Two Child Era

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## Loading required package: ggplot2

## Loading required package: plyr

## Loading required package: scales

## Loading required package: grid

### Basic sample descriptions

In total, I have 225 effective samples.

mytable <- table(only\_child\_mum = dat$only\_child,   
 education = dat$education)  
mytable # print table

## education  
## only\_child\_mum A B C D  
## FALSE 61 47 34 4  
## TRUE 11 36 27 5

# margin.table(mytable, 1) # A frequencies (summed over B)  
# margin.table(mytable, 2) # B frequencies (summed over A)  
#   
# prop.table(mytable) # cell percentages  
# prop.table(mytable, 1) # row percentages  
# prop.table(mytable, 2) # column percentages   
summary(mytable)

## Number of cases in table: 225   
## Number of factors: 2   
## Test for independence of all factors:  
## Chisq = 18.811, df = 3, p-value = 0.0002991  
## Chi-squared approximation may be incorrect

### two sample t test

# group by whether mothers are only-children to their own parents  
# we find group difference in the following variables  
group <- "only\_child"  
unlist(lapply(names(dat)[-c(1:3)], function(i) two\_sample\_t(i, group, dat)))

## [1] "fertility\_preference" "self\_2\_child" "motherhood3"   
## [4] "rank\_daughter" "mother\_birth\_order" "one\_child"   
## [7] "young\_mother" "high\_edu" "childhood"

# group by whether mothers have only one child  
# we find group difference in the following variables  
group <- "one\_child"  
unlist(lapply(names(dat)[-c(1:3)], function(i) two\_sample\_t(i, group, dat)))

## [1] "fertility\_preference" "self\_2\_child" "husband\_2\_child"   
## [4] "parents\_2\_child" "child\_2\_child" "only\_child"   
## [7] "childhood" "pro\_2nd\_child"

# group by whether mothers are willing to have a 2nd child  
# we find group difference in the following variables  
group <- "self\_2\_child"  
unlist(lapply(names(dat)[-c(1:3)], function(i) two\_sample\_t(i, group, dat)))

## [1] "fertility\_preference" "husband\_2\_child" "child\_2\_child"   
## [4] "rank\_wife" "only\_child" "one\_child"   
## [7] "young\_mother" "childhood" "con\_2nd\_child"

# group by whether mothers are young (<= 36 years )  
# we find group difference in the following variables  
group <- "young\_mother"  
unlist(lapply(names(dat)[-c(1:3)], function(i) two\_sample\_t(i, group, dat)))

## [1] "self\_2\_child" "parents\_2\_child" "inlaws\_2\_child"   
## [4] "rank\_self" "rank\_daughter" "mother\_birth\_order"  
## [7] "only\_child" "high\_edu" "high\_income"

# group by whether mothers have attended university or above  
# we find group difference in the following variables  
group <- "high\_edu"  
unlist(lapply(names(dat)[-c(1:3)], function(i) two\_sample\_t(i, group, dat)))

## [1] "motherhood2" "motherhood6" "rank\_daughter"   
## [4] "rank\_occup" "rank2\_son" "rank2\_occup"   
## [7] "mother\_birth\_order" "only\_child" "young\_mother"   
## [10] "life\_satisfaction"

# group by whether mothers have high income (>10'000 per month per capita)  
# we find group difference in the following variables  
group <- "high\_income"  
unlist(lapply(names(dat)[-c(1:3)], function(i) two\_sample\_t(i, group, dat)))

## [1] "rank\_occup" "mother\_birth\_order"   
## [3] "young\_mother" "mother\_interferes\_work"

### Exploratory factor analysis

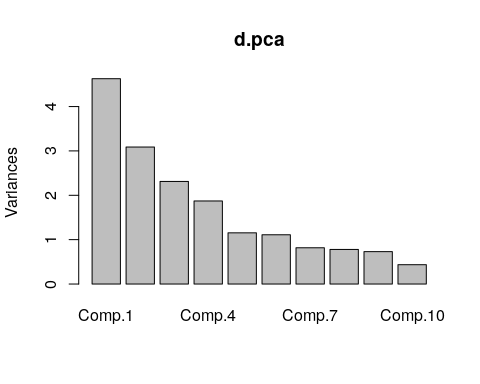
## have to remove 2 rols to avoid singularity  
d <- dat[-c(1:3)]  
dat$rank2\_son <- NULL  
dat$rank\_daughter <- NULL  
  
for(v in names(d)) {  
 #if( !all(is.numeric(d[[v]]) & is.finite(d[[v]])) ) {  
 if( !all(is.finite(d[[v]])) ) {  
 d[[v]] <- NULL  
 }  
}  
d <- d[c(1:6, 13, 21:34)]  
  
## correlation matrix  
cor(d, method = c("pearson", "kendall", "spearman"))

## fertility\_preference self\_2\_child husband\_2\_child  
## fertility\_preference 1.000000e+00 -0.524027252 -0.178984396  
## self\_2\_child -5.240273e-01 1.000000000 0.239420109  
## husband\_2\_child -1.789844e-01 0.239420109 1.000000000  
## parents\_2\_child -1.820293e-01 0.124072917 0.086146098  
## inlaws\_2\_child 9.200373e-02 -0.115267236 0.020224732  
## child\_2\_child -1.081227e-01 0.268858166 0.141671586  
## rank\_self 2.692132e-03 0.021156786 -0.036202955  
## rank2\_father 1.568641e-01 -0.102185207 -0.046035650  
## rank2\_occup -1.121132e-01 0.123286281 0.114435704  
## only\_child 2.375968e-01 -0.176796777 0.004501953  
## one\_child 3.595143e-01 -0.230889332 -0.245436912  
## young\_mother 6.640204e-02 -0.227439807 0.016606806  
## high\_edu 4.831130e-02 -0.057938800 0.023208444  
## high\_income 8.580665e-02 -0.051750543 -0.051440180  
## childhood 5.761681e-01 -0.168663995 -0.038227740  
## status\_origin 1.257359e-01 -0.016276625 0.021974475  
## status\_current 1.573514e-01 0.036918284 0.118092996  
## con\_2nd\_child 4.596621e-01 -0.252034929 -0.061034061  
## pro\_2nd\_child -9.868992e-05 0.092706464 0.129984450  
## life\_satisfaction 1.388530e-01 0.123142799 0.099005693  
## motherhood\_satisfaction 1.954084e-01 -0.004677913 0.116862898  
## parents\_2\_child inlaws\_2\_child child\_2\_child  
## fertility\_preference -0.18202926 0.092003725 -0.108122682  
## self\_2\_child 0.12407292 -0.115267236 0.268858166  
## husband\_2\_child 0.08614610 0.020224732 0.141671586  
## parents\_2\_child 1.00000000 0.120979689 0.048369124  
## inlaws\_2\_child 0.12097969 1.000000000 -0.084356915  
## child\_2\_child 0.04836912 -0.084356915 1.000000000  
## rank\_self -0.01425311 0.076833073 -0.026573631  
## rank2\_father -0.07858683 -0.019278391 0.059081135  
## rank2\_occup -0.09906503 0.019009944 0.025717419  
## only\_child -0.01617556 -0.011100608 0.101591338  
## one\_child -0.15069714 0.018402544 -0.182414115  
## young\_mother 0.13018565 0.159873258 -0.047469434  
## high\_edu 0.04490133 0.086914374 0.064534609  
## high\_income -0.06875239 -0.069945059 0.008867981  
## childhood -0.05513836 0.009935968 0.013741800  
## status\_origin 0.04127449 0.030080511 0.044028959  
## status\_current -0.05131896 -0.064942168 0.059620908  
## con\_2nd\_child -0.13238311 -0.039889406 -0.087612791  
## pro\_2nd\_child 0.14943488 0.119373987 0.049589921  
## life\_satisfaction -0.04462393 -0.004518154 0.126735918  
## motherhood\_satisfaction -0.05069302 -0.016151799 0.080608744  
## rank\_self rank2\_father rank2\_occup  
## fertility\_preference 0.002692132 0.1568640990 -0.112113217  
## self\_2\_child 0.021156786 -0.1021852065 0.123286281  
## husband\_2\_child -0.036202955 -0.0460356499 0.114435704  
## parents\_2\_child -0.014253106 -0.0785868267 -0.099065032  
## inlaws\_2\_child 0.076833073 -0.0192783914 0.019009944  
## child\_2\_child -0.026573631 0.0590811354 0.025717419  
## rank\_self 1.000000000 -0.2496004262 -0.179343139  
## rank2\_father -0.249600426 1.0000000000 -0.203085489  
## rank2\_occup -0.179343139 -0.2030854888 1.000000000  
## only\_child -0.115746772 0.0358278899 -0.028222784  
## one\_child -0.046542889 0.1127192568 -0.006512278  
## young\_mother -0.166584253 0.0114900617 -0.041842540  
## high\_edu -0.084710522 0.0209702788 -0.161259560  
## high\_income 0.002217227 0.0907709366 0.003218680  
## childhood 0.012477411 0.0866042153 -0.069663153  
## status\_origin 0.031406288 -0.0008415909 0.014648831  
## status\_current 0.087201174 -0.1017075442 0.048073163  
## con\_2nd\_child -0.035374056 0.1021201059 -0.083630535  
## pro\_2nd\_child 0.092591002 -0.0878449122 0.078206588  
## life\_satisfaction 0.038183591 -0.1150777023 0.074793482  
## motherhood\_satisfaction 0.033085989 -0.1103513597 0.055677996  
## only\_child one\_child young\_mother  
## fertility\_preference 0.237596817 0.3595142980 0.06640204  
## self\_2\_child -0.176796777 -0.2308893318 -0.22743981  
## husband\_2\_child 0.004501953 -0.2454369117 0.01660681  
## parents\_2\_child -0.016175562 -0.1506971378 0.13018565  
## inlaws\_2\_child -0.011100608 0.0184025438 0.15987326  
## child\_2\_child 0.101591338 -0.1824141147 -0.04746943  
## rank\_self -0.115746772 -0.0465428886 -0.16658425  
## rank2\_father 0.035827890 0.1127192568 0.01149006  
## rank2\_occup -0.028222784 -0.0065122784 -0.04184254  
## only\_child 1.000000000 0.2468958399 0.19695080  
## one\_child 0.246895840 1.0000000000 0.06880055  
## young\_mother 0.196950798 0.0688005494 1.00000000  
## high\_edu 0.149283438 -0.0527440096 0.22167965  
## high\_income 0.054293706 0.0016530032 0.13334060  
## childhood 0.133786408 0.1508582479 0.01008882  
## status\_origin 0.085813013 0.0161727273 0.07647803  
## status\_current 0.068962026 0.0596091121 -0.03246196  
## con\_2nd\_child 0.126688639 0.0830387257 0.01498802  
## pro\_2nd\_child -0.030674912 -0.1653163261 -0.09644941  
## life\_satisfaction 0.043707123 -0.0009109412 -0.04810246  
## motherhood\_satisfaction 0.103042539 -0.0392493166 -0.03448082  
## high\_edu high\_income childhood  
## fertility\_preference 0.04831130 0.0858066519 0.576168122  
## self\_2\_child -0.05793880 -0.0517505426 -0.168663995  
## husband\_2\_child 0.02320844 -0.0514401799 -0.038227740  
## parents\_2\_child 0.04490133 -0.0687523873 -0.055138357  
## inlaws\_2\_child 0.08691437 -0.0699450588 0.009935968  
## child\_2\_child 0.06453461 0.0088679807 0.013741800  
## rank\_self -0.08471052 0.0022172268 0.012477411  
## rank2\_father 0.02097028 0.0907709366 0.086604215  
## rank2\_occup -0.16125956 0.0032186803 -0.069663153  
## only\_child 0.14928344 0.0542937058 0.133786408  
## one\_child -0.05274401 0.0016530032 0.150858248  
## young\_mother 0.22167965 0.1333406026 0.010088819  
## high\_edu 1.00000000 0.0535092709 0.018295634  
## high\_income 0.05350927 1.0000000000 0.075360967  
## childhood 0.01829563 0.0753609671 1.000000000  
## status\_origin -0.08414891 -0.0670485917 0.268960240  
## status\_current -0.07078081 0.0139023930 0.360826539  
## con\_2nd\_child 0.03274015 0.0341031136 0.470796718  
## pro\_2nd\_child -0.08101270 0.0278589031 0.156091945  
## life\_satisfaction -0.12642045 0.0810415467 0.282448822  
## motherhood\_satisfaction -0.12177583 0.0003388453 0.298469926  
## status\_origin status\_current con\_2nd\_child  
## fertility\_preference 0.1257359122 0.15735143 0.45966213  
## self\_2\_child -0.0162766247 0.03691828 -0.25203493  
## husband\_2\_child 0.0219744751 0.11809300 -0.06103406  
## parents\_2\_child 0.0412744942 -0.05131896 -0.13238311  
## inlaws\_2\_child 0.0300805106 -0.06494217 -0.03988941  
## child\_2\_child 0.0440289593 0.05962091 -0.08761279  
## rank\_self 0.0314062881 0.08720117 -0.03537406  
## rank2\_father -0.0008415909 -0.10170754 0.10212011  
## rank2\_occup 0.0146488308 0.04807316 -0.08363053  
## only\_child 0.0858130127 0.06896203 0.12668864  
## one\_child 0.0161727273 0.05960911 0.08303873  
## young\_mother 0.0764780285 -0.03246196 0.01498802  
## high\_edu -0.0841489070 -0.07078081 0.03274015  
## high\_income -0.0670485917 0.01390239 0.03410311  
## childhood 0.2689602399 0.36082654 0.47079672  
## status\_origin 1.0000000000 0.59347910 0.09462808  
## status\_current 0.5934791007 1.00000000 0.22742193  
## con\_2nd\_child 0.0946280848 0.22742193 1.00000000  
## pro\_2nd\_child 0.1786076654 0.19534405 0.18431810  
## life\_satisfaction 0.4176718075 0.60337892 0.05969377  
## motherhood\_satisfaction 0.4699186636 0.63713446 0.29343874  
## pro\_2nd\_child life\_satisfaction  
## fertility\_preference -9.868992e-05 0.1388529783  
## self\_2\_child 9.270646e-02 0.1231427993  
## husband\_2\_child 1.299845e-01 0.0990056928  
## parents\_2\_child 1.494349e-01 -0.0446239255  
## inlaws\_2\_child 1.193740e-01 -0.0045181537  
## child\_2\_child 4.958992e-02 0.1267359184  
## rank\_self 9.259100e-02 0.0381835910  
## rank2\_father -8.784491e-02 -0.1150777023  
## rank2\_occup 7.820659e-02 0.0747934816  
## only\_child -3.067491e-02 0.0437071225  
## one\_child -1.653163e-01 -0.0009109412  
## young\_mother -9.644941e-02 -0.0481024619  
## high\_edu -8.101270e-02 -0.1264204504  
## high\_income 2.785890e-02 0.0810415467  
## childhood 1.560919e-01 0.2824488218  
## status\_origin 1.786077e-01 0.4176718075  
## status\_current 1.953440e-01 0.6033789206  
## con\_2nd\_child 1.843181e-01 0.0596937695  
## pro\_2nd\_child 1.000000e+00 0.1983626180  
## life\_satisfaction 1.983626e-01 1.0000000000  
## motherhood\_satisfaction 2.616087e-01 0.6358215501  
## motherhood\_satisfaction  
## fertility\_preference 0.1954084195  
## self\_2\_child -0.0046779130  
## husband\_2\_child 0.1168628979  
## parents\_2\_child -0.0506930203  
## inlaws\_2\_child -0.0161517986  
## child\_2\_child 0.0806087440  
## rank\_self 0.0330859893  
## rank2\_father -0.1103513597  
## rank2\_occup 0.0556779956  
## only\_child 0.1030425389  
## one\_child -0.0392493166  
## young\_mother -0.0344808201  
## high\_edu -0.1217758335  
## high\_income 0.0003388453  
## childhood 0.2984699260  
## status\_origin 0.4699186636  
## status\_current 0.6371344555  
## con\_2nd\_child 0.2934387442  
## pro\_2nd\_child 0.2616086910  
## life\_satisfaction 0.6358215501  
## motherhood\_satisfaction 1.0000000000

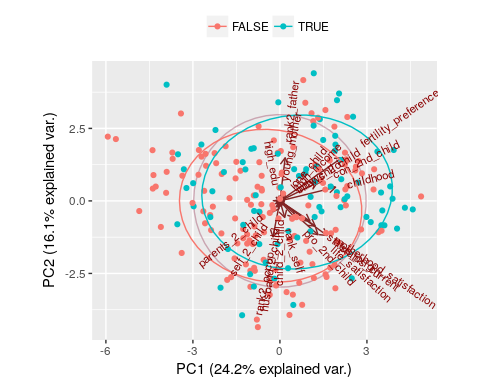
## principle component  
d.pca <- princomp(d)  
summary(d.pca)

## Importance of components:  
## Comp.1 Comp.2 Comp.3 Comp.4 Comp.5  
## Standard deviation 2.1511265 1.7571761 1.5206649 1.36811535 1.07448791  
## Proportion of Variance 0.2416067 0.1612158 0.1207381 0.09772881 0.06028097  
## Cumulative Proportion 0.2416067 0.4028226 0.5235607 0.62128946 0.68157043  
## Comp.6 Comp.7 Comp.8 Comp.9  
## Standard deviation 1.05339955 0.90389895 0.88304229 0.85444100  
## Proportion of Variance 0.05793799 0.04265961 0.04071366 0.03811898  
## Cumulative Proportion 0.73950841 0.78216803 0.82288169 0.86100067  
## Comp.10 Comp.11 Comp.12 Comp.13  
## Standard deviation 0.66056320 0.56300882 0.53314815 0.50305525  
## Proportion of Variance 0.02278274 0.01655036 0.01484134 0.01321322  
## Cumulative Proportion 0.88378341 0.90033377 0.91517511 0.92838833  
## Comp.14 Comp.15 Comp.16 Comp.17  
## Standard deviation 0.49494812 0.46392773 0.44856051 0.428612748  
## Proportion of Variance 0.01279076 0.01123771 0.01050556 0.009591959  
## Cumulative Proportion 0.94117909 0.95241680 0.96292236 0.972514321  
## Comp.18 Comp.19 Comp.20 Comp.21  
## Standard deviation 0.395143255 0.375746744 0.360498455 0.314854478  
## Proportion of Variance 0.008152415 0.007371699 0.006785533 0.005176031  
## Cumulative Proportion 0.980666736 0.988038435 0.994823969 1.000000000

plot(d.pca) # scree plot



#biplot(princomp(d))  
## ggplot  
g <- ggbiplot(d.pca, choices = c(1,2), obs.scale = 1, var.scale = 1,   
 ellipse = TRUE, groups = d$only\_child,  
 circle = TRUE)  
g <- g + scale\_color\_discrete(name = '')  
g <- g + theme(legend.direction = 'horizontal',   
 legend.position = 'top')  
print(g)



d.fac <- factanal(d, factors = 6, rotation = "varimax", scores=c("regression"))  
print(d.fac, digits = 2, cutoff = .2, sort = TRUE)

##   
## Call:  
## factanal(x = d, factors = 6, scores = c("regression"), rotation = "varimax")  
##   
## Uniquenesses:  
## fertility\_preference self\_2\_child husband\_2\_child   
## 0.20 0.48 0.82   
## parents\_2\_child inlaws\_2\_child child\_2\_child   
## 0.83 0.86 0.79   
## rank\_self rank2\_father rank2\_occup   
## 0.80 0.82 0.00   
## only\_child one\_child young\_mother   
## 0.82 0.69 0.46   
## high\_edu high\_income childhood   
## 0.84 0.97 0.45   
## status\_origin status\_current con\_2nd\_child   
## 0.56 0.28 0.63   
## pro\_2nd\_child life\_satisfaction motherhood\_satisfaction   
## 0.69 0.45 0.38   
##   
## Loadings:  
## Factor1 Factor2 Factor3 Factor4 Factor5 Factor6  
## status\_origin 0.65   
## status\_current 0.83   
## life\_satisfaction 0.72   
## motherhood\_satisfaction 0.74 0.22   
## fertility\_preference 0.73 -0.46   
## childhood 0.30 0.66   
## con\_2nd\_child 0.57   
## self\_2\_child -0.29 0.54 -0.33   
## one\_child -0.51   
## rank2\_occup 0.99   
## young\_mother 0.58 0.43   
## husband\_2\_child 0.39   
## parents\_2\_child 0.29 0.24   
## inlaws\_2\_child 0.37   
## child\_2\_child 0.35 -0.24   
## rank\_self -0.39   
## rank2\_father 0.23 -0.21   
## only\_child 0.37   
## high\_edu 0.31   
## high\_income   
## pro\_2nd\_child 0.20 0.25 0.35 -0.21 0.20   
##   
## Factor1 Factor2 Factor3 Factor4 Factor5 Factor6  
## SS loadings 2.43 1.62 1.31 1.13 0.99 0.69  
## Proportion Var 0.12 0.08 0.06 0.05 0.05 0.03  
## Cumulative Var 0.12 0.19 0.26 0.31 0.36 0.39  
##   
## Test of the hypothesis that 6 factors are sufficient.  
## The chi square statistic is 135.6 on 99 degrees of freedom.  
## The p-value is 0.00861