Example for illustration of mixedDesign() function

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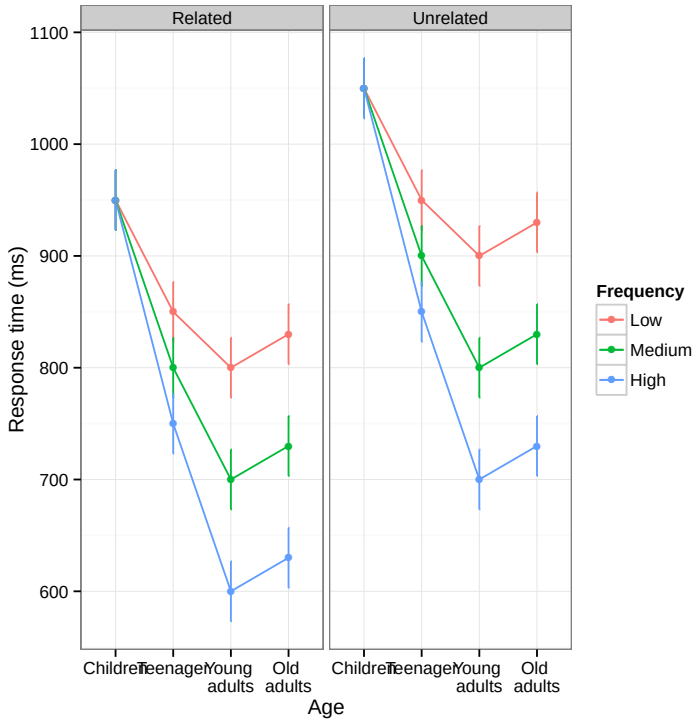
The results below are generated from an R script.

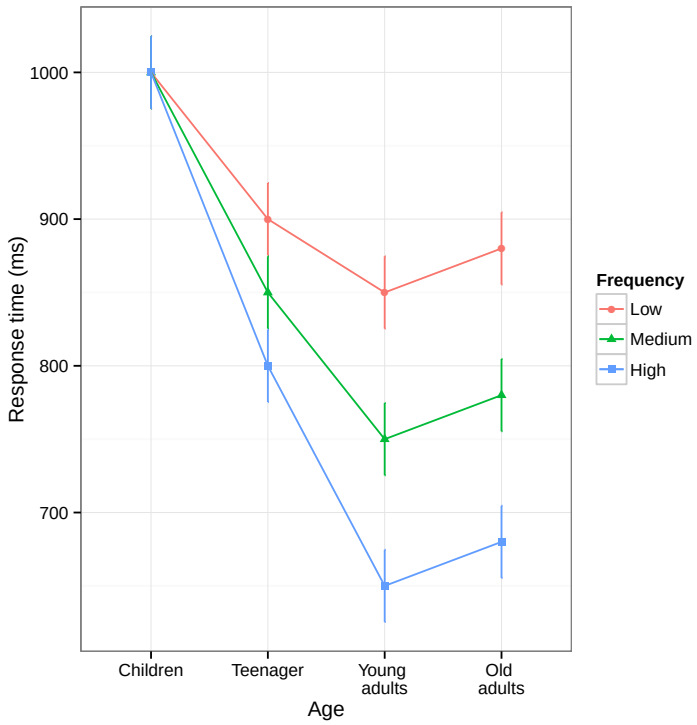
```
# Citation: Hohenstein & Kliegl (2013): Simulation of Factorial Mixed-Model Designs in R:
# The mixedDesign() function

library(MASS)
library(plyr)
library(ggplot2)

source("functions/mixedDesign.v0.6.2.R")

# Cell means (between-subject factor levels across rows; within-subject factor levels
# across columns)
mean.mat <- matrix(c(950, 950, 950, 1050, 1050, 1050, 850, 800, 750, 950, 900, 850, 800, 700,
    600, 900, 800, 700, 830, 730, 630, 930, 830, 730), nrow = 4, ncol = 6, byrow = TRUE)

# Call function
set.seed(1)
data <- mixedDesign(B = 4, W = c(2, 3), M = mean.mat, SD = 60, n = 20, long = TRUE)

## Warning:  Using identical correlation matrix for all groups.

## ...using gaussian distribution

# Rename variables and levels
names(data) <- c("Age", "Subj", "Prime", "Frequency", "RT")
levels(data$Age) <- c("Children", "Teenager", "Young \nadults", "Old \nadults")
levels(data$Prime) <- c("Related", "Unrelated")
levels(data$Frequency) <- c("Low", "Medium", "High")

# Compute table of means for full factorial
table <- ddply(data, .(Age, Frequency, Prime), summarise, N = length(RT), M = mean(RT), SD = sd(RT),
    SE = SD/sqrt(N))
# Note: SE's are valid only for comparisons between age groups (between-subject factor)

# Plot table
qplot(data = table, x = Age, y = M, ylab = "Response time (ms)", group = Frequency, colour = Frequency,
    facets = . ~ Prime, geom = c("point", "line")) + geom_errorbar(aes(ymax = M + 2 * SE, ymin = M -
    2 * SE), width = 0) + theme_bw()
```

*This report is automatically generated with the R package **knitr** (version 1.5).




```
# Age(4) x Prime (2) x Freq(3) mixed-model ANOVA
summary(aov(RT ~ Age * Frequency * Prime + Error(Subj/(Frequency * Prime)), data = data))

##
## Error: Subj
##           Df  Sum Sq Mean Sq F value Pr(>F)
## Age        3 4476000 1492000     414 <2e-16 ***
## Residuals 76  273600    3600
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Error: Subj:Frequency
##                 Df  Sum Sq Mean Sq F value Pr(>F)
## Frequency        2 1250000  625000   173.6 <2e-16 ***
## Age:Frequency    6  550000   91667    25.5 <2e-16 ***
## Residuals      152  547200    3600
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Error: Subj:Prime
##           Df  Sum Sq Mean Sq F value Pr(>F)
## Prime      1 1200000 1200000     333 <2e-16 ***
## Age:Prime  3       0       0       0      1
## Residuals 76  273600    3600
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Error: Subj:Frequency:Prime
##                      Df Sum Sq Mean Sq F value Pr(>F)
## Frequency:Prime       2      0       0       0      1
```

```
## Age:Frequency:Prime   6      0       0       0      1
## Residuals           152 547200    3600

# Significant interaction for Age x Frequency
table.a_f <- ddply(data, .(Age, Frequency), summarise, N = length(RT), M = mean(RT), SD = sd(RT),
    SE = SD/sqrt(N))

qplot(data = table.a_f, x = Age, y = M, ylab = "Response time (ms)", group = Frequency, colour = Frequer
    shape = Frequency, geom = c("point", "line")) + geom_errorbar(aes(ymax = M + 2 * SE, ymin = M -
    2 * SE), width = 0) + theme_bw()
```



The R session information (including the OS info, R version and all packages used):

```
sessionInfo()

## R version 3.0.3 (2014-03-06)
## Platform: x86_64-apple-darwin10.8.0 (64-bit)
##
## locale:
## [1] de_DE.UTF-8/de_DE.UTF-8/de_DE.UTF-8/C/de_DE.UTF-8/de_DE.UTF-8
##
## attached base packages:
## [1] grid      stats     graphics  grDevices utils     datasets  methods   base
##
## other attached packages:
##  [1] knitr_1.5         reshape2_1.2.2    hexbin_1.26.3     coefplot2_0.1.3.2
##  [5] coda_0.16-1       lattice_0.20-27   lme4_1.1-6        Rcpp_0.11.1
##  [9] Matrix_1.1-2-2    plyr_1.8.1        MASS_7.3-30       ggplot2_0.9.3.1
##
## loaded via a namespace (and not attached):
##  [1] colorspace_1.2-4    dichromat_2.0-0     digest_0.6.4        evaluate_0.5.1
```

```
##  [5] formatR_0.10        gtable_0.1.2        highr_0.3           labeling_0.2
##  [9] minqa_1.2.3         munsell_0.4.2       nlme_3.1-115        proto_0.3-10
## [13] RColorBrewer_1.0-5  RcppEigen_0.3.2.1.1 reshape_0.8.4       scales_0.2.3
## [17] splines_3.0.3       stringr_0.6.2       tools_3.0.3

Sys.time()

## [1] "2014-03-30 14:33:17 CEST"
```