[21]    train-logloss:0.061435
[22]    train-logloss:0.058541
[23]    train-logloss:0.055210
[24]    train-logloss:0.051497
[25]    train-logloss:0.048502
[26]    train-logloss:0.046019
[27]    train-logloss:0.043975
[28]    train-logloss:0.042014
[29]    train-logloss:0.040287
[30]    train-logloss:0.038859
[31]    train-logloss:0.037325
[32]    train-logloss:0.035684
[33]    train-logloss:0.034608
[34]    train-logloss:0.033543
[35]    train-logloss:0.031997
[36]    train-logloss:0.030778
[37]    train-logloss:0.030024
[38]    train-logloss:0.029081
[39]    train-logloss:0.028285
[40]    train-logloss:0.027309
[41]    train-logloss:0.026686
[42]    train-logloss:0.025934
[43]    train-logloss:0.025354
```

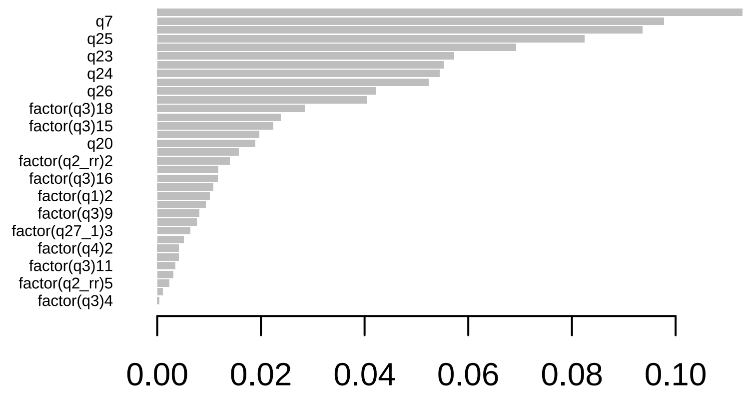
```
[44]	train-logloss:0.024719
[45]	train-logloss:0.023937
[46]	train-logloss:0.023463
[47]	train-logloss:0.022957
[48]	train-logloss:0.022582
[49]	train-logloss:0.022220
[50]	train-logloss:0.021586
[51]	train-logloss:0.021112
[52]	train-logloss:0.020739
[53]	train-logloss:0.020360
[54]	train-logloss:0.019965
[55]	train-logloss:0.019579
[56]	train-logloss:0.019236
[57]	train-logloss:0.018902
[58]	train-logloss:0.018626
[59]	train-logloss:0.018236
[60]	train-logloss:0.017910
[61]	train-logloss:0.017653
[62]	train-logloss:0.017423
[63]	train-logloss:0.017136
[64]	train-logloss:0.016947
[65]	train-logloss:0.016656
[66]	train-logloss:0.016348
[67]	train-logloss:0.016209
[68]	train-logloss:0.016001
[69]	train-logloss:0.015843
[70]	train-logloss:0.015702
[71]	train-logloss:0.015487
[72]	train-logloss:0.015368
[73]	train-logloss:0.015200
[74]	train-logloss:0.015045
[75]	train-logloss:0.014945
[76]	train-logloss:0.014790
[77]	train-logloss:0.014693
[78]	train-logloss:0.014562
[79]	train-logloss:0.014471
[80]	train-logloss:0.014337
[81]	train-logloss:0.014155
[82]	train-logloss:0.013982
[83]	train-logloss:0.013878
[84]	train-logloss:0.013770
[85]	train-logloss:0.013673
[86]	train-logloss:0.013563
[87]	train-logloss:0.013418
[88]	train-logloss:0.013293
[89]	train-logloss:0.013200
[90]	train-logloss:0.013131
[91]	train-logloss:0.013036
[92]	train-logloss:0.012955
[93]	train-logloss:0.012871
[94]	train-logloss:0.012763
[95]	train-logloss:0.012670
[96]	train-logloss:0.012606
[97]	train-logloss:0.012514
```

```
[98]    train-logloss:0.012432
[99]    train-logloss:0.012370
[100]   train-logloss:0.012311
```

```r
importance_matrix <- xgb.importance(model = xgb_model)
importance_matrix
```

```
           Feature         Gain        Cover   Frequency
 1: factor(q27_1)2 0.1128759012 0.0590628213 0.032407407
 2:             q7 0.0977061430 0.0702257340 0.125000000
 3:   factor(q3)10 0.0936159549 0.0567736714 0.019675926
 4:            q25 0.0824015984 0.0910425124 0.127314815
 5:            q22 0.0692224553 0.0829205730 0.087962963
 6:            q23 0.0572483615 0.0517309947 0.060185185
 7:             q6 0.0552135514 0.0737725786 0.125000000
 8:            q24 0.0544638950 0.0806648611 0.083333333
 9:            q10 0.0523707205 0.0423509160 0.053240741
10:            q26 0.0421426514 0.0430806781 0.061342593
11: factor(q27_1)4 0.0405067368 0.0529923883 0.030092593
12:   factor(q3)18 0.0284451479 0.0520482021 0.012731481
13: factor(q2_rr)3 0.0238096201 0.0155157192 0.011574074
14:   factor(q3)15 0.0223570999 0.0266048660 0.015046296
15:    factor(q3)2 0.0196383555 0.0207572426 0.011574074
16:            q20 0.0189052801 0.0190093639 0.015046296
17: factor(q2_rr)6 0.0157096757 0.0149138875 0.006944444
18: factor(q2_rr)2 0.0139847794 0.0101126917 0.008101852
19: factor(q27_1)5 0.0117423804 0.0360037133 0.008101852
20:   factor(q3)16 0.0116340822 0.0091687703 0.004629630
21:    factor(q3)3 0.0108378529 0.0187185410 0.006944444
22:    factor(q1)2 0.0100867263 0.0130830958 0.035879630
23: factor(q2_rr)4 0.0093295293 0.0074093532 0.010416667
24:    factor(q3)9 0.0080827516 0.0144206535 0.004629630
25:   factor(q11)1 0.0076036565 0.0045127815 0.002314815
26: factor(q27_1)3 0.0063441097 0.0072626918 0.011574074
27:           q5_1 0.0050876578 0.0052149845 0.010416667
28:    factor(q4)2 0.0041986496 0.0056375495 0.003472222
29:   factor(q3)14 0.0041711875 0.0073597458 0.002314815
30:   factor(q3)11 0.0034710446 0.0016538537 0.001157407
31:    factor(q3)7 0.0030501195 0.0006707035 0.001157407
32: factor(q2_rr)5 0.0023068352 0.0031057542 0.008101852
33:    factor(q3)6 0.0010353498 0.0017146669 0.001157407
34:    factor(q3)4 0.0004001392 0.0004834399 0.001157407
           Feature         Gain        Cover   Frequency
```

```r
xgb.plot.importance(importance_matrix)
```




```
index.q28_1 <- match("q28_1",colnames(DB.csv))
index.q28_3 <- match("q28_3",colnames(DB.csv))
index.q29_1 <- match("q29_1",colnames(DB.csv))
index.q29_3 <- match("q29_3",colnames(DB.csv))

q28.label <- as.factor(apply(
  DB.csv[,index.q28_1:index.q28_3],
  MARGIN = 1,
  function(row){
    return(paste0(row,collapse = ""))
  }))
unique(q28.label)
```

```
[1] 000 100 010 111 110 101 011 001
Levels: 000 001 010 011 100 101 110 111
```

```
q29.label <- as.factor(apply(
  DB.csv[,index.q29_1:index.q29_3],
  MARGIN = 1,
  function(row){
    return(paste0(row,collapse = ""))
  }))
unique(q29.label)
```

```
[1] 000 111 011 101 010 100 001 110
Levels: 000 001 010 011 100 101 110 111
```

```
q2829.label <- as.factor(apply(
  DB.csv[,c(index.q28_1:index.q28_3,index.q29_1:index.q29_3)],
  MARGIN = 1,
  function(row){
    return(paste0(row,collapse = ""))
  }))
unique(q2829.label)
```

```
 [1] 000000 100111 010011 111111 110101 110010 010100 110111 110001 010101
[11] 100001 100101 010111 110110 010001 100010 101001 100011 011001 110011
[21] 111110 010010 111100 111011 110100 011011 100100 111101 011010 100110
[31] 010110 001010 111001 011101 011100 001111 101011 111010 001011 001001
[41] 001101 101101 101010 011111
44 Levels: 000000 001001 001010 001011 001101 001111 010001 010010 ... 111111
```

```r
table(q28.label)
```

```
q28.label
000 001 010 011 100 101 110 111
301   8 195  10  98   6 355  31
```

```r
table(q29.label)
```

```
q29.label
000 001 010 011 100 101 110 111
301 189  63  70  24 197  18 142
```

```r
table(q2829.label)
```

```
q2829.label
000000 001001 001010 001011 001101 001111 010001 010010 010011 010100 010101
   301      2      3      1      1      1     68     31     24      9     35
010110 010111 011001 011010 011011 011100 011101 011111 100001 100010 100011
     5     23      2      2      2      1      2      1     37     10      5
100100 100101 100110 100111 101001 101010 101011 101101 110001 110010 110011
     8     21      3     14      2      1      2      1     74     15     35
110100 110101 110110 110111 111001 111010 111011 111100 111101 111110 111111
     5    133      6     87      4      1      1      1      4      4     16
```

預期 28 題有選三 (發文等抵制行為) 的抵制程度較高

法一: 1,0 法二: 選項一二合併 vs. 有選三 (11,10,01,00)

第 29 題:

分成: 1 自己, 23 至少選一, 45 至少選一

抵制程度 ~ 其他因素關聯分析

Canonical analysis and PCA

```r
library(FactoMineR)
library(factoextra)
```

```
Welcome! Want to learn more? See two factoextra-related books at https://goo.gl/ve3WBa
```

```r
boycott <- subset(DB.csv, q28_YN == 1)
# 缺失值轉 0

boycott[,c('q30_1','q32_1','q35_1')] <- lapply(boycott[, c('q30_1','q32_1','q35_1')], as.numeric)
y <-boycott[,c('q30_1','q32_1','q35_1')]


boycott$q28_1_2 <- ifelse(boycott$q28_1==1 | boycott$q28_2==1,1,0)
boycott$q29_1_2_inter<-boycott$q29_1*boycott$q29_2
boycott$q29_1_3_inter<-boycott$q29_1*boycott$q29_3
```

```r
boycott$q29_2_3_inter<-boycott$q29_3*boycott$q29_2


boycott[, c("q28_1_2","q28_3","q29_1","q29_2","q29_3")] <- lapply(boycott[, c("q28_1_2","q28_3","q29_1",
y <-boycott[,c('q30_1','q32_1','q35_1')]


x <-boycott[,c("q2","q4","q6","q7","q10","q11","q1719_label","q20","q22","q23","q24","q25","q26","q29_1"

cca <-cancor(x,y)
# 典型相關係數
cca$cor
```

```
[1] 0.5484909 0.3032351 0.2136809
```

```r
# 最大典型相關係數為 0.47，且第一典型變數主要由  q29_3 和 q33_1 和 q35_1 貢獻組成
x_lodings <-cor(x,as.matrix(x)%*% cca$xcoef)
y_lodings <-cor(y,as.matrix(y)%*% cca$ycoef)
x_lodings[,c(1,2)]
```

```
                   [,1]        [,2]
q2           -0.3584664  0.06572691
q4            0.3911103  0.19573708
q6            0.2667750 -0.12495481
q7            0.2588039 -0.22304586
q10           0.3492110  0.13223616
q11           0.2739053  0.15702499
q1719_label   0.2710477  0.17087136
q20           0.1326107  0.40533758
q22           0.5888084  0.06673522
q23           0.3130277  0.30211707
q24           0.4663135  0.01167462
q25           0.1352137  0.17011910
q26           0.5519676 -0.02886869
q29_1         0.3359433  0.16826048
q29_2        -0.1750348  0.25276601
q29_3         0.3191000 -0.08470257
q31_1         0.3283443 -0.61374395
q33_1         0.5565760  0.06789128
q34_1         0.1197939 -0.40217525
q36_1         0.3712339  0.01853303
q29_1_2_inter  0.1347307  0.28539696
q29_1_3_inter  0.3961883  0.11665606
q40          -0.3486927 -0.31966715
q42_1        -0.3573373 -0.21257935
```

```r
y_lodings[,c(1,2)]
```

```
           [,1]       [,2]
q30_1 0.4960180 -0.1574662
q32_1 0.2988692 -0.9441093
q35_1 0.9648598  0.1609171
```

```r
# 第一典型變數與 q22,q33_1 高度相關,q2(負),q4,q10,q23,q24,q26,q29_1,q29_3,q31_1,q36_1,q29_1_3_inter 中度相
# 第一典型變數與 q35_1 高度相關,q30_1 中度相關
# 越常看到別人在網路上的攻擊行為，抵制行為程度越高。如果認為抵制行為很重要，抵制程度也會比較高。抵制程度與抵制
```

```r
# 自我相關係數
round((colSums(x_lodings^2)[1:2]/4),4)
```

```
[1] 0.7330 0.3386
```

```r
round((colSums(y_lodings^2)[1:2]/4),4)
```

```
[1] 0.3166 0.2355
```

```r
# 典型相關係數平方
num<-round(cca$cor^2,4)[1:2]

round((colSums(x_lodings^2)[1:2]/4)*num,4)
```

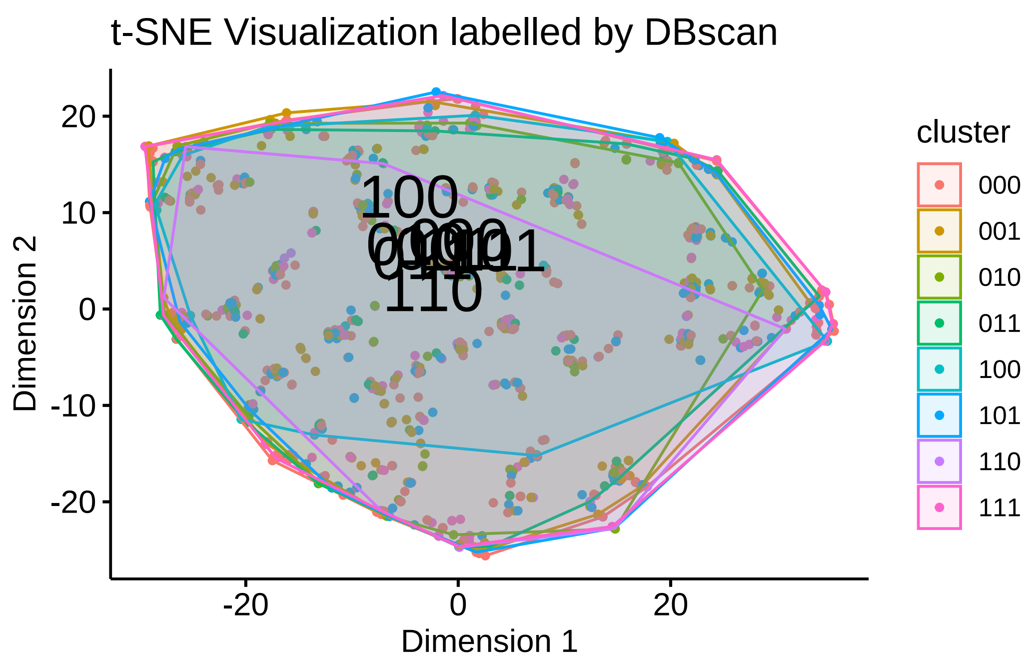
```
[1] 0.2205 0.0312
```

```r
round((colSums(y_lodings^2)[1:2]/4)*num,4)
```

```
[1] 0.0952 0.0217
```

```r
# 第一典型變數能解釋約 9.67% 的預測變數變異、7.42% 的準則變數變異
```

```r
library(Rtsne)
library(ggpubr)
set.seed(2024)
tsne_result <- Rtsne(DB.csv[,-c(45,64)], dims = 2)
tsne_df <- as.data.frame(tsne_result$Y)
tsne_df$cluster <- q29.label
centroids <- tsne_df %>%
  group_by(cluster) %>%
  summarize(V1 = mean(V1), V2 = mean(V2), .groups = 'drop')

ggscatter(data = tsne_df, x = "V1", y = "V2",
          size = 1, color = "cluster", # 使用 cluster 列进行颜色映射
          ellipse = TRUE,
          ellipse.type = "convex",
          repel = TRUE, # 防止标签重叠
          title = "t-SNE Visualization labelled by DBscan",
          xlab = "Dimension 1", ylab = "Dimension 2") +
  scale_color_discrete()+
  geom_text(data = centroids, aes(x = V1, y = V2, label = cluster),
            vjust = -1, size = 8, color = "black")+
  theme(legend.position = "right")
```




```
ggplot(data = tsne_df)+
  geom_point(aes(x=V1, y=V2, color  = as.factor(cluster)))+
  labs(title = "t-SNE Visualization labelled by DBscan",
       x = "Dimension 1",
       y = "Dimension 2",
       color = "Number") +
  geom_text(data = centroids, aes(x = V1, y = V2, label = cluster),
            vjust = -1, size = 10, color = "black")+
  theme(legend.position = "right")
```