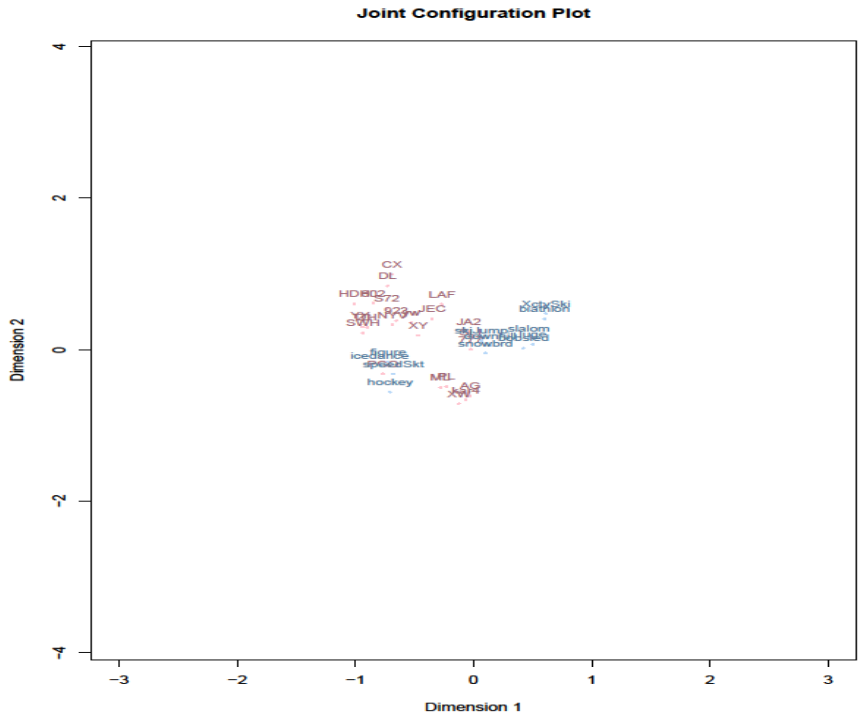
Assn 7: R code KEY

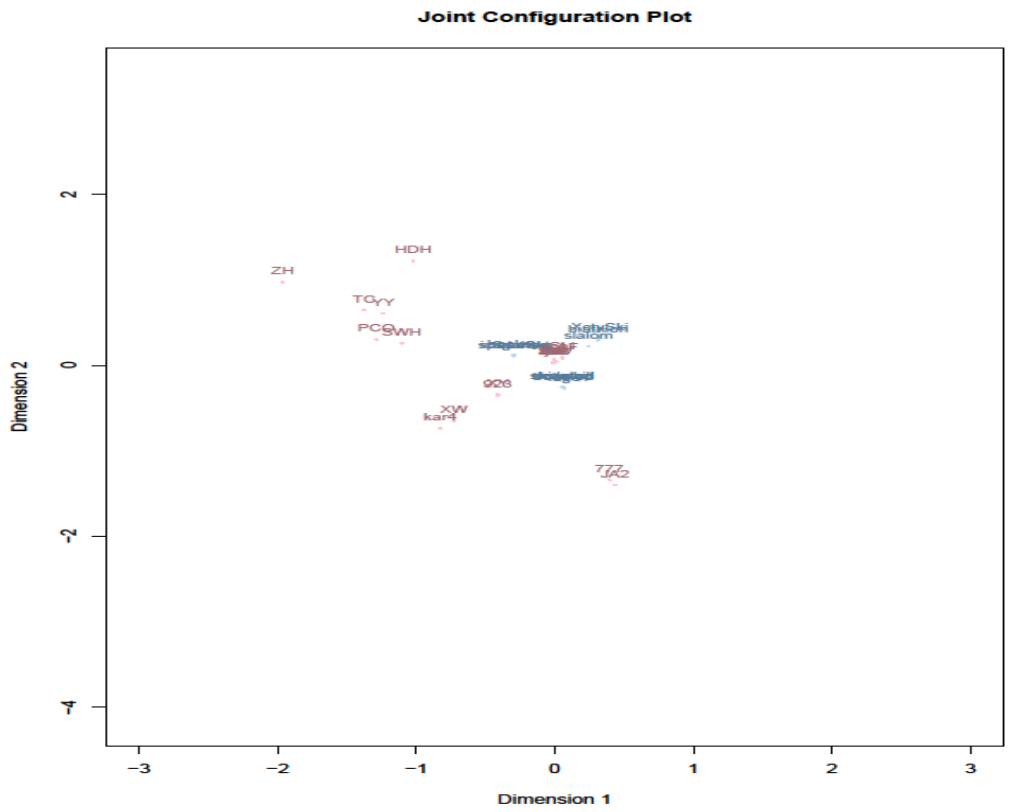
```
> ################################################################
> # Assn 7 unfolding example
> setwd("C:/Users/corter/Desktop/HUDM5124")
> winter <- read.table("winter olympics unfold.txt",header=TRUE)
> winter
   subj biathlon bobsled downhill figure hockey icedance luge skiJump
1    AG        2       5        6      7      6        5    6        8
2   S72        2       2        2      8      2        8    2        7
3   JEC        5       6        8      7      5        7    6        7
4   JA2        5       9        8      6      2        6    9        9
5   LAF        4       4        9      2      7        2    3        7
6    ML        2       4        8      9      9        7    4        8
7   SLI        8       7        9      9      5        9    7        8
8   NYV        3       3        3      9      9        9    3        8
9   SWH        1       5        2      9      7        8    1        6
10   XW        2       6        5      5      9        6    6        6
11   ZH        2       3        7      8      7        8    1        2
12   CX        1       3        2      5      1        1    3        2
13   DL        1       2        3      4      3        5    2        6
14   PL        3       5        9      9      9        7    4        4
15   TC        2       2        2      9      6        8    1        3
16 kar4        2       8        7      5      8        5    7        6
17  HDH        1       1        1      8      3        8    1        1
18  PCO        1       5        5      9      9        9    1        5
19  923        1       2        6      9      2        7    3        9
20  602        2       2        3      6      2        5    1        3
21  777        9       9        9      7      5        7    9        9
22   yw        2       3        9      8      2        7    5        7
23   YY        2       1        2      9      5        9    1        5
24   XY        5       5        8      9      6        9    5        8
   slalom snowbrd speedSkt XctySki
1       8       9        7       1
2       3       8        4       1
3       7       6        6       5
4       6       9        7       6
5       9       8        5       4
6       7       7        8       2
7       9       6        6       8
8       2       9        2       2
9       1       1        9       1
10      4       7        7       2
11      1       2        8       2
12      2       1        3       1
13      3       1        2       1
14      8       9        8       3
15      2       3        8       2
16      2       8        8       2
17      1       1        3       2
18      1       5        9       1
19      2       9        8       2
20      2       3        9       2
21      5       9        7       5
22      5       8        9       2
23      2       2        7       1
24      5       6        9       5
> dim(winter)
[1] 24 13
> # convert ratings to dissim's
> rownames(winter)<-winter[,1]
> winter <- 10-winter[,2:13]
```

```
> winter
     biathlon bobsled downhill figure hockey icedance luge skiJump slalom
AG          8       5        4      3      4         5    4       2      2
S72         8       8        8      2      8         2    8       3      7
JEC         5       4        2      3      5         3    4       3      3
JA2         5       1        2      4      8         4    1       1      4
LAF         6       6        1      8      3         8    7       3      1
ML          8       6        2      1      1         3    6       2      3
SLI         2       3        1      1      5         1    3       2      1
NYV         7       7        7      1      1         1    7       2      8
SWH         9       5        8      1      3         2    9       4      9
XW          8       4        5      5      1         4    4       4      6
ZH          8       7        3      2      3         2    9       8      9
CX          9       7        8      5      9         9    7       8      8
DL          9       8        7      6      7         5    8       4      7
PL          7       5        1      1      1         3    6       6      2
TC          8       8        8      1      4         2    9       7      8
kar4        8       2        3      5      2         5    3       4      8
HDH         9       9        9      2      7         2    9       9      9
PCO         9       5        5      1      1         1    9       5      9
923         9       8        4      1      8         3    7       1      8
602         8       8        7      4      8         5    9       7      8
777         1       1        1      3      5         3    1       1      5
yw          8       7        1      2      8         3    5       3      5
YY          8       9        8      1      5         1    9       5      8
XY          5       5        2      1      4         1    5       2      5
     snowbrd speedSkt XctySki
AG         1        3       9
S72        2        6       9
JEC        4        4       5
JA2        1        3       4
LAF        2        5       6
ML         3        2       8
SLI        4        4       2
NYV        1        8       8
SWH        9        1       9
XW         3        3       8
ZH         8        2       8
CX         9        7       9
DL         9        8       9
PL         1        2       7
TC         7        2       8
kar4       2        2       8
HDH        9        7       8
PCO        5        1       9
923        1        2       8
602        7        1       8
777        1        3       5
yw         2        1       8
YY         8        3       9
XY         4        1       5

> wint_om <- smacofRect(winter,type="ordinal",conditionality="matrix")
> wint_om

Call: smacofRect(delta = winter, type = "ordinal", conditionality = "matrix")

Model:                Rectangular smacof
Number of subjects:   24
Number of objects:    12
Transformation:       ordinalp
Conditionality:       matrix

Stress-1 value:    0.187562
```

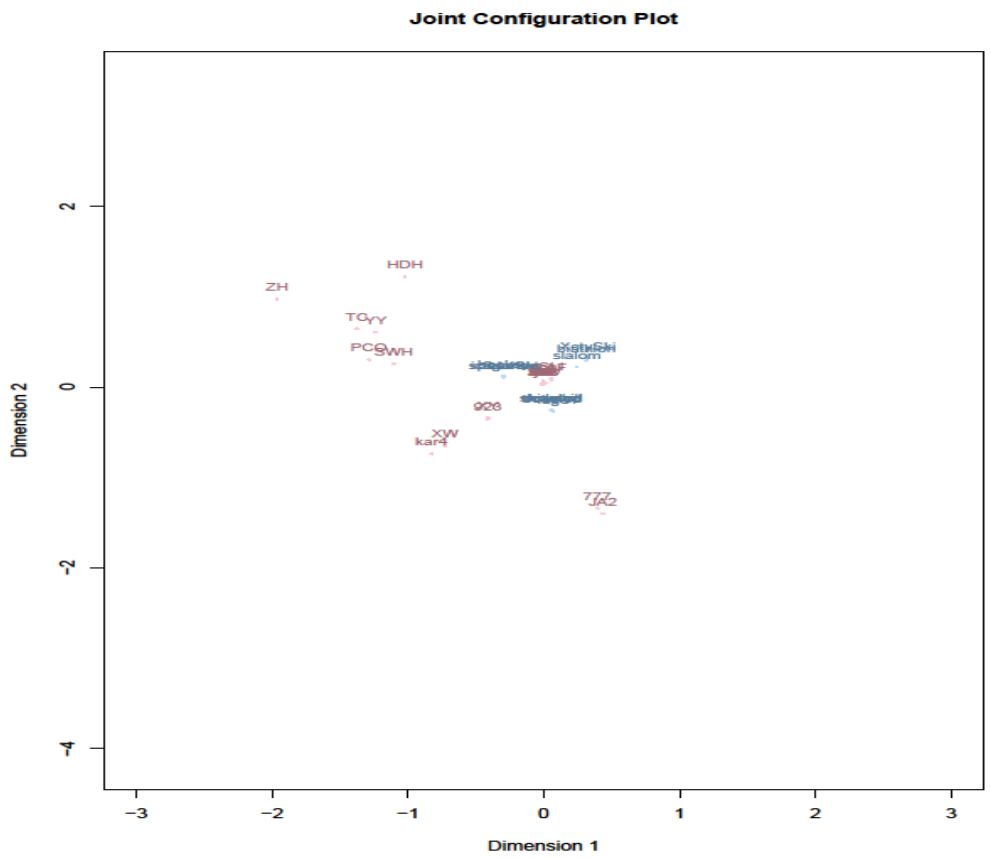
```
Penalized Stress:  1.164006
Number of iterations: 86

> plot(wint_om, xlim = c(-3, 3), asp = 1)
```



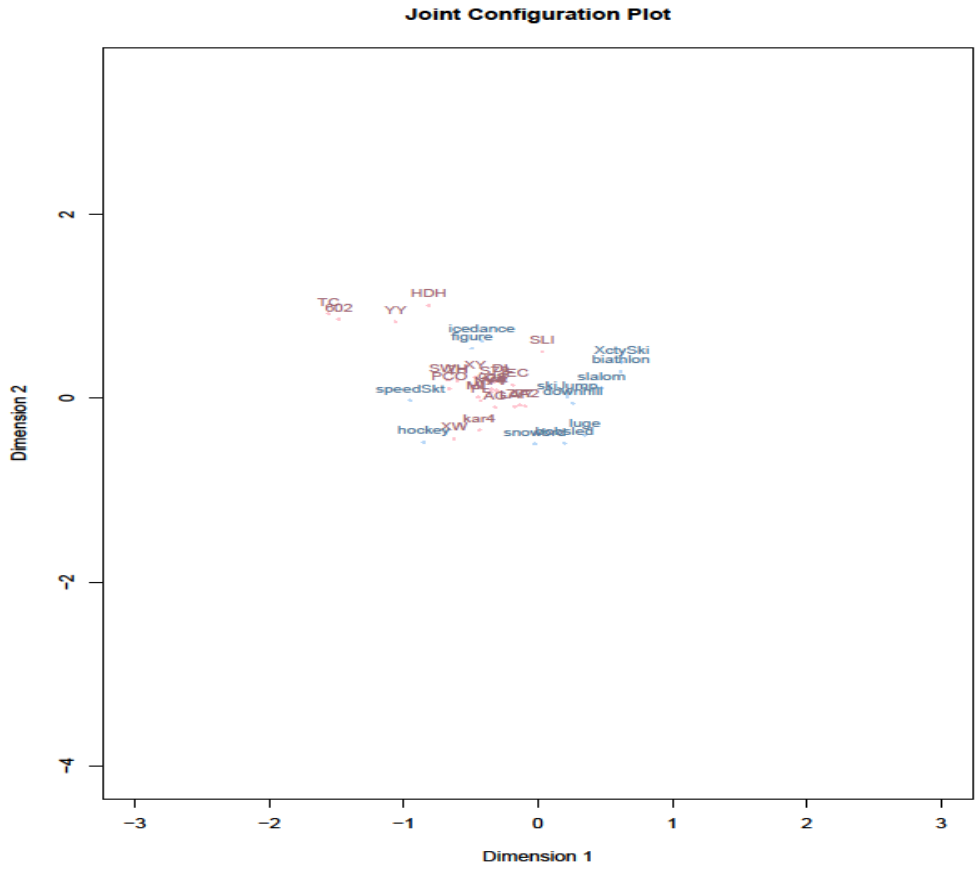

```
>
> wint_im <- smacofRect(winter,type="interval",conditionality="matrix")
> wint_im

Call: smacofRect(delta = winter, type = "interval", conditionality = "matrix")

Model:                Rectangular smacof
Number of subjects:   24
Number of objects:    12
Transformation:       interval
Conditionality:       matrix

Stress-1 value:    0.199461
Penalized Stress:  0.000869
Number of iterations: 1007

> plot(wint_im, xlim = c(-3, 3), asp = 1)
```




```
>
> wint_or <- smacofRect(winter,type="ordinal",conditionality="row",ndim=2)
Warning message:
In smacofRect(winter, type = "ordinal", conditionality = "row",  :
  Iteration limit reached! Increase itmax argument!
> wint_or

Call: smacofRect(delta = winter, ndim = 2, type = "ordinal", conditionality = "row")

Model:                Rectangular smacof
Number of subjects:   24
Number of objects:    12
Transformation:       ordinalp
Conditionality:       row

Stress-1 value:     0.008605
Penalized Stress:   0.805524
Number of iterations: 10000

> plot(wint_or, xlim = c(-3, 3), asp = 1)
```




```
>
> wint_ir <- smacofRect(winter,type="interval",conditionality="row")
Warning message:
In smacofRect(winter, type = "interval", conditionality = "row") :
  Iteration limit reached! Increase itmax argument!
> wint_ir

Call: smacofRect(delta = winter, type = "interval", conditionality = "row")

Model:                Rectangular smacof
Number of subjects:   24
Number of objects:    12
Transformation:       interval
Conditionality:       row

Stress-1 value:    0.146637
Penalized Stress:  0.240829
Number of iterations: 10000

> plot(wint_ir, xlim = c(-3, 3), asp = 1)
```

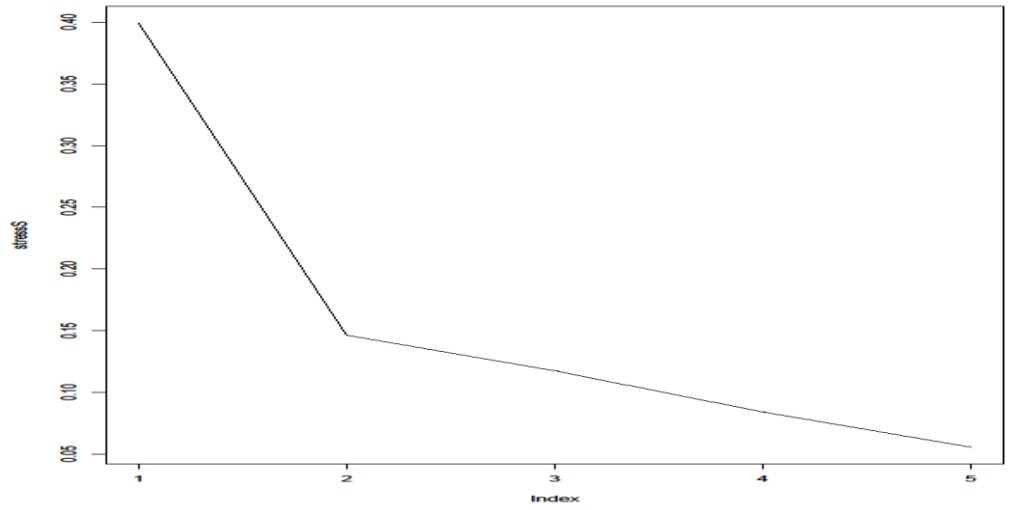



```
> ############# Part 3 ##################
> # I choose the row conditional, interval analysis for further exploration
> # but the ordinal, matrix conditional solution is also a good one
> wint_or1 <- smacofRect(winter,type="interval",conditionality="row",ndim=1)
> wint_or2 <- smacofRect(winter,type="interval",conditionality="row",ndim=2)
Warning message:
In smacofRect(winter, type = "interval", conditionality = "row",  :
  Iteration limit reached! Increase itmax argument!
> wint_or3 <- smacofRect(winter,type="interval",conditionality="row",ndim=3)
Warning message:
In smacofRect(winter, type = "interval", conditionality = "row",  :
  Iteration limit reached! Increase itmax argument!
> wint_or4 <- smacofRect(winter,type="interval",conditionality="row",ndim=4)
Warning message:
In smacofRect(winter, type = "interval", conditionality = "row",  :
  Iteration limit reached! Increase itmax argument!
> wint_or5 <- smacofRect(winter,type="interval",conditionality="row",ndim=5)
Warning message:
In smacofRect(winter, type = "interval", conditionality = "row",  :
  Iteration limit reached! Increase itmax argument!
> ############# Part 3 ##################
> # I choose the row conditional, interval analysis for further exploration
> # but the ordinal, matrix conditional solution is also a good one
> wint_or1 <- smacofRect(winter,type="interval",conditionality="row",ndim=1,itmax=20000)
> wint_or2 <- smacofRect(winter,type="interval",conditionality="row",ndim=2,itmax=20000)
Warning message:
In smacofRect(winter, type = "interval", conditionality = "row",  :
```

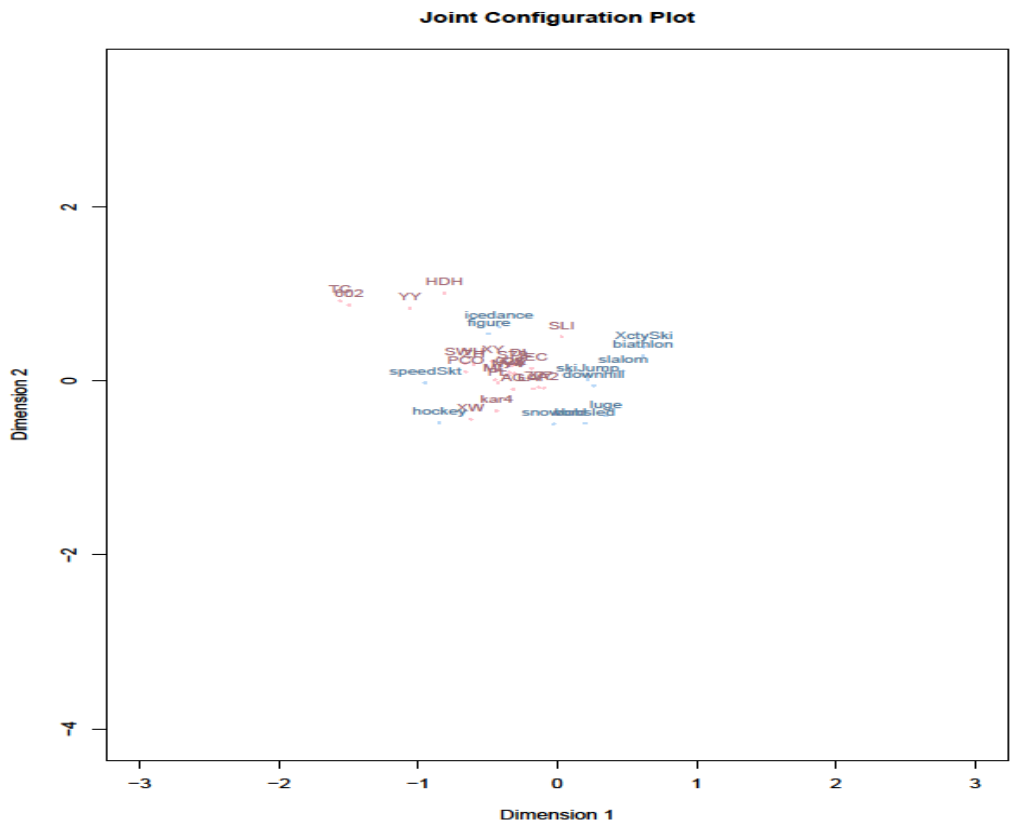
```
  Iteration limit reached! Increase itmax argument!
> wint_or3 <- smacofRect(winter,type="interval",conditionality="row",ndim=3,itmax=20000)
Warning message:
In smacofRect(winter, type = "interval", conditionality = "row",  :
  Iteration limit reached! Increase itmax argument!
> wint_or4 <- smacofRect(winter,type="interval",conditionality="row",ndim=4,itmax=20000)
Warning message:
In smacofRect(winter, type = "interval", conditionality = "row",  :
  Iteration limit reached! Increase itmax argument!
> wint_or5 <- smacofRect(winter,type="interval",conditionality="row",ndim=5,itmax=20000)
Warning message:
In smacofRect(winter, type = "interval", conditionality = "row",  :
  Iteration limit reached! Increase itmax argument!
```

final comment: that fact that several of these ndim>1 runs did not converge
suggests that, indeed, the interval matrix-conditional analysis may be best

```
>
> # put the stress values for dim=1 to 5 into an array stressS
> stressS<-c(rep(0,5))
> stressS[1]<-wint_or1$stress
> stressS[2]<-wint_or2$stress
> stressS[3]<-wint_or3$stress
> stressS[4]<-wint_or4$stress
> stressS[5]<-wint_or5$stress
> # plot stress for the five dimensionalities
> plot(stressS,type="l")
```




```
> # re-check interpretability:
> plot(wint_or2, xlim = c(-3, 3), asp = 1)
```


Joint Configuration Plot
HDH
YY
icedance
figure
SLI
XctySki
biathlon
slalom
speedSkt
ski.jump
downhill
kar4
XW
hockey
luge
Dimension 1
Dimension 2
−3
−2
−1
0
1
2
3
−4
−2
0
2