Block Randomization using R

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Abstract
Block randomization is implemented in the *psych* package or may be done by sourcing the `block.random` function from the personality-project repository.

The assignment of subjects to experimental conditions may be done using various random processes. Flipping a coin, using a table of random numbers, using the `sample` or `runif` functions in R are easy ways to generate random sequences. But to guarantee equal numbers of subjects in all conditions and to avoid end of experiment effects, it is convenient to block randomize subjects to conditions.

Get the psych package or get block.random

This may be done by using the `block.random` function which is available in the *psych* package as of release 1.0.88. (The current release is 1.1.11) so if you have installed *psych* in the last year, you should have it. To install the most recent package, when in R use the `install.packages` option from the menu.)

Alternatively, if you do not have the most recent release of *psych*, or you just want this one function, you can use the *source* command to get `block.random`.

```
url <- "http://personality-project.org/r/src/contrib/psych/R/block.random.R"
source(url)  #this will load the function
```

Remember, if you want to use the *psych* package you must first make it active.

```
library(psyh)
```

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Most recent changes to the documentation were done October 31, 2011
Using block.random

Using `block.random` in an experiment where you want to block randomize 2 factors, sex and drug and you want to run 48 subjects:

```r
library(psych) # make it active
my.cond <- block.random(n=48, c(sex=2, drug=2))
headtail(my.cond) # to show just the first and last 4 cases
# my.cond) (without the comment will show all the cases.

> headtail(my.cond)
blocks   sex   drug
S1       1       1     2
S2       1       1     1
S3       1       2     1
S4       1       2     2
...      ...     ...  
S45      12      2     1
S46      12      1     2
S47      12      1     1
S48      12      2     2
```

Now, consider an experiment with 96 subjects and two drug conditions, three time conditions, and two levels of impulsivity

```r
my.cond <- block.random(n=96, c(drug=2, time=3, imp=2))
headtail(my.cond) # to show just the first and last 4 cases
# my.cond) (without the comment will show all the cases.

blocks   drug time imp
S1       1       2   3   2
S2       1       1   1   1
S3       1       1   2   1
S4       1       1   2   2
...      ...     ...  ...
S93      8       2   1   2
S94      8       1   1   1
S95      8       2   2   2
S96      8       2   3   2
```
Visualizing block randomization

Although not necessary to do in order to use the block randomized conditions, it is useful to visualize what has happened by using the `pairs.panels` function (Figure 1).

```
pairs.panels(my(cond)
```

*Figure 1.* Block randomization of three independent variables (drug, time, and impulsivity) will produce uncorrelated conditions.