

Correlation_tests.R

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```
library(Hmisc)

## Loading required package: lattice
## Loading required package: survival
## Loading required package: Formula
## Loading required package: ggplot2

##
## Attaching package: 'Hmisc'

## The following objects are masked from 'package:base':
##
##      format.pval, round.POSIXt, trunc.POSIXt, units

##Correlation tests, save as tables
##SampleFile <-"D:\\Downloads\\Korea May 2019\\Proportion vs. gender
bias\\Regression data 6 countries 96 and 12 -var3.txt" #regression data 6
countries.txt"
SampleFile <-"D:\\Downloads\\Korea May 2019\\Proportion vs. gender
bias\\regression data 6 countries 50 96 and 12 - var3.txt"
##SampleFile <-"D:\\Downloads\\Korea May 2019\\Proportion vs. gender
bias\\regression data 6 countries 100 96 and 12 -var3.txt"
options(digits=4)
options(scipen=10) #allow width of up to 10 digits before going into
scientific notation

AllData <-read.table(file=SampleFile, head=TRUE, sep = "\\t", na.strings="-
999")

#####
#####
## RQ1: Do large English-speaking countries have similar shares of female
first authors across fields?
#####
#####

#Compare female proportions between countries overall
FemaleProportionCols <-
c("auFem1All", "caFem1All", "ieFem1All", "nzFem1All", "ukFem1All", "usFem1All")
FemaleProportions <- AllData[FemaleProportionCols]
```

```
#round(corr(FemaleProportions,method="spearman", use =
"pairwise.complete.obs"), digits=4) #check if most appropriate is Spearman'
delete pairwise not casewise
rc <- rcorr(as.matrix(FemaleProportions),type="spearman")
```

```
## Warning in sqrt(npair - 2): NaNs produced
```

```
print(rc$r, digits = 4)
```

```
##          auFem1All caFem1All ieFem1All nzFem1All ukFem1All usFem1All
## auFem1All    1.0000    0.9710         NA    1.0000    0.9704    0.9599
## caFem1All    0.9710    1.0000         NA    0.6000    0.9724    0.9760
## ieFem1All         NA         NA          1         NA         NA         NA
## nzFem1All    1.0000    0.6000         NA    1.0000    0.8286    1.0000
## ukFem1All    0.9704    0.9724         NA    0.8286    1.0000    0.9654
## usFem1All    0.9599    0.9760         NA    1.0000    0.9654    1.0000
```

```
print(rc$n, digits = 4)
```

```
##          auFem1All caFem1All ieFem1All nzFem1All ukFem1All usFem1All
## auFem1All         91         87          0          6          91          91
## caFem1All         87        148          0          6        144        148
## ieFem1All          0          0          0          0          0          0
## nzFem1All          6          6          0          6          6          6
## ukFem1All         91        144          0          6        199        199
## usFem1All         91        148          0          6        199        291
```

```
print(rc$P, digits = 4)
```

```
##          auFem1All caFem1All ieFem1All nzFem1All ukFem1All usFem1All
## auFem1All         NA    0.000         NA    0.00000    0.00000          0
## caFem1All          0         NA         NA    0.20800    0.00000          0
## ieFem1All         NA         NA         NA         NA         NA         NA
## nzFem1All          0    0.208         NA         NA    0.04156          0
## ukFem1All          0    0.000         NA    0.04156         NA          0
## usFem1All          0    0.000         NA    0.00000    0.00000         NA
```

```
#Compare female proportions between countries 96
```

```
FemaleProportionCols <-
```

```
c("auFem1.96","caFem1.96","ieFem1.96","nzFem1.96","ukFem1.96","usFem1.96")
```

```
FemaleProportions <- AllData[FemaleProportionCols]
```

```
rc <- rcorr(as.matrix(FemaleProportions),type="spearman")
```

```
## Warning in sqrt(npair - 2): NaNs produced
```

```
print(rc$r, digits = 4)
```

```
##          auFem1.96 caFem1.96 ieFem1.96 nzFem1.96 ukFem1.96 usFem1.96
## auFem1.96    1.0000    0.8114         NA    0.6571    0.8374    0.8158
## caFem1.96    0.8114    1.0000         NA    0.6571    0.8357    0.9212
## ieFem1.96         NA         NA          1         NA         NA         NA
## nzFem1.96    0.6571    0.6571         NA    1.0000    0.7714    0.7143
```

```
## ukFem1.96      0.8374      0.8357      NA      0.7714      1.0000      0.8793
## usFem1.96      0.8158      0.9212      NA      0.7143      0.8793      1.0000
```

```
print(rc$n, digits = 4)
```

```
##          auFem1.96 caFem1.96 ieFem1.96 nzFem1.96 ukFem1.96 usFem1.96
## auFem1.96      91      87          0          6          91          91
## caFem1.96      87     148          0          6         144         148
## ieFem1.96       0       0          0          0          0          0
## nzFem1.96       6       6          0          6          6          6
## ukFem1.96      91     144          0          6         199         199
## usFem1.96      91     148          0          6         199         291
```

```
print(rc$P, digits = 4)
```

```
##          auFem1.96 caFem1.96 ieFem1.96 nzFem1.96 ukFem1.96 usFem1.96
## auFem1.96      NA      0.0000      NA      0.1562      0.0000      0.0000
## caFem1.96      0.0000      NA      NA      0.1562      0.0000      0.0000
## ieFem1.96      NA      NA      NA      NA      NA      NA
## nzFem1.96      0.1562      0.1562      NA      NA      0.0724      0.1108
## ukFem1.96      0.0000      0.0000      NA      0.0724      NA      0.0000
## usFem1.96      0.0000      0.0000      NA      0.1108      0.0000      NA
```

#Compare female proportions between countries 12

```
FemaleProportionCols <-
```

```
c("auFem1.14","caFem1.14","ieFem1.14","nzFem1.14","ukFem1.14","usFem1.14")
```

```
FemaleProportions <- AllData[FemaleProportionCols]
```

```
rc <- rcorr(as.matrix(FemaleProportions),type="spearman")
```

```
## Warning in sqrt(npair - 2): NaNs produced
```

```
print(rc$r, digits = 4)
```

```
##          auFem1.14 caFem1.14 ieFem1.14 nzFem1.14 ukFem1.14 usFem1.14
## auFem1.14      1.0000      0.9236      NA      1.0000      0.9159      0.9467
## caFem1.14      0.9236      1.0000      NA      0.4286      0.9179      0.9587
## ieFem1.14      NA      NA          1      NA      NA      NA
## nzFem1.14      1.0000      0.4286      NA      1.0000      0.3714      0.8286
## ukFem1.14      0.9159      0.9179      NA      0.3714      1.0000      0.9126
## usFem1.14      0.9467      0.9587      NA      0.8286      0.9126      1.0000
```

```
print(rc$n, digits = 4)
```

```
##          auFem1.14 caFem1.14 ieFem1.14 nzFem1.14 ukFem1.14 usFem1.14
## auFem1.14      91      87          0          6          91          91
## caFem1.14      87     148          0          6         144         148
## ieFem1.14       0       0          0          0          0          0
## nzFem1.14       6       6          0          6          6          6
## ukFem1.14      91     144          0          6         199         199
## usFem1.14      91     148          0          6         199         291
```

```
print(rc$P, digits = 4)
```

```
##          auFem1.14 caFem1.14 ieFem1.14 nzFem1.14 ukFem1.14 usFem1.14
## auFem1.14      NA    0.0000      NA    0.00000    0.0000    0.00000
## caFem1.14      0      NA      NA    0.39650    0.0000    0.00000
## ieFem1.14      NA      NA      NA      NA      NA      NA
## nzFem1.14      0    0.3965      NA      NA    0.4685    0.04156
## ukFem1.14      0    0.0000      NA    0.46848      NA    0.00000
## usFem1.14      0    0.0000      NA    0.04156    0.0000      NA
```

#Compare female proportions between countries change

```
FemaleProportionCols <-
c("auChg1", "caChg1", "ieChg1", "nzChg1", "ukChg1", "usChg1")
FemaleProportions <- AllData[FemaleProportionCols]
rc <- rcorr(as.matrix(FemaleProportions), type="spearman")
```

```
## Warning in sqrt(npair - 2): NaNs produced
```

```
print(rc$r, digits = 4)
```

```
##          auChg1  caChg1 ieChg1  nzChg1  ukChg1  usChg1
## auChg1  1.00000  0.43007    NA  0.08571  0.3565  0.37079
## caChg1  0.43007  1.00000    NA -0.08571  0.3265  0.59330
## ieChg1    NA      NA      1      NA      NA      NA
## nzChg1  0.08571 -0.08571    NA  1.00000 -0.4857 -0.08571
## ukChg1  0.35652  0.32653    NA -0.48571  1.0000  0.27765
## usChg1  0.37079  0.59330    NA -0.08571  0.2777  1.00000
```

```
print(rc$n, digits = 4)
```

```
##          auChg1 caChg1 ieChg1 nzChg1 ukChg1 usChg1
## auChg1      91      87      0      6      91      91
## caChg1      87     148      0      6     144     148
## ieChg1       0       0      0      0       0       0
## nzChg1       6       6      0      6       6       6
## ukChg1      91     144      0      6     199     199
## usChg1      91     148      0      6     199     291
```

```
print(rc$P, digits = 4)
```

```
##          auChg1  caChg1 ieChg1 nzChg1  ukChg1  usChg1
## auChg1      NA 3.219e-05    NA 0.8717 0.00052297 2.968e-04
## caChg1 0.00003219      NA    NA 0.8717 0.00006490 1.776e-15
## ieChg1      NA      NA    NA      NA      NA      NA
## nzChg1 0.87174344 8.717e-01    NA      NA 0.32872303 8.717e-01
## ukChg1 0.00052297 6.490e-05    NA 0.3287      NA 7.174e-05
## usChg1 0.00029677 1.776e-15    NA 0.8717 0.00007174      NA
```

```
#####
#####
```

```
## RQ2/5: Are there gender differences in first author citation advantages
similar for fields in large English-speaking countries?
```

```
#####
#####
```

```
#RQ2 Compare female 1st author citation advantages between countries [model  
*with* authors]
```

```
FemaleAdvCols <- c("auFFA1","caFFA1","ieFFA1","nzFFA1","ukFFA1","usFFA1")  
FemaleAdv <- AllData[FemaleAdvCols]
```

```
#round(cor(FemaleAdv,method="spearman", use = "pairwise.complete.obs"),  
digits=4) #check if most appropriate is Spearman' delete pairwise not  
casewise
```

```
rc <- rcorr(as.matrix(FemaleAdv),type="spearman")
```

```
## Warning in sqrt(npair - 2): NaNs produced
```

```
print(rc$r, digits = 4)
```

```
##          auFFA1  caFFA1 ieFFA1  nzFFA1 ukFFA1  usFFA1  
## auFFA1  1.00000  0.1010      NA -0.02857  0.4451  0.3274  
## caFFA1  0.10101  1.0000      NA -0.25714  0.2434  0.1562  
## ieFFA1      NA      NA      1      NA      NA      NA  
## nzFFA1 -0.02857 -0.2571      NA  1.00000  0.7714 -0.5429  
## ukFFA1  0.44507  0.2434      NA  0.77143  1.0000  0.3873  
## usFFA1  0.32741  0.1562      NA -0.54286  0.3873  1.0000
```

```
print(rc$n, digits = 4)
```

```
##          auFFA1 caFFA1 ieFFA1 nzFFA1 ukFFA1 usFFA1  
## auFFA1      90      86      0      6      90      90  
## caFFA1      86     148      0      6     144     148  
## ieFFA1       0      0      0      0      0      0  
## nzFFA1       6      6      0      6      6      6  
## ukFFA1      90     144      0      6     199     199  
## usFFA1      90     148      0      6     199     290
```

```
print(rc$P, digits = 4)
```

```
##          auFFA1  caFFA1 ieFFA1 nzFFA1          ukFFA1          usFFA1  
## auFFA1          NA 0.354743      NA 0.9572 0.00001106472 0.00163307684  
## caFFA1 0.35474262      NA      NA 0.6228 0.00329064265 0.05794124018  
## ieFFA1          NA      NA      NA      NA          NA          NA  
## nzFFA1 0.95715452 0.622787      NA      NA 0.07239649318 0.26570259508  
## ukFFA1 0.00001106 0.003291      NA 0.0724          NA 0.00000001591  
## usFFA1 0.00163308 0.057941      NA 0.2657 0.00000001591          NA
```

```
#RQ5 Compare female 1st author citation advantages between countries [model  
*without* authors]
```

```
FemaleAdvCols <- c("auFFA2","caFFA2","ieFFA2","nzFFA2","ukFFA2","usFFA2")  
FemaleAdv <- AllData[FemaleAdvCols]
```

```
rc <- rcorr(as.matrix(FemaleAdv),type="spearman")
```

```
## Warning in sqrt(npair - 2): NaNs produced
```

```
print(rc$r, digits = 4)
```

```
##          auFFA2 caFFA2 ieFFA2 nzFFA2 ukFFA2 usFFA2
## auFFA2 1.00000 0.3089      NA 0.08571 0.5294 0.4992
## caFFA2 0.30891 1.0000      NA 0.37143 0.3025 0.2193
## ieFFA2      NA      NA      1      NA      NA      NA
## nzFFA2 0.08571 0.3714      NA 1.00000 0.7714 0.2571
## ukFFA2 0.52935 0.3025      NA 0.77143 1.0000 0.4016
## usFFA2 0.49920 0.2193      NA 0.25714 0.4016 1.0000
```

```
print(rc$n, digits = 4)
```

```
##          auFFA2 caFFA2 ieFFA2 nzFFA2 ukFFA2 usFFA2
## auFFA2      91      87      0      6      91      91
## caFFA2      87     148      0      6     144     148
## ieFFA2       0       0      0      0       0       0
## nzFFA2       6       6      0      6       6       6
## ukFFA2      91     144      0      6     199     199
## usFFA2      91     148      0      6     199     291
```

```
print(rc$P, digits = 4)
```

```
##          auFFA2      caFFA2 ieFFA2 nzFFA2          ukFFA2          usFFA2
## auFFA2          NA 0.0036009      NA 0.8717 0.000000068602 0.000000473258
## caFFA2 0.0036009497      NA      NA 0.4685 0.000228861002 0.007415489391
## ieFFA2          NA      NA      NA      NA      NA      NA
## nzFFA2 0.8717434367 0.4684781      NA      NA 0.072396493183 0.622787151734
## ukFFA2 0.0000000686 0.0002289      NA 0.0724      NA 0.000000004142
## usFFA2 0.0000004733 0.0074155      NA 0.6228 0.000000004142      NA
```

```
#Compare female last author citation advantages between countries [model with authors]
```

```
#FemaleAdvCols <- c("auFLA1", "caFLA1", "ieFLA1", "nzFLA1", "ukFLA1", "usFLA1")
```

```
#FemaleAdv <- ALLData[FemaleAdvCols]
```

```
#round(cor(FemaleAdv, method="spearman", use = "pairwise.complete.obs"), digits=4) #check if most appropriate is Spearman' delete pairwise not casewise
```

```
#Compare female last author citation advantages between countries [model without authors]
```

```
#FemaleAdvCols <- c("auFLA2", "caFLA2", "ieFLA2", "nzFLA2", "ukFLA2", "usFLA2")
```

```
#FemaleAdv <- ALLData[FemaleAdvCols]
```

```
#round(cor(FemaleAdv, method="spearman", use = "pairwise.complete.obs"), digits=4) #check if most appropriate is Spearman' delete pairwise not casewise
```

```
#Compare female 1st author citation advantages between countries [model without authors]
```

```
#####
#####
```

```
## RQ3/5: Are female first author citation advantages higher in fields with a greater proportion of females?
```

```
#####
```

```
#####

##RQ3
##All years proportion
FemaleProportionsAndFemale1AdvCols <-
c("au1CtyMFto14","ca1CtyMFto14","ie1CtyMFto14","nz1CtyMFto14","uk1CtyMFto14",
"us1CtyMFto14", "auFFA1","caFFA1","ieFFA1","nzFFA1","ukFFA1","usFFA1")
FemaleProportionsAndFemale1Adv <- AllData[FemaleProportionsAndFemale1AdvCols]
#round(cor(FemaleProportionsAndFemale1Adv,method="spearman", use =
"pairwise.complete.obs"), digits=4) #check if most appropriate is Spearman'
delete pairwise not casewise
rc <- rcorr(as.matrix(FemaleProportionsAndFemale1Adv),type="spearman")

## Warning in sqrt(npair - 2): NaNs produced

print(rc$r, digits = 4)

##          au1CtyMFto14 ca1CtyMFto14 ie1CtyMFto14 nz1CtyMFto14
## au1CtyMFto14      1.0000      0.83020      NaN      0.89655
## ca1CtyMFto14      0.8302      1.00000      NaN      0.74138
## ie1CtyMFto14      NaN      NaN      1      NaN
## nz1CtyMFto14      0.8966      0.74138      NaN      1.00000
## uk1CtyMFto14      0.8085      0.80266      NaN      0.79355
## us1CtyMFto14      0.7670      0.89229      NaN      0.68966
## auFFA1            0.1190      0.07016      NA      0.31429
## caFFA1            0.2586      0.05476      NA      0.71429
## ieFFA1            NA      NA      NA      NA
## nzFFA1            0.1429      0.48571      NA      -0.02857
## ukFFA1            0.1102      0.03911      NA      -0.02857
## usFFA1            0.2103      0.02753      NA      0.54286
##          uk1CtyMFto14 us1CtyMFto14  auFFA1  caFFA1 ieFFA1  nzFFA1
## au1CtyMFto14      0.80852      0.76697  0.11901  0.25858  NA  0.14286
## ca1CtyMFto14      0.80266      0.89229  0.07016  0.05476  NA  0.48571
## ie1CtyMFto14      NaN      NaN      NA      NA      NA      NA
## nz1CtyMFto14      0.79355      0.68966  0.31429  0.71429  NA -0.02857
## uk1CtyMFto14      1.00000      0.80806  0.10389  0.11144  NA  0.48571
## us1CtyMFto14      0.80806      1.00000  0.03290  0.12188  NA  0.77143
## auFFA1            0.10389      0.03290  1.00000  0.10101  NA -0.02857
## caFFA1            0.11144      0.12188  0.10101  1.00000  NA -0.25714
## ieFFA1            NA      NA      NA      NA      1      NA
## nzFFA1            0.48571      0.77143 -0.02857 -0.25714  NA  1.00000
## ukFFA1            0.05155      -0.05546  0.44507  0.24336  NA  0.77143
## usFFA1            0.06063      -0.11340  0.32741  0.15623  NA -0.54286
##          ukFFA1  usFFA1
## au1CtyMFto14  0.11021  0.21035
## ca1CtyMFto14  0.03911  0.02753
## ie1CtyMFto14  NA      NA
## nz1CtyMFto14 -0.02857  0.54286
## uk1CtyMFto14  0.05155  0.06063
## us1CtyMFto14 -0.05546 -0.11340
```

```

## auFFA1      0.44507  0.32741
## caFFA1      0.24336  0.15623
## ieFFA1      NA      NA
## nzFFA1      0.77143 -0.54286
## ukFFA1      1.00000  0.38732
## usFFA1      0.38732  1.00000

print(rc$n, digits = 4)

##          au1CtyMFto14 ca1CtyMFto14 ie1CtyMFto14 nz1CtyMFto14
## au1CtyMFto14      94      90      3      9
## ca1CtyMFto14      90     151      3      9
## ie1CtyMFto14      3      3      5      5
## nz1CtyMFto14      9      9      5     13
## uk1CtyMFto14     94     147      4     10
## us1CtyMFto14     94     151      3      9
## auFFA1           90      86      0      6
## caFFA1           87     148      0      6
## ieFFA1            0      0      0      0
## nzFFA1            6      6      0      6
## ukFFA1           91     144      0      6
## usFFA1           91     148      0      6
##          uk1CtyMFto14 us1CtyMFto14 auFFA1 caFFA1 ieFFA1 nzFFA1 ukFFA1
## au1CtyMFto14      94      94     90     87      0      6     91
## ca1CtyMFto14     147     151     86    148      0      6    144
## ie1CtyMFto14      4      3      0      0      0      0      0
## nz1CtyMFto14     10      9      6      6      0      6      6
## uk1CtyMFto14     203     202     90    144      0      6    199
## us1CtyMFto14     202     294     90    148      0      6    199
## auFFA1           90      90     90     86      0      6     90
## caFFA1          144     148     86    148      0      6    144
## ieFFA1            0      0      0      0      0      0      0
## nzFFA1            6      6      6      6      0      6      6
## ukFFA1          199     199     90    144      0      6    199
## usFFA1          199     290     90    148      0      6    199
##          usFFA1
## au1CtyMFto14     91
## ca1CtyMFto14    148
## ie1CtyMFto14      0
## nz1CtyMFto14      6
## uk1CtyMFto14    199
## us1CtyMFto14    290
## auFFA1          90
## caFFA1          148
## ieFFA1           0
## nzFFA1           6
## ukFFA1          199
## usFFA1          290

print(rc$P, digits = 4)

```



```

##          au1CtyMFto14 ca1CtyMFto14 ie1CtyMFto14 nz1CtyMFto14
## au1CtyMFto14          NA      0.00000      NaN      0.001058
## ca1CtyMFto14      0.000000          NA      NaN      0.022249
## ie1CtyMFto14          NaN          NaN      NA      NaN
## nz1CtyMFto14      0.001058      0.02225      NaN      NA
## uk1CtyMFto14      0.000000      0.00000      NaN      0.006143
## us1CtyMFto14      0.000000      0.00000      NaN      0.039824
## auFFA1            0.263895      0.52091      NA      0.544093
## caFFA1            0.015593      0.50861      NA      0.110787
## ieFFA1            NA          NA      NA      NA
## nzFFA1            0.787172      0.32872      NA      0.957155
## ukFFA1            0.298354      0.64160      NA      0.957155
## usFFA1            0.045362      0.73981      NA      0.265703
##          uk1CtyMFto14 us1CtyMFto14      auFFA1      caFFA1 ieFFA1 nzFFA1
## au1CtyMFto14      0.000000      0.00000 0.26389517 0.015593      NA 0.7872
## ca1CtyMFto14      0.000000      0.00000 0.52091094 0.508612      NA 0.3287
## ie1CtyMFto14          NaN          NaN      NA      NA      NA      NA
## nz1CtyMFto14      0.006143      0.03982 0.54409328 0.110787      NA 0.9572
## uk1CtyMFto14          NA      0.00000 0.32983607 0.183584      NA 0.3287
## us1CtyMFto14      0.000000          NA 0.75819776 0.140036      NA 0.0724
## auFFA1            0.329836      0.75820      NA 0.354743      NA 0.9572
## caFFA1            0.183584      0.14004 0.35474262      NA      NA 0.6228
## ieFFA1            NA          NA      NA      NA      NA      NA
## nzFFA1            0.328723      0.07240 0.95715452 0.622787      NA      NA
## ukFFA1            0.469648      0.43655 0.00001106 0.003291      NA 0.0724
## usFFA1            0.394981      0.05372 0.00163308 0.057941      NA 0.2657
##          ukFFA1      usFFA1
## au1CtyMFto14 0.29835374744 0.04536205452
## ca1CtyMFto14 0.64159969390 0.73981261486
## ie1CtyMFto14          NA          NA
## nz1CtyMFto14 0.95715451871 0.26570259508
## uk1CtyMFto14 0.46964766386 0.39498103667
## us1CtyMFto14 0.43655214638 0.05371993417
## auFFA1      0.00001106472 0.00163307684
## caFFA1      0.00329064265 0.05794124018
## ieFFA1          NA          NA
## nzFFA1      0.07239649318 0.26570259508
## ukFFA1          NA 0.00000001591
## usFFA1      0.00000001591          NA

##96 proportion
FemaleProportionsAndFemale1AdvCols <-
c("auFem1.96", "caFem1.96", "ieFem1.96", "nzFem1.96", "ukFem1.96", "usFem1.96",
  "auFFA1", "caFFA1", "ieFFA1", "nzFFA1", "ukFFA1", "usFFA1")
FemaleProportionsAndFemale1Adv <- AllData[FemaleProportionsAndFemale1AdvCols]
rc <- rcorr(as.matrix(FemaleProportionsAndFemale1Adv), type="spearman")

## Warning in sqrt(npair - 2): NaNs produced

print(rc$r, digits = 4)

```

```
##          auFem1.96 caFem1.96 ieFem1.96 nzFem1.96 ukFem1.96 usFem1.96
## auFem1.96  1.00000  0.8114      NA    0.65714  0.83735  0.81577
## caFem1.96  0.81144  1.0000      NA    0.65714  0.83571  0.92125
## ieFem1.96      NA      NA        1      NA      NA      NA
## nzFem1.96  0.65714  0.6571      NA    1.00000  0.77143  0.71429
## ukFem1.96  0.83735  0.8357      NA    0.77143  1.00000  0.87934
## usFem1.96  0.81577  0.9212      NA    0.71429  0.87934  1.00000
## auFFA1     0.01052  0.1363      NA    0.02857  0.01157  0.03738
## caFFA1     0.04299  0.1094      NA    0.20000  0.11443  0.06807
## ieFFA1      NA      NA      NA      NA      NA      NA
## nzFFA1     0.37143  0.3714      NA   -0.20000  0.25714  0.48571
## ukFFA1     0.06581  0.1395      NA    0.08571  0.11031  0.11288
## usFFA1     0.17855  0.2323      NA    0.25714  0.07491  0.19335
##          auFFA1  caFFA1 ieFFA1  nzFFA1  ukFFA1  usFFA1
## auFem1.96  0.01052  0.04299  NA    0.37143  0.06581  0.17855
## caFem1.96  0.13632  0.10942  NA    0.37143  0.13949  0.23230
## ieFem1.96      NA      NA      NA      NA      NA      NA
## nzFem1.96  0.02857  0.20000  NA   -0.20000  0.08571  0.25714
## ukFem1.96  0.01157  0.11443  NA    0.25714  0.11031  0.07491
## usFem1.96  0.03738  0.06807  NA    0.48571  0.11288  0.19335
## auFFA1     1.00000  0.10101  NA   -0.02857  0.44507  0.32741
## caFFA1     0.10101  1.00000  NA   -0.25714  0.24336  0.15623
## ieFFA1      NA      NA      1      NA      NA      NA
## nzFFA1     -0.02857 -0.25714  NA    1.00000  0.77143 -0.54286
## ukFFA1     0.44507  0.24336  NA    0.77143  1.00000  0.38732
## usFFA1     0.32741  0.15623  NA   -0.54286  0.38732  1.00000
```

```
print(rc$n, digits = 4)
```

```
##          auFem1.96 caFem1.96 ieFem1.96 nzFem1.96 ukFem1.96 usFem1.96
## auFem1.96      91      87          0          6          91          91
## caFem1.96      87     148          0          6         144         148
## ieFem1.96       0       0          0          0          0          0
## nzFem1.96       6       6          0          6          6          6
## ukFem1.96      91     144          0          6         199         199
## usFem1.96      91     148          0          6         199         291
## auFFA1         90      86          0          6          90          90
## caFFA1         87     148          0          6         144         148
## ieFFA1          0       0          0          0          0          0
## nzFFA1          6       6          0          6          6          6
## ukFFA1         91     144          0          6         199         199
## usFFA1         91     148          0          6         199         290
##          auFFA1 caFFA1 ieFFA1  nzFFA1  ukFFA1  usFFA1
## auFem1.96      90      87          0          6          91          91
## caFem1.96      86     148          0          6         144         148
## ieFem1.96       0       0          0          0          0          0
## nzFem1.96       6       6          0          6          6          6
## ukFem1.96      90     144          0          6         199         199
## usFem1.96      90     148          0          6         199         290
## auFFA1         90      86          0          6          90          90
```

```
## caFFA1      86    148    0    6    144    148
## ieFFA1      0     0    0    0     0     0
## nzFFA1      6     6    0    6     6     6
## ukFFA1     90    144    0    6    199    199
## usFFA1     90    148    0    6    199    290
```

```
print(rc$P, digits = 4)
```

```
##          auFem1.96 caFem1.96 ieFem1.96 nzFem1.96 ukFem1.96 usFem1.96
## auFem1.96      NA  0.000000      NA    0.1562    0.0000  0.0000000
## caFem1.96    0.00000      NA      NA    0.1562    0.0000  0.0000000
## ieFem1.96      NA      NA      NA      NA      NA      NA
## nzFem1.96    0.15617  0.156175      NA      NA    0.0724  0.1107872
## ukFem1.96    0.00000  0.000000      NA    0.0724      NA  0.0000000
## usFem1.96    0.00000  0.000000      NA    0.1108    0.0000      NA
## auFFA1       0.92161  0.210748      NA    0.9572    0.9138  0.7265078
## caFFA1       0.69260  0.185543      NA    0.7040    0.1720  0.4110344
## ieFFA1        NA      NA      NA      NA      NA      NA
## nzFFA1       0.46848  0.468478      NA    0.7040    0.6228  0.3287230
## ukFFA1       0.53542  0.095421      NA    0.8717    0.1209  0.1124055
## usFFA1       0.09039  0.004496      NA    0.6228    0.2930  0.0009337
##          auFFA1    caFFA1  ieFFA1  nzFFA1          ukFFA1          usFFA1
## auFem1.96 0.92160783 0.692602      NA 0.4685 0.53541760672 0.09038964285
## caFem1.96 0.21074784 0.185543      NA 0.4685 0.09542125800 0.00449631488
## ieFem1.96      NA      NA      NA      NA      NA      NA
## nzFem1.96 0.95715452 0.704000      NA 0.7040 0.87174343675 0.62278715173
## ukFem1.96 0.91378578 0.172036      NA 0.6228 0.12087890104 0.29301011974
## usFem1.96 0.72650781 0.411034      NA 0.3287 0.11240554993 0.00093372595
## auFFA1       NA 0.354743      NA 0.9572 0.00001106472 0.00163307684
## caFFA1     0.35474262      NA      NA 0.6228 0.00329064265 0.05794124018
## ieFFA1        NA      NA      NA      NA      NA      NA
## nzFFA1     0.95715452 0.622787      NA      NA 0.07239649318 0.26570259508
## ukFFA1     0.00001106 0.003291      NA 0.0724      NA 0.00000001591
## usFFA1     0.00163308 0.057941      NA 0.2657 0.00000001591      NA
```

```
##12 proportion
```

```
FemaleProportionsAndFemale1AdvCols <-
```

```
c("auFem1.14", "caFem1.14", "ieFem1.14", "nzFem1.14", "ukFem1.14", "usFem1.14",
  "auFFA1", "caFFA1", "ieFFA1", "nzFFA1", "ukFFA1", "usFFA1")
```

```
FemaleProportionsAndFemale1Adv <- AllData[FemaleProportionsAndFemale1AdvCols]
```

```
rc <- rcorr(as.matrix(FemaleProportionsAndFemale1Adv), type="spearman")
```

```
## Warning in sqrt(npair - 2): NaNs produced
```

```
print(rc$r, digits = 4)
```

```
##          auFem1.14 caFem1.14 ieFem1.14 nzFem1.14 ukFem1.14 usFem1.14
## auFem1.14  1.00000  0.92359      NA    1.0000  0.915922  0.94669
## caFem1.14  0.92359  1.00000      NA    0.4286  0.917858  0.95867
## ieFem1.14      NA      NA      1      NA      NA      NA
## nzFem1.14  1.00000  0.42857      NA    1.0000  0.371429  0.82857
```

```
## ukFem1.14    0.91592    0.91786      NA    0.3714    1.000000    0.91259
## usFem1.14    0.94669    0.95867      NA    0.8286    0.912588    1.00000
## auFFA1       0.11114    0.09003      NA    0.2571    0.126230    0.10438
## caFFA1       0.02869    0.06605      NA    0.3714    0.005823    0.09185
## ieFFA1            NA            NA      NA            NA            NA            NA
## nzFFA1       0.54286   -0.02857      NA    0.5429   -0.371429    0.60000
## ukFFA1       0.14435    0.13210      NA    0.7714    0.101248    0.13665
## usFFA1       0.24916    0.14983      NA    0.1429    0.141531    0.20460
##              auFFA1    caFFA1  ieFFA1    nzFFA1  ukFFA1    usFFA1
## auFem1.14    0.11114    0.028687      NA    0.54286  0.1443    0.2492
## caFem1.14    0.09003    0.066054      NA   -0.02857  0.1321    0.1498
## ieFem1.14            NA            NA      NA            NA            NA            NA
## nzFem1.14    0.25714    0.371429      NA    0.54286  0.7714    0.1429
## ukFem1.14    0.12623    0.005823      NA   -0.37143  0.1012    0.1415
## usFem1.14    0.10438    0.091846      NA    0.60000  0.1366    0.2046
## auFFA1       1.00000    0.101014      NA   -0.02857  0.4451    0.3274
## caFFA1       0.10101    1.000000      NA   -0.25714  0.2434    0.1562
## ieFFA1            NA            NA      1            NA            NA            NA
## nzFFA1       -0.02857   -0.257143      NA    1.00000  0.7714   -0.5429
## ukFFA1       0.44507    0.243361      NA    0.77143  1.0000    0.3873
## usFFA1       0.32741    0.156228      NA   -0.54286  0.3873    1.0000
```

```
print(rc$n, digits = 4)
```

```
##              auFem1.14  caFem1.14  ieFem1.14  nzFem1.14  ukFem1.14  usFem1.14
## auFem1.14           91           87           0           6           91           91
## caFem1.14           87          148           0           6          144          148
## ieFem1.14           0            0           0           0            0            0
## nzFem1.14           6            6           0           6            6            6
## ukFem1.14           91          144           0           6          199          199
## usFem1.14           91          148           0           6          199          291
## auFFA1              90            86           0           6            90            90
## caFFA1              87          148           0           6          144          148
## ieFFA1              0            0           0           0            0            0
## nzFFA1              6            6           0           6            6            6
## ukFFA1              91          144           0           6          199          199
## usFFA1              91          148           0           6          199          290
##              auFFA1  caFFA1  ieFFA1  nzFFA1  ukFFA1  usFFA1
## auFem1.14          90          87           0           6           91           91
## caFem1.14          86          148           0           6          144          148
## ieFem1.14           0            0           0           0            0            0
## nzFem1.14           6            6           0           6            6            6
## ukFem1.14          90          144           0           6          199          199
## usFem1.14          90          148           0           6          199          290
## auFFA1              90            86           0           6            90            90
## caFFA1              86          148           0           6          144          148
## ieFFA1              0            0           0           0            0            0
## nzFFA1              6            6           0           6            6            6
## ukFFA1              90          144           0           6          199          199
## usFFA1              90          148           0           6          199          290
```

```
print(rc$P, digits = 4)
```

```
##          auFem1.14 caFem1.14 ieFem1.14 nzFem1.14 ukFem1.14 usFem1.14
## auFem1.14      NA    0.00000      NA    0.00000    0.00000 0.0000000
## caFem1.14    0.00000      NA      NA    0.39650    0.00000 0.0000000
## ieFem1.14      NA      NA      NA      NA      NA      NA
## nzFem1.14    0.00000    0.39650      NA      NA    0.46848 0.0415627
## ukFem1.14    0.00000    0.00000      NA    0.46848      NA 0.0000000
## usFem1.14    0.00000    0.00000      NA    0.04156    0.00000      NA
## auFFA1       0.29700    0.40972      NA    0.62279    0.23581 0.3275295
## caFFA1       0.79196    0.42508      NA    0.46848    0.94477 0.2669003
## ieFFA1        NA      NA      NA      NA      NA      NA
## nzFFA1       0.26570    0.95715      NA    0.26570    0.46848 0.2080000
## ukFFA1       0.17222    0.11451      NA    0.07240    0.15475 0.0542821
## usFFA1       0.01724    0.06913      NA    0.78717    0.04615 0.0004544
##          auFFA1    caFFA1 ieFFA1 nzFFA1      ukFFA1      usFFA1
## auFem1.14 0.29700404 0.791965      NA 0.2657 0.17221956112 0.01723579969
## caFem1.14 0.40971803 0.425081      NA 0.9572 0.11450522600 0.06912798649
## ieFem1.14      NA      NA      NA      NA      NA      NA
## nzFem1.14 0.62278715 0.468478      NA 0.2657 0.07239649318 0.78717200228
## ukFem1.14 0.23580863 0.944772      NA 0.4685 0.15475367569 0.04615046667
## usFem1.14 0.32752955 0.266900      NA 0.2080 0.05428212491 0.00045441496
## auFFA1      NA    0.354743      NA 0.9572 0.00001106472 0.00163307684
## caFFA1     0.35474262      NA      NA 0.6228 0.00329064265 0.05794124018
## ieFFA1      NA      NA      NA      NA      NA      NA
## nzFFA1     0.95715452 0.622787      NA      NA 0.07239649318 0.26570259508
## ukFFA1     0.00001106 0.003291      NA 0.0724      NA 0.00000001591
## usFFA1     0.00163308 0.057941      NA 0.2657 0.00000001591      NA
```

```
##RQ5
```

```
##All years proportion
```

```
FemaleProportionsAndFemale1AdvCols <-
```

```
c("au1CtyMFto14", "ca1CtyMFto14", "ie1CtyMFto14", "nz1CtyMFto14", "uk1CtyMFto14",
  "us1CtyMFto14", "auFFA2", "caFFA2", "ieFFA2", "nzFFA2", "ukFFA2", "usFFA2")
```

```
FemaleProportionsAndFemale1Adv <- AllData[FemaleProportionsAndFemale1AdvCols]
```

```
rc <- rcorr(as.matrix(FemaleProportionsAndFemale1Adv), type="spearman")
```

```
## Warning in sqrt(npair - 2): NaNs produced
```

```
print(rc$r, digits = 4)
```

```
##          au1CtyMFto14 ca1CtyMFto14 ie1CtyMFto14 nz1CtyMFto14
## au1CtyMFto14      1.00000      0.83020      NaN      0.89655
## ca1CtyMFto14      0.83020      1.00000      NaN      0.74138
## ie1CtyMFto14      NaN      NaN      1      NaN
## nz1CtyMFto14      0.89655      0.74138      NaN      1.00000
## uk1CtyMFto14      0.80852      0.80266      NaN      0.79355
## us1CtyMFto14      0.76697      0.89229      NaN      0.68966
## auFFA2           0.10174     -0.01343      NA      0.42857
## caFFA2           0.30586      0.07081      NA      0.65714
## ieFFA2           NA      NA      NA      NA
```

```
## nzFFA2      0.14286      0.48571      NA      -0.02857
## ukFFA2      0.05424     -0.04356      NA      0.31429
## usFFA2      0.13632     -0.03001      NA      0.82857
##            uk1CtyMFto14 us1CtyMFto14  auFFA2  caFFA2  ieFFA2  nzFFA2
## au1CtyMFto14 0.808525    0.76697    0.10174 0.30586    NA    0.14286
## ca1CtyMFto14 0.802662    0.89229   -0.01343 0.07081    NA    0.48571
## ie1CtyMFto14      NaN      NaN      NA      NA      NA      NA
## nz1CtyMFto14 0.793548    0.68966    0.42857 0.65714    NA   -0.02857
## uk1CtyMFto14 1.000000    0.80806    0.11471 0.15390    NA    0.48571
## us1CtyMFto14 0.808062    1.00000   -0.01941 0.13521    NA    0.77143
## auFFA2      0.114708   -0.01941    1.00000 0.30891    NA    0.08571
## caFFA2      0.153903    0.13521    0.30891 1.00000    NA    0.37143
## ieFFA2      NA      NA      NA      NA      1      NA
## nzFFA2      0.485714    0.77143    0.08571 0.37143    NA    1.00000
## ukFFA2     -0.009847   -0.05738    0.52935 0.30248    NA    0.77143
## usFFA2      0.017922   -0.07083    0.49920 0.21927    NA    0.25714
##            ukFFA2    usFFA2
## au1CtyMFto14 0.054245 0.13632
## ca1CtyMFto14 -0.043564 -0.03001
## ie1CtyMFto14      NA      NA
## nz1CtyMFto14 0.314286 0.82857
## uk1CtyMFto14 -0.009847 0.01792
## us1CtyMFto14 -0.057382 -0.07083
## auFFA2      0.529352 0.49920
## caFFA2      0.302480 0.21927
## ieFFA2      NA      NA
## nzFFA2      0.771429 0.25714
## ukFFA2      1.000000 0.40157
## usFFA2      0.401567 1.00000
```

```
print(rc$n, digits = 4)
```

```
##            au1CtyMFto14 ca1CtyMFto14 ie1CtyMFto14 nz1CtyMFto14
## au1CtyMFto14      94      90      3      9
## ca1CtyMFto14      90     151      3      9
## ie1CtyMFto14       3       3      5      5
## nz1CtyMFto14       9       9      5     13
## uk1CtyMFto14      94     147      4     10
## us1CtyMFto14      94     151      3      9
## auFFA2           91      87      0      6
## caFFA2           87     148      0      6
## ieFFA2            0       0      0      0
## nzFFA2            6       6      0      6
## ukFFA2           91     144      0      6
## usFFA2           91     148      0      6
##            uk1CtyMFto14 us1CtyMFto14 auFFA2  caFFA2  ieFFA2  nzFFA2  ukFFA2
## au1CtyMFto14      94      94      91      87      0      6      91
## ca1CtyMFto14     147     151      87     148      0      6     144
## ie1CtyMFto14       4       3       0       0      0      0       0
## nz1CtyMFto14     10       9       6       6      0      6       6
```

```
## uk1CtyMFto14      203      202      91      144      0      6      199
## us1CtyMFto14      202      294      91      148      0      6      199
## auFFA2             91       91      91      87      0      6      91
## caFFA2            144      148      87      148      0      6      144
## ieFFA2             0        0       0       0      0      0       0
## nzFFA2             6        6       6       6      0      6       6
## ukFFA2            199      199      91      144      0      6      199
## usFFA2            199      291      91      148      0      6      199
##                  usFFA2
## au1CtyMFto14      91
## ca1CtyMFto14     148
## ie1CtyMFto14      0
## nz1CtyMFto14      6
## uk1CtyMFto14     199
## us1CtyMFto14     291
## auFFA2            91
## caFFA2            148
## ieFFA2            0
## nzFFA2            6
## ukFFA2            199
## usFFA2            291
```

```
print(rc$P, digits = 4)
```

```
##                  au1CtyMFto14 ca1CtyMFto14 ie1CtyMFto14 nz1CtyMFto14
## au1CtyMFto14      NA          0.00000      NaN          0.001058
## ca1CtyMFto14      0.00000      NA          NaN          0.022249
## ie1CtyMFto14      NaN          NaN          NA           NA
## nz1CtyMFto14      0.001058    0.02225      NaN          NA
## uk1CtyMFto14      0.000000    0.00000      NaN          0.006143
## us1CtyMFto14      0.000000    0.00000      NaN          0.039824
## auFFA2             0.337265    0.90173      NA          0.396501
## caFFA2             0.003964    0.39244      NA          0.156175
## ieFFA2             NA          NA          NA           NA
## nzFFA2             0.787172    0.32872      NA          0.957155
## ukFFA2             0.609572    0.60414      NA          0.544093
## usFFA2             0.197585    0.71734      NA          0.041563
##                  uk1CtyMFto14 us1CtyMFto14      auFFA2      caFFA2 ieFFA2
## au1CtyMFto14      0.000000    0.00000 0.3372649612 0.0039641      NA
## ca1CtyMFto14      0.000000    0.00000 0.9017262225 0.3924439      NA
## ie1CtyMFto14      NaN          NaN      NA           NA      NA
## nz1CtyMFto14      0.006143    0.03982 0.3965014525 0.1561749      NA
## uk1CtyMFto14      NA          0.00000 0.2789423310 0.0655151      NA
## us1CtyMFto14      0.000000    NA      0.8550694722 0.1013318      NA
## auFFA2             0.278942    0.85507      NA 0.0036009      NA
## caFFA2             0.065515    0.10133 0.0036009497      NA      NA
## ieFFA2             NA          NA          NA           NA      NA
## nzFFA2             0.328723    0.07240 0.8717434367 0.4684781      NA
## ukFFA2             0.890211    0.42080 0.0000000686 0.0002289      NA
## usFFA2             0.801620    0.22834 0.0000004733 0.0074155      NA
```

```

##          nzFFA2          ukFFA2          usFFA2
## au1CtyMFto14 0.7872 0.609571822053 0.197584957545
## ca1CtyMFto14 0.3287 0.604141479987 0.717340695595
## ie1CtyMFto14    NA          NA          NA
## nz1CtyMFto14 0.9572 0.544093279497 0.041562677411
## uk1CtyMFto14 0.3287 0.890211153875 0.801619655056
## us1CtyMFto14 0.0724 0.420801399153 0.228339505761
## auFFA2        0.8717 0.000000068602 0.000000473258
## caFFA2        0.4685 0.000228861002 0.007415489391
## ieFFA2        NA          NA          NA
## nzFFA2        NA 0.072396493183 0.622787151734
## ukFFA2        0.0724          NA 0.000000004142
## usFFA2        0.6228 0.000000004142          NA

##96 proportion
FemaleProportionsAndFemale1AdvCols <-
c("auFem1.96", "caFem1.96", "ieFem1.96", "nzFem1.96", "ukFem1.96", "usFem1.96",
  "auFFA2", "caFFA2", "ieFFA2", "nzFFA2", "ukFFA2", "usFFA2")
FemaleProportionsAndFemale1Adv <- AllData[FemaleProportionsAndFemale1AdvCols]
rc <- rcorr(as.matrix(FemaleProportionsAndFemale1Adv), type="spearman")

## Warning in sqrt(npair - 2): NaNs produced

print(rc$r, digits = 4)

##          auFem1.96 caFem1.96 ieFem1.96 nzFem1.96 ukFem1.96 usFem1.96
## auFem1.96  1.00000  0.8114    NA    0.65714  0.83735  0.81577
## caFem1.96  0.81144  1.0000    NA    0.65714  0.83571  0.92125
## ieFem1.96    NA      NA      1      NA      NA      NA
## nzFem1.96  0.65714  0.6571    NA    1.00000  0.77143  0.71429
## ukFem1.96  0.83735  0.8357    NA    0.77143  1.00000  0.87934
## usFem1.96  0.81577  0.9212    NA    0.71429  0.87934  1.00000
## auFFA2      0.05263  0.1554    NA    0.20000  0.02118  0.06253
## caFFA2      0.15722  0.1276    NA   -0.25714  0.15165  0.09908
## ieFFA2      NA      NA      NA      NA      NA      NA
## nzFFA2      0.37143  0.3714    NA   -0.20000  0.25714  0.48571
## ukFFA2      0.05956  0.1056    NA   -0.08571  0.07544  0.08105
## usFFA2      0.07466  0.1695    NA   -0.08571 -0.01760  0.10509
##          auFFA2    caFFA2 ieFFA2    nzFFA2    ukFFA2    usFFA2
## auFem1.96 0.05263  0.15722    NA    0.37143  0.05956  0.07466
## caFem1.96 0.15535  0.12756    NA    0.37143  0.10558  0.16953
## ieFem1.96    NA      NA      NA      NA      NA      NA
## nzFem1.96 0.20000 -0.25714    NA   -0.20000 -0.08571 -0.08571
## ukFem1.96 0.02118  0.15165    NA    0.25714  0.07544 -0.01760
## usFem1.96 0.06253  0.09908    NA    0.48571  0.08105  0.10509
## auFFA2      1.00000  0.30891    NA    0.08571  0.52935  0.49920
## caFFA2      0.30891  1.00000    NA    0.37143  0.30248  0.21927
## ieFFA2      NA      NA      1      NA      NA      NA
## nzFFA2      0.08571  0.37143    NA    1.00000  0.77143  0.25714
## ukFFA2      0.52935  0.30248    NA    0.77143  1.00000  0.40157
## usFFA2      0.49920  0.21927    NA    0.25714  0.40157  1.00000

```



```
print(rc$n, digits = 4)
```

```
##          auFem1.96 caFem1.96 ieFem1.96 nzFem1.96 ukFem1.96 usFem1.96
## auFem1.96      91      87      0      6      91      91
## caFem1.96      87     148      0      6     144     148
## ieFem1.96       0       0      0      0       0       0
## nzFem1.96       6       6      0      6       6       6
## ukFem1.96      91     144      0      6     199     199
## usFem1.96      91     148      0      6     199     291
## auFFA2         91      87      0      6      91      91
## caFFA2         87     148      0      6     144     148
## ieFFA2          0       0      0      0       0       0
## nzFFA2          6       6      0      6       6       6
## ukFFA2         91     144      0      6     199     199
## usFFA2         91     148      0      6     199     291
##          auFFA2 caFFA2 ieFFA2 nzFFA2 ukFFA2 usFFA2
## auFem1.96      91      87      0      6      91      91
## caFem1.96      87     148      0      6     144     148
## ieFem1.96       0       0      0      0       0       0
## nzFem1.96       6       6      0      6       6       6
## ukFem1.96      91     144      0      6     199     199
## usFem1.96      91     148      0      6     199     291
## auFFA2         91      87      0      6      91      91
## caFFA2         87     148      0      6     144     148
## ieFFA2          0       0      0      0       0       0
## nzFFA2          6       6      0      6       6       6
## ukFFA2         91     144      0      6     199     199
## usFFA2         91     148      0      6     199     291
```

```
print(rc$P, digits = 4)
```

```
##          auFem1.96 caFem1.96 ieFem1.96 nzFem1.96 ukFem1.96 usFem1.96
## auFem1.96      NA    0.00000      NA    0.1562    0.0000    0.00000
## caFem1.96    0.0000      NA      NA    0.1562    0.0000    0.00000
## ieFem1.96      NA      NA      NA      NA      NA      NA
## nzFem1.96    0.1562    0.15617      NA      NA    0.0724    0.11079
## ukFem1.96    0.0000    0.00000      NA    0.0724      NA    0.00000
## usFem1.96    0.0000    0.00000      NA    0.1108    0.0000      NA
## auFFA2       0.6203    0.15077      NA    0.7040    0.8420    0.55600
## caFFA2       0.1459    0.12235      NA    0.6228    0.0696    0.23090
## ieFFA2        NA      NA      NA      NA      NA      NA
## nzFFA2       0.4685    0.46848      NA    0.7040    0.6228    0.32872
## ukFFA2       0.5750    0.20786      NA    0.8717    0.2896    0.25512
## usFFA2       0.4818    0.03941      NA    0.8717    0.8051    0.07347
##          auFFA2    caFFA2 ieFFA2 nzFFA2      ukFFA2
## auFem1.96 0.6202848601 0.1458736      NA 0.4685 0.574950285288
## caFem1.96 0.1507655033 0.1223470      NA 0.4685 0.207858103678
## ieFem1.96      NA      NA      NA      NA      NA
## nzFem1.96 0.7039999957 0.6227872      NA 0.7040 0.871743436747
## ukFem1.96 0.8420354516 0.0696039      NA 0.6228 0.289569954252
```

```

## usFem1.96 0.5560020897 0.2309023 NA 0.3287 0.255116245813
## auFFA2 NA 0.0036009 NA 0.8717 0.000000068602
## caFFA2 0.0036009497 NA NA 0.4685 0.000228861002
## ieFFA2 NA NA NA NA NA
## nzFFA2 0.8717434367 0.4684781 NA NA 0.072396493183
## ukFFA2 0.0000000686 0.0002289 NA 0.0724 NA
## usFFA2 0.0000004733 0.0074155 NA 0.6228 0.000000004142
##
## usFFA2
## auFem1.96 0.481824400650
## caFem1.96 0.039408992146
## ieFem1.96 NA
## nzFem1.96 0.871743436747
## ukFem1.96 0.805128954442
## usFem1.96 0.073468449425
## auFFA2 0.000000473258
## caFFA2 0.007415489391
## ieFFA2 NA
## nzFFA2 0.622787151734
## ukFFA2 0.000000004142
## usFFA2 NA

##12 proportion
FemaleProportionsAndFemale1AdvCols <-
c("auFem1.14", "caFem1.14", "ieFem1.14", "nzFem1.14", "ukFem1.14", "usFem1.14",
  "auFFA2", "caFFA2", "ieFFA2", "nzFFA2", "ukFFA2", "usFFA2")
FemaleProportionsAndFemale1Adv <- AllData[FemaleProportionsAndFemale1AdvCols]
rc <- rcorr(as.matrix(FemaleProportionsAndFemale1Adv), type="spearman")

## Warning in sqrt(npair - 2): NaNs produced

print(rc$r, digits = 4)

##
## auFem1.14 caFem1.14 ieFem1.14 nzFem1.14 ukFem1.14 usFem1.14
## auFem1.14 1.0000 0.92359 NA 1.0000 0.91592 0.9467
## caFem1.14 0.9236 1.00000 NA 0.4286 0.91786 0.9587
## ieFem1.14 NA NA 1 NA NA NA
## nzFem1.14 1.0000 0.42857 NA 1.0000 0.37143 0.8286
## ukFem1.14 0.9159 0.91786 NA 0.3714 1.00000 0.9126
## usFem1.14 0.9467 0.95867 NA 0.8286 0.91259 1.0000
## auFFA2 0.1140 0.07804 NA 0.5429 0.11417 0.1321
## caFFA2 0.1056 0.06491 NA 0.5429 0.02569 0.1100
## ieFFA2 NA NA NA NA NA NA
## nzFFA2 0.5429 -0.02857 NA 0.5429 -0.37143 0.6000
## ukFFA2 0.1772 0.12130 NA 0.7714 0.08336 0.1169
## usFFA2 0.1800 0.08146 NA 0.6000 0.05522 0.1131
##
## auFFA2 caFFA2 ieFFA2 nzFFA2 ukFFA2 usFFA2
## auFem1.14 0.11404 0.10560 NA 0.54286 0.17721 0.17998
## caFem1.14 0.07804 0.06491 NA -0.02857 0.12130 0.08146
## ieFem1.14 NA NA NA NA NA NA
## nzFem1.14 0.54286 0.54286 NA 0.54286 0.77143 0.60000
## ukFem1.14 0.11417 0.02569 NA -0.37143 0.08336 0.05522

```

```
## usFem1.14 0.13209 0.11001 NA 0.60000 0.11695 0.11314
## auFFA2 1.00000 0.30891 NA 0.08571 0.52935 0.49920
## caFFA2 0.30891 1.00000 NA 0.37143 0.30248 0.21927
## ieFFA2 NA NA 1 NA NA NA
## nzFFA2 0.08571 0.37143 NA 1.00000 0.77143 0.25714
## ukFFA2 0.52935 0.30248 NA 0.77143 1.00000 0.40157
## usFFA2 0.49920 0.21927 NA 0.25714 0.40157 1.00000
```

```
print(rc$n, digits = 4)
```

```
##          auFem1.14 caFem1.14 ieFem1.14 nzFem1.14 ukFem1.14 usFem1.14
## auFem1.14          91          87          0          6          91          91
## caFem1.14          87          148          0          6          144          148
## ieFem1.14          0          0          0          0          0          0
## nzFem1.14          6          6          0          6          6          6
## ukFem1.14          91          144          0          6          199          199
## usFem1.14          91          148          0          6          199          291
## auFFA2            91          87          0          6          91          91
## caFFA2            87          148          0          6          144          148
## ieFFA2            0          0          0          0          0          0
## nzFFA2            6          6          0          6          6          6
## ukFFA2            91          144          0          6          199          199
## usFFA2            91          148          0          6          199          291
##          auFFA2 caFFA2 ieFFA2 nzFFA2 ukFFA2 usFFA2
## auFem1.14          91          87          0          6          91          91
## caFem1.14          87          148          0          6          144          148
## ieFem1.14          0          0          0          0          0          0
## nzFem1.14          6          6          0          6          6          6
## ukFem1.14          91          144          0          6          199          199
## usFem1.14          91          148          0          6          199          291
## auFFA2            91          87          0          6          91          91
## caFFA2            87          148          0          6          144          148
## ieFFA2            0          0          0          0          0          0
## nzFFA2            6          6          0          6          6          6
## ukFFA2            91          144          0          6          199          199
## usFFA2            91          148          0          6          199          291
```

```
print(rc$P, digits = 4)
```

```
##          auFem1.14 caFem1.14 ieFem1.14 nzFem1.14 ukFem1.14 usFem1.14
## auFem1.14          NA          0.0000          NA          0.00000          0.0000          0.00000
## caFem1.14          0.00000          NA          NA          0.39650          0.0000          0.00000
## ieFem1.14          NA          NA          NA          NA          NA          NA
## nzFem1.14          0.00000          0.3965          NA          NA          0.4685          0.04156
## ukFem1.14          0.00000          0.0000          NA          0.46848          NA          0.00000
## usFem1.14          0.00000          0.0000          NA          0.04156          0.0000          NA
## auFFA2            0.28177          0.4725          NA          0.26570          0.2812          0.21198
## caFFA2            0.33033          0.4332          NA          0.26570          0.7599          0.18316
## ieFFA2            NA          NA          NA          NA          NA          NA
## nzFFA2            0.26570          0.9572          NA          0.26570          0.4685          0.20800
## ukFFA2            0.09287          0.1476          NA          0.07240          0.2418          0.09998
```

```
## usFFA2      0.08779    0.3250      NA    0.20800    0.4385    0.05387
##              auFFA2    caFFA2  ieFFA2  nzFFA2      ukFFA2
## auFem1.14  0.2817738151 0.3303325      NA 0.2657 0.092871926754
## caFem1.14  0.4724505658 0.4331734      NA 0.9572 0.147558731405
## ieFem1.14      NA      NA      NA      NA      NA
## nzFem1.14  0.2657025951 0.2657026      NA 0.2657 0.072396493183
## ukFem1.14  0.2812011743 0.7599007      NA 0.4685 0.241793928774
## usFem1.14  0.2119845909 0.1831624      NA 0.2080 0.099975265576
## auFFA2      NA 0.0036009      NA 0.8717 0.000000068602
## caFFA2    0.0036009497      NA      NA 0.4685 0.000228861002
## ieFFA2      NA      NA      NA      NA      NA
## nzFFA2    0.8717434367 0.4684781      NA      NA 0.072396493183
## ukFFA2    0.0000000686 0.0002289      NA 0.0724      NA
## usFFA2    0.0000004733 0.0074155      NA 0.6228 0.000000004142
##              usFFA2
## auFem1.14  0.087793895248
## caFem1.14  0.324993255368
## ieFem1.14      NA
## nzFem1.14  0.207999977112
## ukFem1.14  0.438534932063
## usFem1.14  0.053867512108
## auFFA2    0.000000473258
## caFFA2    0.007415489391
## ieFFA2      NA
## nzFFA2    0.622787151734
## ukFFA2    0.000000004142
## usFFA2      NA
```

```
#####
#####
```

```
## RQ4/5: Are female first author citation advantages higher in fields with a
greater increase in the proportion of females?
```

```
#####
#####
```

```
##RQ4
```

```
FemaleProportionsAndFemale1AdvCols <-
```

```
c("auChg1","caChg1","ieChg1","nzChg1","ukChg1","usChg1",
  "auFFA1","caFFA1","ieFFA1","nzFFA1","ukFFA1","usFFA1")
```

```
FemaleProportionsAndFemale1Adv <- AllData[FemaleProportionsAndFemale1AdvCols]
```

```
rc <- rcorr(as.matrix(FemaleProportionsAndFemale1Adv),type="spearman")
```

```
## Warning in sqrt(npair - 2): NaNs produced
```

```
print(rc$r, digits = 4)
```

```
##              auChg1    caChg1  ieChg1    nzChg1    ukChg1    usChg1    auFFA1
## auChg1    1.00000    0.43007      NA    0.08571    0.35652    0.37079    0.15754
## caChg1    0.43007    1.00000      NA   -0.08571    0.32653    0.59330   -0.05760
## ieChg1      NA      NA      1      NA      NA      NA      NA
## nzChg1    0.08571   -0.08571      NA    1.00000   -0.48571   -0.08571    0.02857
```

```
## ukChg1  0.35652  0.32653      NA -0.48571  1.00000  0.27765  0.22550
## usChg1  0.37079  0.59330      NA -0.08571  0.27765  1.00000  0.17962
## auFFA1  0.15754 -0.05760      NA  0.02857  0.22550  0.17962  1.00000
## caFFA1  0.09479  0.02213      NA  0.20000 -0.08079  0.09064  0.10101
## ieFFA1      NA      NA      NA      NA      NA      NA      NA
## nzFFA1 -0.42857 -0.37143      NA  0.82857 -0.77143 -0.37143 -0.02857
## ukFFA1  0.14716  0.06290      NA  0.77143  0.07912  0.11784  0.44507
## usFFA1  0.19165 -0.02732      NA -0.08571  0.17740  0.10592  0.32741
##          caFFA1 ieFFA1  nzFFA1  ukFFA1  usFFA1
## auChg1  0.09479      NA -0.42857 0.14716  0.19165
## caChg1  0.02213      NA -0.37143 0.06290 -0.02732
## ieChg1      NA      NA      NA      NA      NA
## nzChg1  0.20000      NA  0.82857 0.77143 -0.08571
## ukChg1 -0.08079      NA -0.77143 0.07912  0.17740
## usChg1  0.09064      NA -0.37143 0.11784  0.10592
## auFFA1  0.10101      NA -0.02857 0.44507  0.32741
## caFFA1  1.00000      NA -0.25714 0.24336  0.15623
## ieFFA1      NA      1      NA      NA      NA
## nzFFA1 -0.25714      NA  1.00000 0.77143 -0.54286
## ukFFA1  0.24336      NA  0.77143 1.00000  0.38732
## usFFA1  0.15623      NA -0.54286 0.38732  1.00000
```

```
print(rc$n, digits = 4)
```

```
##          auChg1 caChg1 ieChg1 nzChg1 ukChg1 usChg1 auFFA1 caFFA1 ieFFA1
## auChg1      91      87      0      6      91      91      90      87      0
## caChg1      87     148      0      6     144     148     86     148      0
## ieChg1       0      0      0      0      0      0      0      0      0
## nzChg1       6      6      0      6      6      6      6      6      0
## ukChg1      91     144      0      6     199     199     90     144      0
## usChg1      91     148      0      6     199     291     90     148      0
## auFFA1      90      86      0      6      90      90      90      86      0
## caFFA1      87     148      0      6     144     148     86     148      0
## ieFFA1       0      0      0      0      0      0      0      0      0
## nzFFA1       6      6      0      6      6      6      6      6      0
## ukFFA1      91     144      0      6     199     199     90     144      0
## usFFA1      91     148      0      6     199     290     90     148      0
##          nzFFA1 ukFFA1 usFFA1
## auChg1       6      91      91
## caChg1       6     144     148
## ieChg1       0      0      0
## nzChg1       6      6      6
## ukChg1       6     199     199
## usChg1       6     199     290
## auFFA1       6      90      90
## caFFA1       6     144     148
## ieFFA1       0      0      0
## nzFFA1       6      6      6
## ukFFA1       6     199     199
## usFFA1       6     199     290
```

```
print(rc$P, digits = 4)
```

```
##          auChg1    caChg1 ieChg1  nzChg1    ukChg1    usChg1    auFFA1
## auChg1          NA 3.219e-05    NA 0.87174 0.00052297 2.968e-04 0.13808473
## caChg1 0.00003219          NA    NA 0.87174 0.00006490 1.776e-15 0.59836391
## ieChg1          NA          NA    NA    NA          NA          NA          NA
## nzChg1 0.87174344 8.717e-01    NA    NA 0.32872303 8.717e-01 0.95715452
## ukChg1 0.00052297 6.490e-05    NA 0.32872          NA 7.174e-05 0.03259846
## usChg1 0.00029677 1.776e-15    NA 0.87174 0.00007174          NA 0.09026494
## auFFA1 0.13808473 5.984e-01    NA 0.95715 0.03259846 9.026e-02          NA
## caFFA1 0.38248135 7.895e-01    NA 0.70400 0.33577387 2.733e-01 0.35474262
## ieFFA1          NA          NA    NA    NA          NA          NA          NA
## nzFFA1 0.39650145 4.685e-01    NA 0.04156 0.07239649 4.685e-01 0.95715452
## ukFFA1 0.16392989 4.538e-01    NA 0.07240 0.26661213 9.738e-02 0.00001106
## usFFA1 0.06877332 7.417e-01    NA 0.87174 0.01218513 7.170e-02 0.00163308
##          caFFA1 ieFFA1  nzFFA1          ukFFA1          usFFA1
## auChg1 0.382481          NA 0.39650 0.16392989224 0.06877332278
## caChg1 0.789529          NA 0.46848 0.45384380598 0.74166904715
## ieChg1          NA          NA          NA          NA          NA
## nzChg1 0.704000          NA 0.04156 0.07239649318 0.87174343675
## ukChg1 0.335774          NA 0.07240 0.26661213326 0.01218512655
## usChg1 0.273262          NA 0.46848 0.09738248866 0.07170250571
## auFFA1 0.354743          NA 0.95715 0.00001106472 0.00163307684
## caFFA1          NA          NA 0.62279 0.00329064265 0.05794124018
## ieFFA1          NA          NA          NA          NA          NA
## nzFFA1 0.622787          NA          NA 0.07239649318 0.26570259508
## ukFFA1 0.003291          NA 0.07240          NA 0.00000001591
## usFFA1 0.057941          NA 0.26570 0.00000001591          NA
```

```
##RQ5
```

```
FemaleProportionsAndFemale1AdvCols <-
```

```
c("auChg1", "caChg1", "ieChg1", "nzChg1", "ukChg1", "usChg1",
  "auFFA2", "caFFA2", "ieFFA2", "nzFFA2", "ukFFA2", "usFFA2")
```

```
FemaleProportionsAndFemale1Adv <- AllData[FemaleProportionsAndFemale1AdvCols]
```

```
rc <- rcorr(as.matrix(FemaleProportionsAndFemale1Adv), type="spearman")
```

```
## Warning in sqrt(npair - 2): NaNs produced
```

```
print(rc$r, digits = 4)
```

```
##          auChg1    caChg1 ieChg1  nzChg1    ukChg1    usChg1    auFFA2
## auChg1 1.0000000 0.430069    NA 0.08571 0.35652 0.37079 0.08057
## caChg1 0.4300685 1.000000    NA -0.08571 0.32653 0.59330 -0.13480
## ieChg1          NA          NA    1    NA          NA          NA          NA
## nzChg1 0.0857143 -0.085714    NA 1.00000 -0.48571 -0.08571 0.20000
## ukChg1 0.3565217 0.326529    NA -0.48571 1.00000 0.27765 0.16313
## usChg1 0.3707915 0.593303    NA -0.08571 0.27765 1.00000 0.16479
## auFFA2 0.0805702 -0.134796    NA 0.20000 0.16313 0.16479 1.00000
## caFFA2 0.0006197 -0.001577    NA 0.77143 -0.10071 0.05430 0.30891
## ieFFA2          NA          NA    NA          NA          NA          NA          NA
## nzFFA2 -0.4285714 -0.371429    NA 0.82857 -0.77143 -0.37143 0.08571
```

```
## ukFFA2 0.1757923 0.057351 NA 0.94286 0.08147 0.12614 0.52935
## usFFA2 0.1684345 -0.108234 NA 0.60000 0.14921 0.05003 0.49920
##          caFFA2 ieFFA2  nzFFA2  ukFFA2  usFFA2
## auChg1 0.0006197 NA -0.42857 0.17579 0.16843
## caChg1 -0.0015770 NA -0.37143 0.05735 -0.10823
## ieChg1 NA NA NA NA NA
## nzChg1 0.7714286 NA 0.82857 0.94286 0.60000
## ukChg1 -0.1007073 NA -0.77143 0.08147 0.14921
## usChg1 0.0543021 NA -0.37143 0.12614 0.05003
## auFFA2 0.3089050 NA 0.08571 0.52935 0.49920
## caFFA2 1.0000000 NA 0.37143 0.30248 0.21927
## ieFFA2 NA 1 NA NA NA
## nzFFA2 0.3714286 NA 1.00000 0.77143 0.25714
## ukFFA2 0.3024797 NA 0.77143 1.00000 0.40157
## usFFA2 0.2192702 NA 0.25714 0.40157 1.00000
```

```
print(rc$n, digits = 4)
```

```
##          auChg1 caChg1 ieChg1 nzChg1 ukChg1 usChg1 auFFA2 caFFA2 ieFFA2
## auChg1      91      87      0      6      91      91      91      87      0
## caChg1      87     148      0      6     144     148      87     148      0
## ieChg1       0      0      0      0      0      0      0      0      0
## nzChg1       6      6      0      6      6      6      6      6      0
## ukChg1      91     144      0      6     199     199      91     144      0
## usChg1      91     148      0      6     199     291      91     148      0
## auFFA2      91      87      0      6      91      91      91      87      0
## caFFA2      87     148      0      6     144     148      87     148      0
## ieFFA2       0      0      0      0      0      0      0      0      0
## nzFFA2       6      6      0      6      6      6      6      6      0
## ukFFA2      91     144      0      6     199     199      91     144      0
## usFFA2      91     148      0      6     199     291      91     148      0
##          nzFFA2 ukFFA2 usFFA2
## auChg1       6      91      91
## caChg1       6     144     148
## ieChg1       0      0      0
## nzChg1       6      6      6
## ukChg1       6     199     199
## usChg1       6     199     291
## auFFA2       6      91      91
## caFFA2       6     144     148
## ieFFA2       0      0      0
## nzFFA2       6      6      6
## ukFFA2       6     199     199
## usFFA2       6     199     291
```

```
print(rc$P, digits = 4)
```

```
##          auChg1      caChg1 ieChg1      nzChg1      ukChg1      usChg1
## auChg1      NA 3.219e-05      NA 0.871743 0.00052297 2.968e-04
## caChg1 0.00003219      NA      NA 0.871743 0.00006490 1.776e-15
## ieChg1      NA      NA      NA      NA      NA      NA
```

```
## nzChg1 0.87174344 8.717e-01 NA NA 0.32872303 8.717e-01
## ukChg1 0.00052297 6.490e-05 NA 0.328723 NA 7.174e-05
## usChg1 0.00029677 1.776e-15 NA 0.871743 0.00007174 NA
## auFFA2 0.44773242 2.132e-01 NA 0.704000 0.12233941 1.185e-01
## caFFA2 0.99545504 9.848e-01 NA 0.072396 0.22974673 5.121e-01
## ieFFA2 NA NA NA NA NA NA
## nzFFA2 0.39650145 4.685e-01 NA 0.041563 0.07239649 4.685e-01
## ukFFA2 0.09555877 4.948e-01 NA 0.004805 0.25262559 7.584e-02
## usFFA2 0.11049419 1.904e-01 NA 0.208000 0.03543541 3.951e-01
## auFFA2 caFFA2 ieFFA2 nzFFA2 ukFFA2 usFFA2
## auChg1 0.4477324189 0.9954550 NA 0.39650 0.095558772157 0.110494185421
## caChg1 0.2132050892 0.9848235 NA 0.46848 0.494750557782 0.190395905700
## ieChg1 NA NA NA NA NA NA
## nzChg1 0.7039999957 0.0723965 NA 0.04156 0.004804664156 0.207999977112
## ukChg1 0.1223394141 0.2297467 NA 0.07240 0.252625594562 0.035435407419
## usChg1 0.1185397102 0.5121485 NA 0.46848 0.075839781818 0.395108747264
## auFFA2 NA 0.0036009 NA 0.87174 0.000000068602 0.000000473258
## caFFA2 0.0036009497 NA NA 0.46848 0.000228861002 0.007415489391
## ieFFA2 NA NA NA NA NA NA
## nzFFA2 0.8717434367 0.4684781 NA NA 0.072396493183 0.622787151734
## ukFFA2 0.0000000686 0.0002289 NA 0.07240 NA 0.00000004142
## usFFA2 0.0000004733 0.0074155 NA 0.62279 0.00000004142 NA
```

#Basic stats

```
SampleSizeCols <-
c("au1CtyMFto14", "ca1CtyMFto14", "ie1CtyMFto14", "nz1CtyMFto14", "uk1CtyMFto14",
"us1CtyMFto14")
SampleSizes <- AllData[SampleSizeCols]
colSums(SampleSizes)
```

```
## au1CtyMFto14 ca1CtyMFto14 ie1CtyMFto14 nz1CtyMFto14 uk1CtyMFto14
## NA NA NA NA NA
## us1CtyMFto14
## NA
```

```
colSums(SampleSizes != 0)
```

```
## au1CtyMFto14 ca1CtyMFto14 ie1CtyMFto14 nz1CtyMFto14 uk1CtyMFto14
## NA NA NA NA NA
## us1CtyMFto14
## NA
```