

Block Randomization using R

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Abstract

Block randomization is implemented in the *psych* package. It allows for block randomization of Subjects by blocks with randomization of the IV within blocks.

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.

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

R code

```
library(psych)
```

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. In the call you specify how many total subjects (`n`) as well as the names and number of levels of your experimental conditions. In this first example, we specify we want 48 subjects with two conditions.

R code

```
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
```

Note that for the purpose of this handout, just the first and last 4 lines are shown. To show all of them, just ask for `my.cond`

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

R code

```
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
```

Once again, to see all of them, just ask for `my.cond`.

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).

R code

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

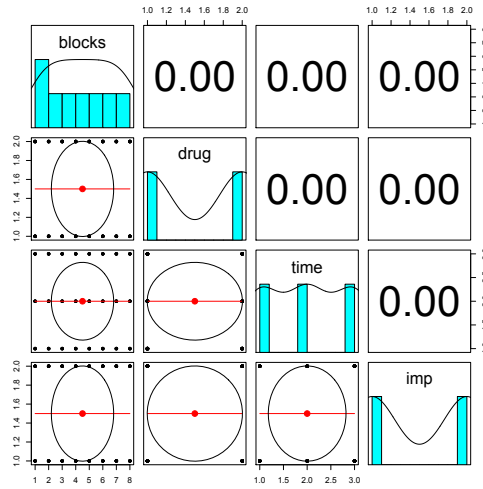


Figure 1. Block randomization of three independent variables (drug, time, and impulsivity) will produce uncorrelated conditions.