National Survey Statistics on Factor Analysis Produced Variables

- Question – For each of the factor variables (knowledge and other), are there differences in the average response by age?

  Answer – YES, there are significant differences among the age categories for both factor variables, and with the exception of group 4 vs group 5 for the factor variable "other" all groups differed significantly from each other. Difference

```
. dunntest iknowledge, by(iage)
Kruskal-Wallis probability =     0.0001

Dunn's Pairwise Comparison of iknowledge by iage
                            (No adjustment)
Col Mean-|
Row Mean |       2          3          4
---------+----------------------------------
       3 |  -3.047089
         |     0.0012
         |
       4 |  -6.647864  -3.042354
         |     0.0000     0.0012
         |
       5 |  -8.540506  -5.326895  -2.884203
         |     0.0000     0.0000     0.0020

alpha =   0.05
Reject Ho if p = P(Z <= |z|) <= alpha/2


. dunntest iother, by(iage)
Kruskal-Wallis probability =     0.0001

                Dunn's Pairwise Comparison of iother by iage
                            (No adjustment)
Col Mean-|
Row Mean |       2          3          4
---------+----------------------------------
       3 |  -3.687658
         |     0.0001
         |
       4 |  -6.409482  -2.160471
         |     0.0000     0.0154
         |
       5 |  -5.995882  -2.338749  -0.480036
         |     0.0000     0.0097     0.3156
```

- Question – For each of the factor variables (knowledge and other), are there differences in the average response by gender?

  Answer – YES, for both factor variables (knowledge and other) the differences in responses of the genders are very highly significantly different (p <0.0001)

- Question – For each of the factor variables (knowledge and other), are there differences in the average response by income?

  Answer – YES, but only for the factor variable knowledge. Most of the differences among pairs are between group 1 and other groups and between group 3 and other groups.

```
. dunntest iknowledge, by(iincome)
Kruskal-Wallis probability =     0.0005
```

```
Dunn's Pairwise Comparison of iknowledge by iincome
                            (No adjustment)
Col Mean-|
Row Mean |       1          2          3          4          5          6
---------+------------------------------------------------------------------
       2 |  -2.497470
         |     0.0063
         |
       3 |  -1.980782   0.879087
         |     0.0238     0.1897
         |
       4 |  -3.815271  -1.257535  -2.470334
         |     0.0001     0.1043     0.0067
         |
       5 |  -3.893000  -1.495793  -2.613509  -0.363691
         |     0.0000     0.0674     0.0045     0.3580
         |
       6 |  -3.353408  -1.183058  -2.060025  -0.184688   0.114798
         |     0.0004     0.1184     0.0197     0.4267     0.4543
         |
       7 |  -3.552889  -1.742852  -2.457248  -0.959300  -0.688698  -0.722300
         |     0.0002     0.0407     0.0070     0.1687     0.2455     0.2351
         |
       8 |  -1.760408  -0.130388  -0.635829   0.591132   0.774389   0.656758
         |     0.0392     0.4481     0.2624     0.2772     0.2194     0.2557
         |
       9 |  -2.347848  -1.192059  -1.563387  -0.708333  -0.559877  -0.597431
         |     0.0094     0.1166     0.0590     0.2394     0.2878     0.2751
         |
      10 |  -3.169354  -1.756891  -2.259138  -1.163994  -0.964239  -0.987559
         |     0.0008     0.0395     0.0119     0.1222     0.1675     0.1617
         |
      11 |  -3.282179  -0.905285  -1.879430   0.235565   0.541013   0.359674
         |     0.0005     0.1827     0.0301     0.4069     0.2942     0.3595
Col Mean-|
Row Mean |       7          8          9          10
---------+--------------------------------------------
       8 |   1.160782
         |     0.1229
         |
       9 |  -0.140395  -0.960591
         |     0.4442     0.1684
         |
      10 |  -0.396438  -1.342428  -0.168444
         |     0.3459     0.0897     0.4331
         |
      11 |   1.061221  -0.433697   0.788364   1.244967
         |     0.1443     0.3323     0.2152     0.1066

alpha =   0.05
Reject Ho if p = P(Z <= |z|) <= alpha/2
```

- Question: For each of the factor variables (knowledge and other), are there differences in the average response among regions?

  Answer – NO, for both factor variables, there are no significant differences in responses among regions.

- Question: For each of the factor variables (knowledge and other), are there differences in the average response based upon type of device used?

  Answer – YES, for both factor variables there are significant differences in response provided on various devices.

```
. dunntest iknowledge, by(idevice)
Kruskal-Wallis probability =     0.0002

Dunn's Pairwise Comparison of iknowledge by idevice
                            (No adjustment)
Col Mean-|
Row Mean |       1          2          4          5
---------+--------------------------------------------
       2 |  -0.842399
```

```
          |     0.1998
          |
        4 |  -4.104772  -3.575691
          |     0.0000     0.0002
          |
        5 |  -2.253612  -1.999900  -0.286000
          |     0.0121     0.0228     0.3874
          |
        6 |  -1.116132  -0.951199   0.143918   0.293782
          |     0.1322     0.1708     0.4428     0.3845

alpha =   0.05
Reject Ho if p = P(Z <= |z|) <= alpha/2


. dunntest iother, by(idevice)
Kruskal-Wallis probability =     0.0423

Dunn's Pairwise Comparison of iother by idevice
                              (No adjustment)
Col Mean-|
Row Mean |       1          2          4          5
---------+--------------------------------------------
       2 |  -1.392887
         |     0.0818
         |
       4 |  -3.084003  -2.201813
         |     0.0010     0.0138
         |
       5 |  -0.728643  -0.307796   0.691191
         |     0.2331     0.3791     0.2447
         |
       6 |   0.005101   0.278162   0.929115   0.406324
         |     0.4980     0.3904     0.1764     0.3423

alpha =   0.05
Reject Ho if p = P(Z <= |z|) <= alpha/2
```

STATISTICS

- Question – For each of the factor variables (knowledge and other), are there differences in the average response by age?

```
. dunntest iknowledge, by(iage)

Warning: by() values are unlabeled, option nolabel implicit


Kruskal-Wallis equality-of-populations rank test

  +------------------------+
  | iage | Obs |  Rank Sum |
  |------+-----+-----------|
  |    2 | 297 | 126497.00 |
  |    3 | 230 | 115847.50 |
  |    4 | 343 | 198606.00 |
  |    5 | 197 | 128827.50 |
  +------------------------+

chi-squared =    75.931 with 3 d.f.
probability =     0.0001

chi-squared with ties =    85.400 with 3 d.f.
probability =     0.0001


              Dunn's Pairwise Comparison of iknowledge by iage
                              (No adjustment)
Col Mean-|
Row Mean |       2          3          4
---------+----------------------------------
       3 |  -3.047089
         |     0.0012
         |
       4 |  -6.647864  -3.042354
         |     0.0000     0.0012
```

```
          |
        5 |  -8.540506  -5.326895  -2.884203
          |     0.0000     0.0000     0.0020

alpha =   0.05
Reject Ho if p = P(Z <= |z|) <= alpha/2

.
. dunntest iother, by(iage)

Warning: by() values are unlabeled, option nolabel implicit


Kruskal-Wallis equality-of-populations rank test

  +------------------------+
  | iage | Obs |  Rank Sum |
  |------+-----+-----------|
  |    2 | 297 | 128210.00 |
  |    3 | 230 | 122050.50 |
  |    4 | 343 | 201312.00 |
  |    5 | 197 | 118205.50 |
  +------------------------+

chi-squared =    51.926 with 3 d.f.
probability =     0.0001

chi-squared with ties =    52.814 with 3 d.f.
probability =     0.0001


                Dunn's Pairwise Comparison of iother by iage
                              (No adjustment)
Col Mean-|
Row Mean |       2          3          4
---------+---------------------------------
       3 |  -3.687658
         |     0.0001
         |
       4 |  -6.409482  -2.160471
         |     0.0000     0.0154
         |
       5 |  -5.995882  -2.338749  -0.480036
         |     0.0000     0.0097     0.3156

alpha =   0.05
Reject Ho if p = P(Z <= |z|) <= alpha/2
```

==========

- Question – For each of the factor variables (knowledge and other), are there differences in the average response by gender?

```
. dunntest iknowledge, by(igender)

Warning: by() values are unlabeled, option nolabel implicit


Kruskal-Wallis equality-of-populations rank test

  +--------------------------+
  | igender | Obs |  Rank Sum |
  |---------+-----+-----------|
  |       1 | 497 | 240985.50 |
  |       2 | 570 | 328792.50 |
  +--------------------------+

chi-squared =    23.638 with 1 d.f.
probability =     0.0001

chi-squared with ties =    26.585 with 1 d.f.
probability =     0.0001


            Dunn's Pairwise Comparison of iknowledge by igender
                              (No adjustment)
Col Mean-|
```

```
Row Mean |             1
---------+-----------
       2 |  -5.156095
         |     0.0000

alpha =   0.05
Reject Ho if p = P(Z <= |z|) <= alpha/2

.
. dunntest iother, by(igender)

Warning: by() values are unlabeled, option nolabel implicit


Kruskal-Wallis equality-of-populations rank test

  +---------------------------+
  | igender | Obs |  Rank Sum |
  |---------+-----+-----------|
  |       1 | 497 | 238686.50 |
  |       2 | 570 | 331091.50 |
  +---------------------------+

chi-squared =    28.299 with 1 d.f.
probability =     0.0001

chi-squared with ties =    28.783 with 1 d.f.
probability =     0.0001


              Dunn's Pairwise Comparison of iother by igender
                                (No adjustment)
Col Mean-|
Row Mean |             1
---------+-----------
       2 |  -5.365020
         |     0.0000

alpha =   0.05
Reject Ho if p = P(Z <= |z|) <= alpha/2
```

==========

- Question – For each of the factor variables (knowledge and other), are there differences in the average response by income?

```
. dunntest iknowledge, by(iincome)

Warning: by() values are unlabeled, option nolabel implicit


Kruskal-Wallis equality-of-populations rank test

  +---------------------------+
  | iincome | Obs |  Rank Sum |
  |---------+-----+-----------|
  |       1 |  85 |  35381.50 |
  |       2 | 124 |  64287.00 |
  |       3 | 220 | 107747.00 |
  |       4 | 194 | 108728.50 |
  |       5 | 138 |  78967.00 |
  |---------+-----+-----------|
  |       6 |  81 |  45972.00 |
  |       7 |  45 |  27296.00 |
  |       8 |  29 |  15261.50 |
  |       9 |  13 |   8052.50 |
  |      10 |  22 |  14004.00 |
  |---------+-----+-----------|
  |      11 | 116 |  64081.00 |
  +---------------------------+

chi-squared =    28.138 with 10 d.f.
probability =     0.0017

chi-squared with ties =    31.647 with 10 d.f.
probability =     0.0005
```

```
           Dunn's Pairwise Comparison of iknowledge by iincome
                          (No adjustment)
Col Mean-|
Row Mean |             1             2             3             4             5             6
---------+------------------------------------------------------------------------------------
       2 |  -2.497470
         |     0.0063
         |
       3 |  -1.980782   0.879087
         |     0.0238     0.1897
         |
       4 |  -3.815271  -1.257535  -2.470334
         |     0.0001     0.1043     0.0067
         |
       5 |  -3.893000  -1.495793  -2.613509  -0.363691
         |     0.0000     0.0674     0.0045     0.3580
         |
       6 |  -3.353408  -1.183058  -2.060025  -0.184688   0.114798
         |     0.0004     0.1184     0.0197     0.4267     0.4543
         |
       7 |  -3.552889  -1.742852  -2.457248  -0.959300  -0.688698  -0.722300
         |     0.0002     0.0407     0.0070     0.1687     0.2455     0.2351
         |
       8 |  -1.760408  -0.130388  -0.635829   0.591132   0.774389   0.656758
         |     0.0392     0.4481     0.2624     0.2772     0.2194     0.2557
         |
       9 |  -2.347848  -1.192059  -1.563387  -0.708333  -0.559877  -0.597431
         |     0.0094     0.1166     0.0590     0.2394     0.2878     0.2751
         |
      10 |  -3.169354  -1.756891  -2.259138  -1.163994  -0.964239  -0.987559
         |     0.0008     0.0395     0.0119     0.1222     0.1675     0.1617
         |
      11 |  -3.282179  -0.905285  -1.879430   0.235565   0.541013   0.359674
         |     0.0005     0.1827     0.0301     0.4069     0.2942     0.3595
Col Mean-|
Row Mean |             7             8             9            10
---------+--------------------------------------------
       8 |   1.160782
         |     0.1229
         |
       9 |  -0.140395  -0.960591
         |     0.4442     0.1684
         |
      10 |  -0.396438  -1.342428  -0.168444
         |     0.3459     0.0897     0.4331
         |
      11 |   1.061221  -0.433697   0.788364   1.244967
         |     0.1443     0.3323     0.2152     0.1066

alpha =   0.05
Reject Ho if p = P(Z <= |z|) <= alpha/2

.
. dunntest iother, by(iincome)

Warning: by() values are unlabeled, option nolabel implicit


Kruskal-Wallis equality-of-populations rank test

  +---------------------------+
  | iincome | Obs |  Rank Sum |
  |---------+-----+-----------|
  |       1 |  85 |  40557.50 |
  |       2 | 124 |  68881.50 |
  |       3 | 220 | 111152.50 |
  |       4 | 194 | 109253.00 |
  |       5 | 138 |  76566.00 |
  |---------+-----+-----------|
  |       6 |  81 |  38956.50 |
  |       7 |  45 |  26963.00 |
  |       8 |  29 |  15964.00 |
  |       9 |  13 |   7397.50 |
  |      10 |  22 |  12425.50 |
  |---------+-----+-----------|
  |      11 | 116 |  61661.00 |
  +---------------------------+

chi-squared =    12.672 with 10 d.f.
```

```
probability =     0.2426

chi-squared with ties =    12.889 with 10 d.f.
probability =     0.2299


             Dunn's Pairwise Comparison of iother by iincome
                           (No adjustment)
Col Mean-|
Row Mean |             1             2             3             4             5             6
---------+------------------------------------------------------------------------------------
       2 |  -1.820902
         |     0.0343
         |
       3 |  -0.719869   1.464701
         |     0.2358     0.0715
         |
       4 |  -2.164101  -0.218148  -1.924668
         |     0.0152     0.4137     0.0271
         |
       5 |  -1.843770   0.017718  -1.494472   0.244915
         |     0.0326     0.4929     0.0675     0.4033
         |
       6 |  -0.080037   1.707810   0.611758   2.033932   1.727440
         |     0.4681     0.0438     0.2703     0.0210     0.0420
         |
       7 |  -2.166306  -0.821450  -1.879091  -0.712417  -0.845545  -2.081181
         |     0.0151     0.2057     0.0301     0.2381     0.1989     0.0187
         |
       8 |  -1.116035   0.079540  -0.749513   0.208387   0.069584  -1.051661
         |     0.1322     0.4683     0.2268     0.4175     0.4723     0.1465
         |
       9 |  -1.009833  -0.152029  -0.731528  -0.067154  -0.160323  -0.964946
         |     0.1563     0.4396     0.2322     0.4732     0.4363     0.1673
         |
      10 |  -1.199166  -0.131556  -0.871672  -0.023795  -0.142123  -1.141432
         |     0.1152     0.4477     0.1917     0.4905     0.4435     0.1268
         |
      11 |  -1.247245   0.606437  -0.750743   0.881120   0.604470  -1.144015
         |     0.1062     0.2721     0.2264     0.1891     0.2728     0.1263
Col Mean-|
Row Mean |             7             8             9            10
---------+--------------------------------------------
       8 |   0.669238
         |     0.2517
         |
       9 |   0.313259  -0.181941
         |     0.3770     0.4278
         |
      10 |   0.432536  -0.165674   0.039694
         |     0.3327     0.4342     0.4842
         |
      11 |   1.260049   0.298282   0.419363   0.467740
         |     0.1038     0.3827     0.3375     0.3200

alpha =   0.05
Reject Ho if p = P(Z <= |z|) <= alpha/2
```

==========

- Question: For each of the factor variables (knowledge and other), are there differences in the average response among regions?

```
. dunntest iknowledge, by(iregion)

Warning: by() values are unlabeled, option nolabel implicit


Kruskal-Wallis equality-of-populations rank test

  +---------------------------+
  | iregion | Obs |  Rank Sum |
  |---------+-----+-----------|
  |       1 |  47 |  24583.50 |
  |       2 | 123 |  70842.50 |
  |       3 | 190 | 100915.00 |
  |       4 |  60 |  30070.50 |
  |       5 | 196 |  98718.00 |
```

```
  |---------+-----+-----------|
  |       6 |  74 |  38057.50 |
  |       7 | 102 |  54316.00 |
  |       8 |  77 |  42647.50 |
  |       9 | 189 | 100060.50 |
  +---------------------------+

chi-squared =     5.469 with 8 d.f.
probability =     0.7065

chi-squared with ties =     6.162 with 8 d.f.
probability =     0.6291


            Dunn's Pairwise Comparison of iknowledge by iregion
                              (No adjustment)
Col Mean-|
Row Mean |             1             2             3             4             5             6
---------+------------------------------------------------------------------------------------
       2 |  -1.071609
         |     0.1419
         |
       3 |  -0.172251   1.345399
         |     0.4316     0.0892
         |
       4 |   0.390149   1.649590   0.702685
         |     0.3482     0.0495     0.2411
         |
       5 |   0.414702   2.183041   0.937194  -0.058582
         |     0.3392     0.0145     0.1743     0.4766
         |
       6 |   0.163190   1.455991   0.426919  -0.262248  -0.270564
         |     0.4352     0.0727     0.3347     0.3966     0.3934
         |
       7 |  -0.186328   1.126918  -0.039002  -0.669008  -0.820729  -0.414454
         |     0.4261     0.1299     0.4844     0.2517     0.2059     0.3393
         |
       8 |  -0.578186   0.528077  -0.584510  -1.062830  -1.296538  -0.844421
         |     0.2816     0.2987     0.2794     0.1439     0.0974     0.1992
         |
       9 |  -0.135699   1.395304   0.057851  -0.662132  -0.877640  -0.383263
         |     0.4460     0.0815     0.4769     0.2539     0.1901     0.3508
Col Mean-|
Row Mean |             7             8
---------+----------------------
       8 |  -0.491339
         |     0.3116
         |
       9 |   0.087340   0.628024
         |     0.4652     0.2650

alpha =   0.05
Reject Ho if p = P(Z <= |z|) <= alpha/2

.
. dunntest iother, by(iregion)

Warning: by() values are unlabeled, option nolabel implicit


Kruskal-Wallis equality-of-populations rank test

  +---------------------------+
  | iregion | Obs |  Rank Sum |
  |---------+-----+-----------|
  |       1 |  47 |  22561.50 |
  |       2 | 123 |  69595.50 |
  |       3 | 190 |  98283.50 |
  |       4 |  60 |  29825.50 |
  |       5 | 196 | 103603.00 |
  |---------+-----+-----------|
  |       6 |  74 |  38500.50 |
  |       7 | 102 |  56208.00 |
  |       8 |  77 |  40265.50 |
  |       9 | 189 | 101368.00 |
  +---------------------------+

chi-squared =     4.655 with 8 d.f.
probability =     0.7937
```

```
chi-squared with ties =     4.736 with 8 d.f.
probability =     0.7854


             Dunn's Pairwise Comparison of iother by iregion
                            (No adjustment)
Col Mean-|
Row Mean |             1             2             3             4             5             6
---------+------------------------------------------------------------------------------------
       2 |  -1.651264
         |     0.0493
         |
       3 |  -0.754747   1.384344
         |     0.2252     0.0831
         |
       4 |  -0.289090   1.440613   0.450033
         |     0.3863     0.0748     0.3263
         |
       5 |  -0.986810   1.068340  -0.366535  -0.704618
         |     0.1619     0.1427     0.3570     0.2405
         |
       6 |  -0.712218   1.021777  -0.072157  -0.440535   0.201037
         |     0.2382     0.1534     0.4712     0.3298     0.4203
         |
       7 |  -1.329861   0.363767  -0.908316  -1.094902  -0.607562  -0.665397
         |     0.0918     0.3580     0.1819     0.1368     0.2717     0.2529
         |
       8 |  -0.764952   0.974207  -0.137978  -0.495255   0.138866  -0.053765
         |     0.2221     0.1650     0.4451     0.3102     0.4448     0.4786
         |
       9 |  -1.140280   0.839921  -0.612310  -0.874259  -0.250994  -0.386621
         |     0.1271     0.2005     0.2702     0.1910     0.4009     0.3495
Col Mean-|
Row Mean |             7             8
---------+----------------------
       8 |   0.615064
         |     0.2693
         |
       9 |   0.395481  -0.327411
         |     0.3462     0.3717

alpha =   0.05
Reject Ho if p = P(Z <= |z|) <= alpha/2
```

- Question: For each of the factor variables (knowledge and other), are there differences in the average response based upon type of device used?

```
. dunntest iknowledge, by(idevice)

Warning: by() values are unlabeled, option nolabel implicit


Kruskal-Wallis equality-of-populations rank test

  +---------------------------+
  | idevice | Obs |  Rank Sum |
  |---------+-----+-----------|
  |       1 | 455 | 231846.00 |
  |       2 | 464 | 243925.50 |
  |       4 | 117 |  74083.00 |
  |       5 |  22 |  14355.00 |
  |       6 |   9 |   5568.50 |
  +---------------------------+

chi-squared =    19.255 with 4 d.f.
probability =     0.0007

chi-squared with ties =    21.656 with 4 d.f.
probability =     0.0002


            Dunn's Pairwise Comparison of iknowledge by idevice
```

```
                            (No adjustment)
Col Mean-|
Row Mean |       1          2          4          5
---------+--------------------------------------------
       2 |  -0.842399
         |     0.1998
         |
       4 |  -4.104772  -3.575691
         |     0.0000     0.0002
         |
       5 |  -2.253612  -1.999900  -0.286000
         |     0.0121     0.0228     0.3874
         |
       6 |  -1.116132  -0.951199   0.143918   0.293782
         |     0.1322     0.1708     0.4428     0.3845

alpha =   0.05
Reject Ho if p = P(Z <= |z|) <= alpha/2

.
. dunntest iother, by(idevice)

Warning: by() values are unlabeled, option nolabel implicit


Kruskal-Wallis equality-of-populations rank test

  +---------------------------+
  | idevice | Obs |  Rank Sum |
  |---------+-----+-----------|
  |       1 | 455 | 232086.50 |
  |       2 | 464 | 249706.50 |
  |       4 | 117 |  71108.00 |
  |       5 |  22 |  12291.00 |
  |       6 |   9 |   4586.00 |
  +---------------------------+

chi-squared =     9.727 with 4 d.f.
probability =     0.0453

chi-squared with ties =     9.893 with 4 d.f.
probability =     0.0423


              Dunn's Pairwise Comparison of iother by idevice
                            (No adjustment)
Col Mean-|
Row Mean |       1          2          4          5
---------+--------------------------------------------
       2 |  -1.392887
         |     0.0818
         |
       4 |  -3.084003  -2.201813
         |     0.0010     0.0138
         |
       5 |  -0.728643  -0.307796   0.691191
         |     0.2331     0.3791     0.2447
         |
       6 |   0.005101   0.278162   0.929115   0.406324
         |     0.4980     0.3904     0.1764     0.3423

alpha =   0.05
Reject Ho if p = P(Z <= |z|) <= alpha/2
```