Script to investigate a design for a Human subjects experiment in which Raters assess pain from videos

For this design Viewing order and Raters are regarded as sources of variation and Raters do not assess all Patients

- The first-phase design is a systematic design;
- The second-phase design is a split-unit design, with the first-phase factors allocated using a row-column design.

Initialize

```
library(knitr)
#knitr::spin("AltRowColDesign.r")
library(dae)
packageVersion("dae")
```

```
## [1] '3.1.37'
```

```
options(width = 95)
```

Generate first-phase systematic design

```
ph1.sys <- cbind(fac.gen(list(Expressiveness = c("Yes", "No"), Patients = 4, Occasions = 2)),
                 fac.gen(list(Motions = c("active", "passive")), times = 8))
```

Generate first-phase systematic design

```
g <- 2
ph1.sys <- cbind(fac.gen(list(Patients = 4*g, Expressiveness = c("Exp", "Unexp"), Occasions = 2)),
                 fac.gen(list(Motions = c("Act", "Pas")), times = 8*g))
ph1.sys <- cbind(fac.gen(list(P1 = g, videos = 16)),
                 ph1.sys)
```

Generate the two-phase systematic design

```
ph2.sys <- cbind(fac.gen(list(Raters = 64, Viewings = 16)),
                 fac.gen(list(Trainings = c("Co", "Tr"), 16*32)),
                 fac.gen(list(P1 = g, 2, videos = 16)))
ph2.sys$videos <- factor(rep(designLatinSqrSys(16), times = g*2))
ph2.sys <- merge(ph2.sys, ph1.sys, by = c("P1", "videos"))
ph2.sys <- with(ph2.sys, ph2.sys[order(Raters, Viewings), ])
rownames(ph2.sys) <- NULL
```

Randomize the two-phase design, with Viewings crossed with Raters

```
ph2.lay <- designRandomize(allocated = ph2.sys[c("Trainings", "Expressiveness", "Patients",
                                                 "Occasions", "Motions", "P1")],
                           recipient = ph2.sys[c("Raters", "Viewings")],
                           seed = 36451)
```

Plot the design

```
ph2.lay <- within(ph2.lay,
                  {
                    Videos <- fac.combine(list(Motions, Expressiveness, Patients), combine.levels = TRU
                    levels(Videos) <- as.vector(t(outer(c("A,E,", "A,U,", "P,E,", "P,U,"),
                                                        as.character(1:8), paste0)))
                    Trainings.Groups <- fac.combine(list(Trainings, P1), combine.levels = TRUE)
                  })
designGGPlot(ph2.lay, row.factors = "Raters", column.factors = "Viewings",
             labels = "Videos", label.size = 3,
             cellfillcolour.column = "Trainings.Groups", cellalpha = 0.5,
             title = NULL, title.size = 12, axis.text.size = 10,
             ggplotFuncs = list(theme(legend.position = "bottom")))
```

Convert names of the factors to single capital letters

```
ph2.L.lay <- ph2.lay
names(ph2.L.lay)[match(c("Raters", "Viewings", "Trainings", "Expressiveness", "Patients",
                         "Occasions", "Motions"), names(ph2.L.lay))] <- c("R", "V", "T",
                                                                          "E", "P", "O", "M")
```

Produce the anatomy of the design for the initial allocation model, without the groups pseudofactor

- The design is not structure balanced because some orders are not 1.

```
ph2.init.canon <- designAnatomy(formulae = list(episo = ~ R * V,
                                                video = ~ (E/P)*O,
                                                trt   = ~ T * M),
                                data = ph2.L.lay)
summary(ph2.init.canon, which.criteria = c("aeff", "eeff", "order", "dforth"))
```

```
##
##
## Summary table of the decomposition for episo, video & trt (based on adjusted quantities)
##
##  Source.episo df1 Source.video df2 Source.trt df3 aefficiency eefficiency order dforthog
##  R             63 P[E]           1                     1.0000      1.0000     1        1
##                   Residual      62 T             1      1.0000      1.0000     1        1
##                                    Residual     61
##  V             15 P[E]           1                     0.5000      0.5000     1        0
##                   P#O[E]         1                     0.5000      0.5000     1        0
##                   Residual      13
##  R#V          945 E              1                     1.0000      1.0000     1        1
##                   P[E]          13                     0.9286      0.5000     2       12
##                   O              1 M             1      1.0000      1.0000     1        1
##                   E#O            1                     1.0000      1.0000     1        1
##                   P#O[E]        14                     0.9333      0.5000     2       13
##                   Residual     915 T#M           1      1.0000      1.0000     1        1
##                                    Residual    914
##
## The design is not orthogonal
```

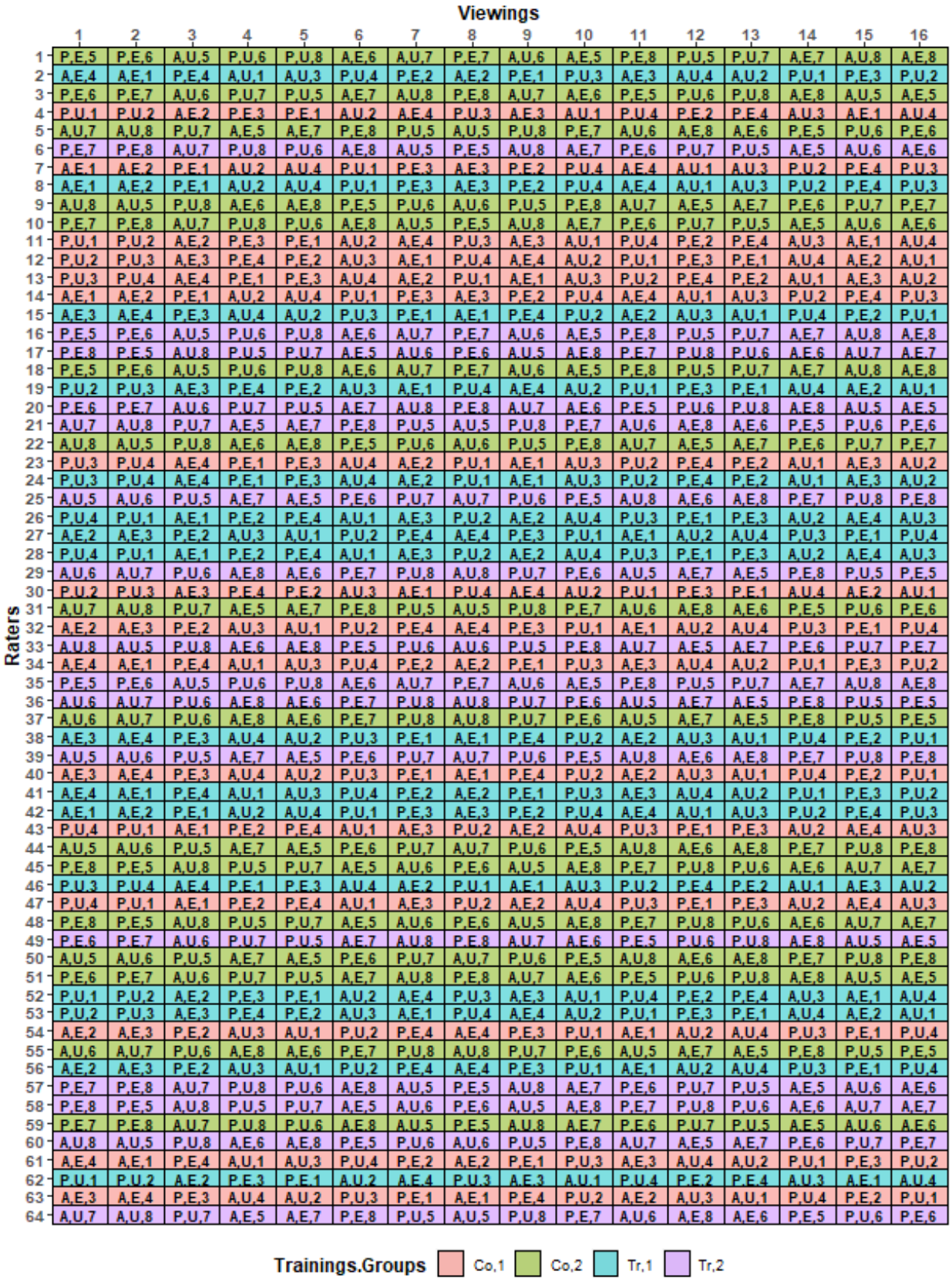

Figure 1: The alternative design that uses a row-column design. It shows the allocation videos to Viewings, with the colour corresponding to the combinations of Trainings and Patients groups

Produce the anatomy of the design for the initial allocation model, with the groups pseudofactor

- The design is nonorthogonal, but structure balanced because some aefficiencies are not 1, but all orders are 1.

```
ph2.inipseud.canon <- designAnatomy(formulae = list(episo = ~ R * V,
                                                    video = ~ ((P1 * E)/P)*O,
                                                    trt   = ~ T * M),
                                    data = ph2.L.lay)
summary(ph2.inipseud.canon, which.criteria = c("aeff", "eeff", "order", "dforth"))
```

```
##
##
## Summary table of the decomposition for episo, video & trt (based on adjusted quantities)
##
##  Source.episo df1 Source.video df2 Source.trt df3 aefficiency eefficiency order dforthog
##  R             63 P1             1                     1.0000      1.0000     1        1
##                   Residual      62 T             1      1.0000      1.0000     1        1
##                                    Residual    61
##  V             15 P1#E           1                     0.5000      0.5000     1        0
##                   P1#E#O         1                     0.5000      0.5000     1        0
##                   Residual      13
##  R#V          945 E              1                     1.0000      1.0000     1        1
##                   P1#E           1                     0.5000      0.5000     1        0
##                   P[P1:E]       12                     1.0000      1.0000     1       12
##                   O              1 M             1      1.0000      1.0000     1        1
##                   P1#O           1                     1.0000      1.0000     1        1
##                   E#O            1                     1.0000      1.0000     1        1
##                   P1#E#O         1                     0.5000      0.5000     1        0
##                   P#O[P1:E]     12                     1.0000      1.0000     1       12
##                   Residual     915 T#M           1      1.0000      1.0000     1        1
##                                    Residual    914
##
## The design is not orthogonal
```

Produce the anatomy of the second-phase intertier interactions

- The design is orthogonal because all aefficiencies are 1.

```
units.homog.canon <- designAnatomy(formulae = list(episo = ~ R * V,
                                                   train = ~ T * V),
                                   data = ph2.L.lay)
summary(units.homog.canon, which.criteria = c("aeff", "eeff", "order", "dforth"))
```

```
##
##
## Summary table of the decomposition for episo & train
##
##  Source.episo df1 Source.train df2 aefficiency eefficiency order dforthog
##  R             63 T              1      1.0000      1.0000     1        1
##                   Residual      62
##  V             15 V             15      1.0000      1.0000     1       15
##  R#V          945 T#V           15      1.0000      1.0000     1       15
##                   Residual     930
```

Produce the anatomy of the combined-units design for the homogeneous allocation model, with intertier interactions

- The design is not structure balanced because some orders are not 1.
- Also, there is partial aliasing.

```
units.homog.canon <- designAnatomy(formulae = list(episo = ~ R * V,
                                                   train = ~ T * V,
                                                   video = ~ (E/P) * O * R),
                                   data = ph2.L.lay)
```

```
## Warning in projs.2canon(CombinedSets$Q[[ntiers]], struct[[ktier]]$Q): E#R is aliased with
## previous terms in V&V
```

```
## Warning in projs.2canon(CombinedSets$Q[[ntiers]], struct[[ktier]]$Q): E#R and P#O[E] are
## partially aliased in R#V&Residual
```

```
## Warning in projs.2canon(CombinedSets$Q[[ntiers]], struct[[ktier]]$Q): E#O#R and P[E] are
## partially aliased in R#V&Residual
```

```
## Warning in projs.2canon(CombinedSets$Q[[ntiers]], struct[[ktier]]$Q): E#O#R and E#R are
## partially aliased in R#V&Residual
```

```
## Warning in projs.2canon(CombinedSets$Q[[ntiers]], struct[[ktier]]$Q): P#O#R[E] and P#R[E] are
## partially aliased in R#V&Residual
```

```
summary(units.homog.canon, which.criteria = c("aeff", "eeff", "order", "dforth"))
```

```
##
##
## Summary table of the decomposition for episo, train & video (based on adjusted quantities)
##
##  Source.episo df1 Source.train df2 Source.video df3 aefficiency eefficiency order dforthog
##  R             63 T              1 R              1      1.0000      1.0000     1        1
##                   Residual      62 P[E]           1      1.0000      1.0000     1        1
##                                    R            61      1.0000      1.0000     1       61
##  V             15 V             15 P[E]           1      0.5000      0.5000     1        0
##                                    P#O[E]         1      0.5000      0.5000     1        0
##                                    P#R[E]        12      0.1500      0.0381     6        0
##                                    O#R            1      1.0000      1.0000     1        1
##  R#V          945 T#V           15 E#R            2      0.5000      0.5000     1        0
##                                    P#R[E]        12      0.1500      0.0381     6        0
##                                    O#R            1      1.0000      1.0000     1        1
##                   Residual     930 E              1      1.0000      1.0000     1        1
##                                    P[E]          13      0.9286      0.5000     2       12
##                                    O              1      1.0000      1.0000     1        1
##                                    E#O            1      1.0000      1.0000     1        1
##                                    P#O[E]        14      0.9333      0.5000     2       13
##                                    E#R           61      0.9683      0.5000     2       59
##                                    P#R[E]       372      0.7323      0.0381     7      348
##                                    O#R           60      1.0000      1.0000     1       60
##                                    E#O#R         59      1.0000      1.0000     1       59
##                                    P#O#R[E]     348      1.0000      1.0000     1      348
##
## Table of information (partially) aliased with previous sources derived from the same formula
##
##  Source   df Alias                    In           aefficiency eefficiency order dforthog
##  R         1 P[E]                     video              1.0000      1.0000     1        1
```

```
##  R         62 ## Information remaining video             1.0000      1.0000     1       62
##  E#R        2 P[E]                      video             1.0000      1.0000     1        2
##  E#R       62 ## Information remaining video             1.0000      1.0000     1       62
##  O#R        1 P[E]                      video             1.0000      1.0000     1        1
##  O#R        1 P#O[E]                    video             1.0000      1.0000     1        1
##  O#R       62 ## Information remaining video             1.0000      1.0000     1       62
##  E#O#R      2 P[E]                      video             1.0000      1.0000     1        2
##  E#O#R      2 P#O[E]                    video             1.0000      1.0000     1        2
##  E#O#R     62 ## Information remaining video             1.0000      1.0000     1       62
##  E#R        0 ## Aliased                V&V               0.0000      0.0000     0        0
##  E#R        1 P#O[E]                    R#V&Residual      1.0000      1.0000     1        1
##  E#O#R      1 P[E]                      R#V&Residual      1.0000      1.0000     1        1
##  E#O#R      2 E#R                       R#V&Residual      1.0000      1.0000     1        2
##  P#O#R[E]  24 P#R[E]                    R#V&Residual      1.0000      1.0000     1       24
##
## The design is not orthogonal
```

Produce the anatomy of the combined-units design for the homogeneous allocation model, with the groups pseudofactor

- The design is not structure balanced because some orders are not 1.
- Also, there is partial aliasing.

```
units.hompseudo.canon <- designAnatomy(formulae = list(episo  = ~ R * V,
                                                       train  = ~ T * V,
                                                       video  = ~ O * ((P1 * E)/P) * R),
                                       data = ph2.L.lay)
```

```
## Warning in pstructure.formula(formulae[[ktier]], keep.order = keep.order, : P1:R is aliased
## with previous terms in the formula and has been removed
```

```
## Warning in pstructure.formula(formulae[[ktier]], keep.order = keep.order, : P1:E:R is aliased
## with previous terms in the formula and has been removed
```

```
## Warning in pstructure.formula(formulae[[ktier]], keep.order = keep.order, : O:P1:R is aliased
## with previous terms in the formula and has been removed
```

```
## Warning in pstructure.formula(formulae[[ktier]], keep.order = keep.order, : O:P1:E:R is aliased
## with previous terms in the formula and has been removed
```

```
## Warning in projs.2canon(CombinedSets$Q[[ntiers]], struct[[ktier]]$Q): E#R[P1] is aliased with
## previous terms in V&V
```

```
## Warning in projs.2canon(CombinedSets$Q[[ntiers]], struct[[ktier]]$Q): E#R[P1] and O#P1#E are
## partially aliased in R#V&Residual
```

```
## Warning in projs.2canon(CombinedSets$Q[[ntiers]], struct[[ktier]]$Q): O#E#R[P1] and P1#E are
## partially aliased in R#V&Residual
```

```
## Warning in projs.2canon(CombinedSets$Q[[ntiers]], struct[[ktier]]$Q): O#E#R[P1] and E#R[P1] are
## partially aliased in R#V&Residual
```

```
## Warning in projs.2canon(CombinedSets$Q[[ntiers]], struct[[ktier]]$Q): O#P#R[P1:E] and P#R[P1:E]
## are partially aliased in R#V&Residual
```

```
summary(units.hompseudo.canon, which.criteria = c("aeff", "eeff", "order", "dforth"))
```

```
##
##
```

```
## Summary table of the decomposition for episo, train & video (based on adjusted quantities)
##
##  Source.episo df1 Source.train df2 Source.video df3 aefficiency eefficiency order dforthog
##  R             63 T              1 R[P1]          1      1.0000      1.0000     1         1
##                   Residual      62 P1            1      1.0000      1.0000     1         1
##                                    R[P1]         61      1.0000      1.0000     1        61
##  V             15 V             15 P1#E           1      0.5000      0.5000     1         0
##                                    O#P1#E        1      0.5000      0.5000     1         0
##                                    O#R[P1]       1      1.0000      1.0000     1         1
##                                    P#R[P1:E]    12      0.1500      0.0381     6         0
##  R#V          945 T#V           15 O#R[P1]       1      1.0000      1.0000     1         1
##                                    E#R[P1]       2      0.5000      0.5000     1         0
##                                    P#R[P1:E]    12      0.1500      0.0381     6         0
##                   Residual     930 O            1      1.0000      1.0000     1         1
##                                    E            1      1.0000      1.0000     1         1
##                                    P1#E         1      0.5000      0.5000     1         0
##                                    P[P1:E]     12      1.0000      1.0000     1        12
##                                    O#P1         1      1.0000      1.0000     1         1
##                                    O#E          1      1.0000      1.0000     1         1
##                                    O#P1#E       1      0.5000      0.5000     1         0
##                                    O#P[P1:E]   12      1.0000      1.0000     1        12
##                                    O#R[P1]     60      1.0000      1.0000     1        60
##                                    E#R[P1]     61      0.9683      0.5000     2        59
##                                    P#R[P1:E]  372      0.7323      0.0381     7       348
##                                    O#E#R[P1]   59      1.0000      1.0000     1        59
##                                    O#P#R[P1:E] 348      1.0000      1.0000     1       348
##
## Table of information (partially) aliased with previous sources derived from the same formula
##
##  Source      df  Alias      In           aefficiency eefficiency order dforthog
##  R[P1]        63 R[P1]      video             1.0000      1.0000     1         1
##  R[P1]        63 ## Aliased video             0.0000      0.0000     0         0
##  E#R[P1]     127 E#R[P1]    video             1.0000      1.0000     1         1
##  E#R[P1]     127 ## Aliased video             0.0000      0.0000     0         0
##  O#R[P1]     127 O#R[P1]    video             1.0000      1.0000     1         1
##  O#R[P1]     127 ## Aliased video             0.0000      0.0000     0         0
##  O#E#R[P1]   255 O#E#R[P1]  video             1.0000      1.0000     1         1
##  O#E#R[P1]   255 ## Aliased video             0.0000      0.0000     0         0
##  E#R[P1]       0 ## Aliased V&V               0.0000      0.0000     0         0
##  E#R[P1]       1 O#P1#E     R#V&Residual      1.0000      1.0000     1         1
##  O#E#R[P1]     1 P1#E       R#V&Residual      1.0000      1.0000     1         1
##  O#E#R[P1]     2 E#R[P1]    R#V&Residual      1.0000      1.0000     1         2
##  O#P#R[P1:E]  24 P#R[P1:E]  R#V&Residual      1.0000      1.0000     1        24
##
## The design is not orthogonal
```

Produce the anatomy for the homogeneous allocation model, without the groups pseudofactor

- The design is not structure balanced because some orders are not 1.
- Also, there is partial aliasing.

```
ph2.homog.canon <- designAnatomy(formulae = list(episo  = ~ R * V,
                                                 train  = ~ T * V,
```

```
                                                video  = ~ O * (E/P) * R,
                                                motion = ~ T * M * (E/P) + M * R),
                                    data = ph2.L.lay)
```

```
## Warning in projs.2canon(CombinedSets$Q[[ntiers]], struct[[ktier]]$Q): E#R is aliased with
## previous terms in V&V
```

```
## Warning in projs.2canon(CombinedSets$Q[[ntiers]], struct[[ktier]]$Q): E#R and O#P[E] are
## partially aliased in R#V&Residual
```

```
## Warning in projs.2canon(CombinedSets$Q[[ntiers]], struct[[ktier]]$Q): O#E#R and P[E] are
## partially aliased in R#V&Residual
```

```
## Warning in projs.2canon(CombinedSets$Q[[ntiers]], struct[[ktier]]$Q): O#E#R and E#R are
## partially aliased in R#V&Residual
```

```
## Warning in projs.2canon(CombinedSets$Q[[ntiers]], struct[[ktier]]$Q): O#P#R[E] and P#R[E] are
## partially aliased in R#V&Residual
```

```
summary(ph2.homog.canon, which.criteria = c("aeff", "eeff", "order", "dforth"))
```

```
##
##
## Summary table of the decomposition for episo, train, video & motion (based on adjusted quantities)
##
##  Source.episo df1 Source.train df2 Source.video df3 Source.motion df4 aefficiency eefficiency
##  R             63 T              1 R              1 T               1      1.0000      1.0000
##                   Residual      62 P[E]           1 P[E]            1      1.0000      1.0000
##                                    R             61 T#P[E]          1      1.0000      1.0000
##                                                     R[T]           60      1.0000      1.0000
##  V             15 V             15 P[E]           1 P[E]            1      0.5000      0.5000
##                                    O#P[E]         1 M#P[E]          1      0.5000      0.5000
##                                    O#R            1 M#R[T]          1      1.0000      1.0000
##                                    P#R[E]        12                          0.1500      0.0381
##  R#V          945 T#V           15 O#R            1 M#R[T]          1      1.0000      1.0000
##                                    E#R            2 T#P[E]          1      0.5000      0.5000
##                                                     T#M#P[E]        1      0.5000      0.5000
##                                    P#R[E]        12                          0.1500      0.0381
##                   Residual     930 O              1 M               1      1.0000      1.0000
##                                    E              1 E               1      1.0000      1.0000
##                                    P[E]          13 P[E]           13      0.9286      0.5000
##                                    O#E            1 M#E             1      1.0000      1.0000
##                                    O#P[E]        14 M#P[E]         14      0.9333      0.5000
##                                    O#R           60 T#M             1      1.0000      1.0000
##                                                     T#M#P[E]        1      1.0000      1.0000
##                                                     M#R[T]         58      1.0000      1.0000
##                                    E#R           61 T#E             1      1.0000      1.0000
##                                                     T#P[E]          1      0.5000      0.5000
##                                                     T#M#P[E]        1      0.5000      0.5000
##                                                     Residual       58      0.9683      0.5000
##                                    P#R[E]       372 T#P[E]         12      1.0000      1.0000
##                                                     Residual      360      0.7323      0.0381
##                                    O#E#R         59 T#M#E           1      1.0000      1.0000
##                                                     Residual       58      1.0000      1.0000
##                                    O#P#R[E]     348 T#M#P[E]       12      1.0000      1.0000
##                                                     Residual      336      1.0000      1.0000
```

```
##  order dforthog
##      1        1
##      1        1
##      1        1
##      1       60
##      1        0
##      1        0
##      1        1
##      6        0
##      1        1
##      1        0
##      1        0
##      6        0
##      1        1
##      1        1
##      2       12
##      1        1
##      2       13
##      1        1
##      1        1
##      1       58
##      1        1
##      1        0
##      1        0
##      2       59
##      1       12
##      7      348
##      1        1
##      1       59
##      1       12
##      1      348
##
## Table of information (partially) aliased with previous sources derived from the same formula
##
##  Source   df Alias                    In           aefficiency eefficiency order dforthog
##  R         1 P[E]                     video             1.0000      1.0000     1        1
##  R        62 ## Information remaining video             1.0000      1.0000     1       62
##  O#R       1 P[E]                     video             1.0000      1.0000     1        1
##  O#R       1 O#P[E]                   video             1.0000      1.0000     1        1
##  O#R      62 ## Information remaining video             1.0000      1.0000     1       62
##  E#R       2 P[E]                     video             1.0000      1.0000     1        2
##  E#R      62 ## Information remaining video             1.0000      1.0000     1       62
##  O#E#R     2 P[E]                     video             1.0000      1.0000     1        2
##  O#E#R     2 O#P[E]                   video             1.0000      1.0000     1        2
##  O#E#R    62 ## Information remaining video             1.0000      1.0000     1       62
##  E#R       0 ## Aliased               V&V               0.0000      0.0000     0        0
##  E#R       1 O#P[E]                   R#V&Residual      1.0000      1.0000     1        1
##  O#E#R     1 P[E]                     R#V&Residual      1.0000      1.0000     1        1
##  O#E#R     2 E#R                      R#V&Residual      1.0000      1.0000     1        2
##  O#P#R[E] 24 P#R[E]                   R#V&Residual      1.0000      1.0000     1       24
##  R[T]      1 P[E]                     motion            1.0000      1.0000     1        1
##  R[T]      1 T#P[E]                   motion            1.0000      1.0000     1        1
##  R[T]     60 ## Information remaining motion            1.0000      1.0000     1       60
##  M#R[T]    1 P[E]                     motion            1.0000      1.0000     1        1
```

```
##  M#R[T]    1 T#P[E]                    motion            1.0000      1.0000     1        1
##  M#R[T]    1 M#P[E]                    motion            1.0000      1.0000     1        1
##  M#R[T]    1 T#M#P[E]                  motion            1.0000      1.0000     1        1
##  M#R[T]   60 ## Information remaining motion            1.0000      1.0000     1       60
##
## The design is not orthogonal
```

Output the anatomy with terms instead of sources

```
summary(ph2.homog.canon, , which.criteria = c("aeff", "eeff", "order", "dforth"),
        labels.swap = TRUE)
```

```
##
##
## Summary table of the decomposition for episo, train, video & motion (based on adjusted quantities)
##
##  Term.episo df1 Term.train df2 Term.video df3 Term.motion df4 aefficiency eefficiency order
##  R           63 T            1 R            1 T             1      1.0000      1.0000     1
##                 Residual    62 E:P          1 E:P           1      1.0000      1.0000     1
##                                R           61 T:E:P         1      1.0000      1.0000     1
##                                               R            60      1.0000      1.0000     1
##  V           15 V           15 E:P          1 E:P           1      0.5000      0.5000     1
##                                O:E:P        1 M:E:P         1      0.5000      0.5000     1
##                                O:R          1 M:R           1      1.0000      1.0000     1
##                                E:P:R       12                      0.1500      0.0381     6
##  R:V        945 T:V         15 O:R          1 M:R           1      1.0000      1.0000     1
##                                E:R          2 T:E:P         1      0.5000      0.5000     1
##                                               T:M:E:P       1      0.5000      0.5000     1
##                                E:P:R       12                      0.1500      0.0381     6
##                 Residual   930 O            1 M             1      1.0000      1.0000     1
##                                E            1 E             1      1.0000      1.0000     1
##                                E:P         13 E:P          13      0.9286      0.5000     2
##                                O:E          1 M:E           1      1.0000      1.0000     1
##                                O:E:P       14 M:E:P        14      0.9333      0.5000     2
##                                O:R         60 T:M           1      1.0000      1.0000     1
##                                               T:M:E:P       1      1.0000      1.0000     1
##                                               M:R          58      1.0000      1.0000     1
##                                E:R         61 T:E           1      1.0000      1.0000     1
##                                               T:E:P         1      0.5000      0.5000     1
##                                               T:M:E:P       1      0.5000      0.5000     1
##                                               Residual     58      0.9683      0.5000     2
##                                E:P:R      372 T:E:P        12      1.0000      1.0000     1
##                                               Residual    360      0.7323      0.0381     7
##                                O:E:R       59 T:M:E         1      1.0000      1.0000     1
##                                               Residual     58      1.0000      1.0000     1
##                                O:E:P:R    348 T:M:E:P      12      1.0000      1.0000     1
##                                               Residual    336      1.0000      1.0000     1
##  dforthog
##         1
##         1
##         1
##        60
##         0
##         0
```

```
##         1
##         0
##         1
##         0
##         0
##         0
##         1
##         1
##        12
##         1
##        13
##         1
##         1
##        58
##         1
##         0
##         0
##        59
##        12
##       348
##         1
##        59
##        12
##       348
##
## Table of information (partially) aliased with previous sources derived from the same formula
##
##  Source   df Alias                     In           aefficiency eefficiency order dforthog
##  R         1 P[E]                      video             1.0000      1.0000     1        1
##  R        62 ## Information remaining video             1.0000      1.0000     1       62
##  O#R       1 P[E]                      video             1.0000      1.0000     1        1
##  O#R       1 O#P[E]                    video             1.0000      1.0000     1        1
##  O#R      62 ## Information remaining video             1.0000      1.0000     1       62
##  E#R       2 P[E]                      video             1.0000      1.0000     1        2
##  E#R      62 ## Information remaining video             1.0000      1.0000     1       62
##  O#E#R     2 P[E]                      video             1.0000      1.0000     1        2
##  O#E#R     2 O#P[E]                    video             1.0000      1.0000     1        2
##  O#E#R    62 ## Information remaining video             1.0000      1.0000     1       62
##  E#R       0 ## Aliased                V&V               0.0000      0.0000     0        0
##  E#R       1 O#P[E]                    R#V&Residual      1.0000      1.0000     1        1
##  O#E#R     1 P[E]                      R#V&Residual      1.0000      1.0000     1        1
##  O#E#R     2 E#R                       R#V&Residual      1.0000      1.0000     1        2
##  O#P#R[E] 24 P#R[E]                    R#V&Residual      1.0000      1.0000     1       24
##  R[T]      1 P[E]                      motion            1.0000      1.0000     1        1
##  R[T]      1 T#P[E]                    motion            1.0000      1.0000     1        1
##  R[T]     60 ## Information remaining motion            1.0000      1.0000     1       60
##  M#R[T]    1 P[E]                      motion            1.0000      1.0000     1        1
##  M#R[T]    1 T#P[E]                    motion            1.0000      1.0000     1        1
##  M#R[T]    1 M#P[E]                    motion            1.0000      1.0000     1        1
##  M#R[T]    1 T#M#P[E]                  motion            1.0000      1.0000     1        1
##  M#R[T]   60 ## Information remaining motion            1.0000      1.0000     1       60
##
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```

Save the image

```
save.image("AltRowColDesign.RData")
```