—a title: “Honor thesis Study 1_ Qilin” author: “Qilin Zhang” date: “11/18/2020” output: pdf_document —

```
#Packages
library(dplyr)
```

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

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

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

```
library(ggplot2)
library(psych)
```

```
##
## Attaching package: 'psych'

## The following objects are masked from 'package:ggplot2':
##
##     %+%, alpha
```

```
library(summarytools)
```

```
## Registered S3 method overwritten by 'pryr':
##   method      from
##   print.bytes Rcpp

## For best results, restart R session and update pander using devtools:: or remotes::install_github('ra
```

```
library(car)
```

```
## Loading required package: carData

##
## Attaching package: 'car'

## The following object is masked from 'package:psych':
##
##     logit

## The following object is masked from 'package:dplyr':
##
##     recode
```

```r
#Data Cleaning
##filtering unqualified data
HT_MC1 <- HT_MC1_Raw
HT_MC1$X500<- NULL
HT_MC1 <- HT_MC1[c(-1,-2),]
HT_MC1 <- subset(HT_MC1, as.numeric(HT_MC1$Progress)>=95)
HT_MC1_1 <- subset(HT_MC1, as.numeric(HT_MC1$`Q56_Page Submit`)>=30)
HT_MC1_2 <- subset(HT_MC1, as.numeric(HT_MC1$`Q60_Page Submit`)>=30)
HT_MC1_3 <- subset(HT_MC1, as.numeric(HT_MC1$`Q61_Page Submit`)>=30)

HT_MC1 <- rbind.data.frame(HT_MC1_1,HT_MC1_2,HT_MC1_3)
HT_MC1 <- subset(HT_MC1,(is.na(HT_MC1$Comprehension_check)== FALSE))


##Labeling condition
HT_MC1$Condition <- ifelse((is.na(HT_MC1$Self_S_reflect_4)== FALSE),"self",(ifelse(is.na(HT_MC1$Other_O

##Re-code Values
HT_MC1$Vol_Benefits_Bi_S <- as.numeric(factor((HT_MC1$Vol_Benefits_Bi_S),
levels=c("Strongly disagree","Disagree","Somewhat disagree","Neither agree nor disagree","Somewhat agre
labels=c("1","2","3","4","5","6","7")))

HT_MC1$Vol_Benefits_Bi_O <- as.numeric(factor((HT_MC1$Vol_Benefits_Bi_O),
levels=c("Strongly disagree","Disagree","Somewhat disagree","Neither agree nor disagree","Somewhat agre
labels=c("1","2","3","4","5","6","7")))

HT_MC1$Vol_Benefits_Uni <- as.numeric(as.character(factor((HT_MC1$Vol_Benefits_Uni),
levels=c("benefited the students extremely more than the Matthew","benefited the students moderately mo
labels=c("1","2","3","4","5","6","")))

HT_MC1$Vol_Intent_S <- as.numeric(factor((HT_MC1$Vol_Intent_S),
levels=c("Strongly disagree","Disagree","Somewhat disagree","Neither agree nor disagree","Somewhat agre
labels=c("1","2","3","4","5","6","7")))

HT_MC1$Vol_Intent_O <- as.numeric(factor((HT_MC1$Vol_Intent_O),
levels=c("Strongly disagree","Disagree","Somewhat disagree","Neither agree nor disagree","Somewhat agre
labels=c("1","2","3","4","5","6","7")))
```

```r
#Descriptive Analysis
##Participants' by condition
freq(HT_MC1$Condition)
```

```
## Frequencies
## HT_MC1$Condition
## Type: Character
##
##                     Freq   % Valid   % Valid Cum.   % Total   % Total Cum.
## ---------------- ------ --------- -------------- --------- --------------
##            other     46     31.29          31.29     31.29          31.29
##             self     51     34.69          65.99     34.69          65.99
##       self&other     50     34.01         100.00     34.01         100.00
##             <NA>      0                               0.00         100.00
##            Total    147    100.00         100.00    100.00         100.00
```

```
##Volunteer benefit_self or others_Forced choice
freq(HT_MC1$Vol_Benefits_forced)
```

```
## Frequencies
## HT_MC1$Vol_Benefits_forced
## Type: Character
##
##                      Freq   % Valid   % Valid Cum.   % Total   % Total Cum.
## ------------------ ------ --------- -------------- --------- --------------
##            Matthew     63     42.86          42.86     42.86          42.86
##      The students      84     57.14         100.00     57.14         100.00
##              <NA>       0                               0.00         100.00
##             Total     147    100.00         100.00    100.00         100.00
```

```
##Volunteer benefits and intentions
###Volunteer benefits_others
descr(as.numeric(HT_MC1$Vol_Benefits_Bi_O))
```

```
## Warning: `funs()` is deprecated as of dplyr 0.8.0.
## Please use a list of either functions or lambdas:
##
##   # Simple named list:
##   list(mean = mean, median = median)
##
##   # Auto named with `tibble::lst()`:
##   tibble::lst(mean, median)
##
##   # Using lambdas
##   list(~ mean(., trim = .2), ~ median(., na.rm = TRUE))
## This warning is displayed once every 8 hours.
## Call `lifecycle::last_warnings()` to see where this warning was generated.

## Descriptive Statistics
## value
## N: 147
##
##                     value
## ----------------- --------
##              Mean     6.44
##           Std.Dev     0.77
##               Min     4.00
##                Q1     6.00
##            Median     7.00
##                Q3     7.00
##               Max     7.00
##               MAD     0.00
##               IQR     1.00
##                CV     0.12
##          Skewness    -1.38
##       SE.Skewness     0.20
##          Kurtosis     1.50
##           N.Valid   147.00
##         Pct.Valid   100.00
```

```
###Volunteer benefits_self
descr(as.numeric(HT_MC1$Vol_Benefits_Bi_S))
```

```
## Descriptive Statistics
## value
## N: 147
##
##                      value
## ----------------- --------
##              Mean     6.44
##           Std.Dev     0.79
##               Min     3.00
##                Q1     6.00
##            Median     7.00
##                Q3     7.00
##               Max     7.00
##               MAD     0.00
##               IQR     1.00
##                CV     0.12
##          Skewness    -1.99
##       SE.Skewness     0.20
##          Kurtosis     5.42
##           N.Valid   147.00
##         Pct.Valid   100.00
```

```
###Volunteer Intention_benefiting self
descr(as.numeric(HT_MC1$Vol_Intent_S))
```

```
## Descriptive Statistics
## value
## N: 147
##
##                      value
## ----------------- --------
##              Mean     4.03
##           Std.Dev     1.53
##               Min     1.00
##                Q1     3.00
##            Median     4.00
##                Q3     5.00
##               Max     7.00
##               MAD     1.48
##               IQR     2.00
##                CV     0.38
##          Skewness    -0.07
##       SE.Skewness     0.20
##          Kurtosis    -1.14
##           N.Valid   147.00
##         Pct.Valid   100.00
```

```
###Volunteer Intention_benefiting others
descr(as.numeric(HT_MC1$Vol_Intent_O))
```

```
## Descriptive Statistics
## value
## N: 147
##
##                      value
## ----------------- --------
##              Mean     6.16
##           Std.Dev     0.75
##               Min     3.00
##                Q1     6.00
##            Median     6.00
##                Q3     7.00
##               Max     7.00
##               MAD     0.00
##               IQR     1.00
##                CV     0.12
##          Skewness    -0.85
##       SE.Skewness     0.20
##          Kurtosis     1.41
##           N.Valid   147.00
##         Pct.Valid   100.00
```

```
###Volunteer benefit_self or others
descr(HT_MC1$Vol_Benefits_Uni)
```

```
## Descriptive Statistics
## HT_MC1$Vol_Benefits_Uni
## N: 147
##
##                     Vol_Benefits_Uni
## ----------------- ------------------
##              Mean               3.71
##           Std.Dev               1.52
##               Min               1.00
##                Q1               2.00
##            Median               4.00
##                Q3               5.00
##               Max               6.00
##               MAD               1.48
##               IQR               3.00
##                CV               0.41
##          Skewness              -0.15
##       SE.Skewness               0.20
##          Kurtosis              -1.03
##           N.Valid             147.00
##         Pct.Valid             100.00
```

```
##Demographics
###Age
descr(as.numeric(HT_MC1$Dem_Age))
```

```
## Descriptive Statistics
## value
```

```
## N: 147
##
##                      value
## ----------------- --------
##              Mean    20.19
##           Std.Dev     1.80
##               Min    18.00
##                Q1    19.00
##            Median    20.00
##                Q3    21.00
##               Max    31.00
##               MAD     1.48
##               IQR     2.00
##                CV     0.09
##          Skewness     1.85
##       SE.Skewness     0.20
##          Kurtosis     7.78
##           N.Valid   147.00
##         Pct.Valid   100.00
```

```
###Sex
freq(HT_MC1$Dem_Bio_Sex)
```

```
## Frequencies
## HT_MC1$Dem_Bio_Sex
## Type: Character
##
##                             Freq   % Valid   % Valid Cum.   % Total   % Total Cum.
## -------------------------- ------ --------- -------------- --------- --------------
##                     Female    110     74.83          74.83     74.83          74.83
##                       Male     36     24.49          99.32     24.49          99.32
##       Prefer not to answer      1      0.68         100.00      0.68         100.00
##                      <NA>      0                                0.00         100.00
##                      Total    147    100.00         100.00    100.00         100.00
```

```
###Gender
freq(HT_MC1$Dem_Gen_ID)
```

```
## Frequencies
## HT_MC1$Dem_Gen_ID
## Type: Character
##
##                            Freq   % Valid   % Valid Cum.   % Total   % Total Cum.
## ------------------------- ------ --------- -------------- --------- --------------
##                    Female    108     73.47          73.47     73.47          73.47
##       Gendernetural/other      3      2.04          75.51      2.04          75.51
##                      Male     36     24.49         100.00     24.49         100.00
##                      <NA>      0                                0.00         100.00
##                     Total    147    100.00         100.00    100.00         100.00
```

```
###Education_father figure
freq(HT_MC1$Dem_Edu_father)
```

```
## Frequencies
## HT_MC1$Dem_Edu_father
## Type: Character
##
##                                              Freq   % Valid   % Valid Cum.   % Total   % Total Cu
## ---------------------------------------- ------ --------- -------------- --------- ------------
##              Associate degree (junior college)     16     10.88          10.88     10.88          10
##                              Bachelor's degree     52     35.37          46.26     35.37          46
##                                       Doctorate      6      4.08          50.34      4.08          50
##       High school diploma or equivalency (GED)     24     16.33          66.67     16.33          66
##                              Master's degree     30     20.41          87.07     20.41          87
##                                          Other      5      3.40          90.48      3.40          90
##                          Prefer not to answer      2      1.36          91.84      1.36          91
##               Professional (MD, JD, DDS, etc.)      5      3.40          95.24      3.40          95
##                              Some High School      7      4.76         100.00      4.76         100
##                                          <NA>      0                                0.00         100
##                                         Total    147    100.00         100.00    100.00         100
```

```
###Education_mother figure
freq(HT_MC1$Dem_Edu_mother)
```

```
## Frequencies
## HT_MC1$Dem_Edu_mother
## Type: Character
##
##                                              Freq   % Valid   % Valid Cum.   % Total   % Total Cu
## ---------------------------------------- ------ --------- -------------- --------- ------------
##              Associate degree (junior college)     19     12.93          12.93     12.93          12
##                              Bachelor's degree     55     37.41          50.34     37.41          50
##                                       Doctorate     11      7.48          57.82      7.48          57
##       High school diploma or equivalency (GED)     19     12.93          70.75     12.93          70
##                              Master's degree     16     10.88          81.63     10.88          81
##                                          Other      4      2.72          84.35      2.72          84
##                          Prefer not to answer      5      3.40          87.76      3.40          87
##               Professional (MD, JD, DDS, etc.)     11      7.48          95.24      7.48          95
##                              Some High School      7      4.76         100.00      4.76         100
##                                          <NA>      0                                0.00         100
##                                         Total    147    100.00         100.00    100.00         100
```

```
###Nationality
freq(HT_MC1$Dem_Nationality)
```

```
## Frequencies
## HT_MC1$Dem_Nationality
## Type: Character
##
##                                    Freq   % Valid   % Valid Cum.   % Total   % Total Cum.
## ---------------------------------- ------ --------- -------------- --------- --------------
##             I am a domestic student    136     92.52          92.52     92.52          92.52
##       I am an international Student     11      7.48         100.00      7.48         100.00
##                                <NA>      0                                0.00         100.00
##                               Total    147    100.00         100.00    100.00         100.00
```

```r
freq(HT_MC1$Dem_Nationality_text)
```

```
## Frequencies
## HT_MC1$Dem_Nationality_text
## Type: Character
##
##                      Freq   % Valid   % Valid Cum.   % Total   % Total Cum.
## ------------------ ------ --------- -------------- --------- --------------
##             Brazil      1      9.09           9.09      0.68           0.68
##              China      5     45.45          54.55      3.40           4.08
##            England      1      9.09          63.64      0.68           4.76
##              Korea      1      9.09          72.73      0.68           5.44
##           Malaysia      1      9.09          81.82      0.68           6.12
##               Oman      1      9.09          90.91      0.68           6.80
##        South Korea      1      9.09         100.00      0.68           7.48
##               <NA>    136                               92.52         100.00
##              Total    147    100.00         100.00    100.00         100.00
```

```r
#Inferential Analysis
Anova(lm(Vol_Intent_O~Condition, data=HT_MC1))
```

```
## Anova Table (Type II tests)
##
## Response: Vol_Intent_O
##            Sum Sq  Df F value   Pr(>F)
## Condition   5.594   2  5.3132 0.005938 **
## Residuals 75.807 144
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```r
tapply(HT_MC1$Vol_Intent_O, INDEX =HT_MC1$Condition, FUN = mean)
```

```
##      other       self self&other
##   6.369565   5.901961   6.220000
```

```r
tapply(HT_MC1$Vol_Intent_O, INDEX =HT_MC1$Condition, FUN = sd)
```

```
##      other       self self&other
##  0.8783494  0.6404655  0.6480741
```

```r
TukeyHSD(aov(lm(Vol_Intent_O~Condition, data=HT_MC1)))
```

```
##   Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = lm(Vol_Intent_O ~ Condition, data = HT_MC1))
##
## $Condition
##                         diff         lwr        upr     p adj
## self-other       -0.4676044 -0.81699708 -0.1182118 0.0052719
## self&other-other -0.1495652 -0.50061087  0.2014804 0.5724013
## self&other-self   0.3180392 -0.02392644  0.6600049 0.0741434
```

```r
Anova(lm(Vol_Intent_S~Condition, data=HT_MC1))
```

```
## Anova Table (Type II tests)
##
## Response: Vol_Intent_S
##           Sum Sq  Df F value Pr(>F)
## Condition   1.24   2  0.2631  0.769
## Residuals 340.65 144
```

```r
tapply(HT_MC1$Vol_Intent_S, INDEX =HT_MC1$Condition, FUN = mean)
```

```
##      other       self self&other
##   4.108696   3.901961   4.080000
```

```r
tapply(HT_MC1$Vol_Intent_S, INDEX =HT_MC1$Condition, FUN = sd)
```

```
##      other       self self&other
##   1.594829   1.500065   1.523155
```

```r
TukeyHSD(aov(lm(Vol_Intent_S~Condition, data=HT_MC1)))
```

```
##   Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = lm(Vol_Intent_S ~ Condition, data = HT_MC1))
##
## $Condition
##                          diff        lwr       upr     p adj
## self-other       -0.20673487 -0.9473804 0.5339107 0.7864043
## self&other-other -0.02869565 -0.7728452 0.7154539 0.9954129
## self&other-self   0.17803922 -0.5468625 0.9029409 0.8301553
```

```r
Anova(lm(Vol_Benefits_Uni~Condition, data=HT_MC1))
```

```
## Anova Table (Type II tests)
##
## Response: Vol_Benefits_Uni
##           Sum Sq  Df F value    Pr(>F)
## Condition 160.52   2  65.858 < 2.2e-16 ***
## Residuals 175.48 144
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```r
tapply(HT_MC1$Vol_Benefits_Uni, INDEX =HT_MC1$Condition, FUN = mean)
```

```
##      other       self self&other
##   2.434783   5.000000   3.580000
```

```r
tapply(HT_MC1$Vol_Benefits_Uni, INDEX =HT_MC1$Condition, FUN = sd)
```

```
##      other       self self&other
##  0.9809785  1.0392305  1.2631351
```

```r
TukeyHSD(aov(lm(Vol_Benefits_Uni~Condition, data=HT_MC1)))
```

```
##   Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = lm(Vol_Benefits_Uni ~ Condition, data = HT_MC1))
##
## $Condition
##                        diff        lwr        upr   p adj
## self-other         2.565217  2.0336262  3.0968085 0.0e+00
## self&other-other   1.145217  0.6111112  1.6793235 3.5e-06
## self&other-self   -1.420000 -1.9402912 -0.8997088 0.0e+00
```

```r
Anova(lm(Vol_Benefits_Bi_O~Condition, data=HT_MC1))
```

```
## Anova Table (Type II tests)
##
## Response: Vol_Benefits_Bi_O
##           Sum Sq  Df F value    Pr(>F)
## Condition 22.879   2  25.991 2.304e-10 ***
## Residuals 63.379 144
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```r
tapply(HT_MC1$Vol_Benefits_Bi_O, INDEX =HT_MC1$Condition, FUN = mean)
```

```
##      other       self self&other
##   6.760870   5.901961   6.700000
```

```r
tapply(HT_MC1$Vol_Benefits_Bi_O, INDEX =HT_MC1$Condition, FUN = sd)
```

```
##      other       self self&other
##  0.4312660  0.9220608  0.5050763
```

```r
TukeyHSD(aov(lm(Vol_Benefits_Bi_O~Condition, data=HT_MC1)))
```

```
##   Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = lm(Vol_Benefits_Bi_O ~ Condition, data = HT_MC1))
##
## $Condition
##                          diff        lwr        upr     p adj
## self-other         -0.85890878 -1.1783806 -0.5394370 0.0000000
## self&other-other   -0.06086957 -0.3818528  0.2601137 0.8948844
## self&other-self     0.79803922  0.4853584  1.1107200 0.0000000
```

```r
Anova(lm(Vol_Benefits_Bi_S~Condition, data=HT_MC1))
```

```
## Anova Table (Type II tests)
##
## Response: Vol_Benefits_Bi_S
##           Sum Sq  Df F value    Pr(>F)
## Condition 21.877   2  22.419 3.339e-09 ***
## Residuals 70.259 144
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```r
tapply(HT_MC1$Vol_Benefits_Bi_S, INDEX =HT_MC1$Condition, FUN = mean)
```

```
##      other       self self&other
##   5.869565   6.627451   6.760000
```

```r
tapply(HT_MC1$Vol_Benefits_Bi_S, INDEX =HT_MC1$Condition, FUN = sd)
```

```
##      other       self self&other
##  1.0458106  0.4882944  0.4314191
```

```r
TukeyHSD(aov(lm(Vol_Benefits_Bi_S~Condition, data=HT_MC1)))
```

```
##   Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = lm(Vol_Benefits_Bi_S ~ Condition, data = HT_MC1))
##
## $Condition
##                         diff        lwr       upr     p adj
## self-other         0.7578858  0.4215218 1.0942497 0.0000011
## self&other-other 0.8904348  0.5524795 1.2283901 0.0000000
## self&other-self  0.1325490 -0.1966649 0.4617629 0.6074115
```

```r
chisq.test(HT_MC1$Condition,HT_MC1$Vol_Benefits_forced)
```

```
##
##  Pearson's Chi-squared test
##
## data:  HT_MC1$Condition and HT_MC1$Vol_Benefits_forced
## X-squared = 85.078, df = 2, p-value < 2.2e-16
```

```r
tapply(HT_MC1$Vol_Benefits_forced, INDEX =HT_MC1$Condition, FUN = freq)
```

```
## x must either be a summarytools object created with freq(), descr(), or a list of summarytools objec
```