Holcombe:ProgrammingInR

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SUPA Sydney University Perception and Action Lab Primer (https://docs.google.com/document/d/1xWk0qvaZXhMri4PaW2pE2CMFm5Dym8m_ss7jTWy_yzs/edit) editing help (http://meta.wikimedia.org/wiki/Help:Wikitext) refcard (http://upload.wikimedia.org/wikipedia/meta/e/e7/MediaWikiRefCard.png)

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R is an interactive programming language for statistics. The syntax is very idiosyncratic, and not really in a good way. Try R for programmers (http://www.johndcook.com/R_language_for_programmers.html) for a description. However it may have menu-driven versions maybe available R commander (http://socserv.mcmaster.ca/jfox/Misc/Rcmdr/) we haven't tried that and another one is pmg GTK maybe here (http://www.ggobi.org/rgtk2)

In the lab we have the book *Using R for Introductory Statistics*. R_Statistics introduces you to R

Dani has posted some example code and graphs on his personal website (http://www.dlinares.org/Site/R_code.html) .

R reference cheatsheet (http://www.rpad.org/Rpad/R-refcard.pdf) , also a file here Media:Matlab-python-xref.pdf that gives equivalent code for doing array operations in MATLAB, Python, and R plot parameters (http://www.statmethods.net/advgraphs/axes.html)

There is a wiki with some good tips here (http://wiki.r-project.org/rwiki/doku.php?id=start) . Also Data frame tips (http://rwiki.sciviews.org/doku.php?id=tips:tips#data) , list of R websites (http://alittleknowledge.wordpress.com/2009/09/11/r-for-pedestrians/)

Functions in R can only return one parameter.

dataframe tips

Examining your data frame or object, let's say it's called *datos*

```
typeof(datos) #returns "list!"
str(datos) #tells you it's a dataframe, number of observations, columns, etc
head(datos)
str(datos)
summary(datos) #good for ggplot objects also
```

```
df$varWithExtraLevels = factor(df$varWithExtraLevels)
```

```
length(df) #number of columns of dataframe
```

```
names(df) #names of columns of dataframe
```

```
library(Hmisc);
describe(df)
```

```
#Calling typeof() on a dataframe returns "list"
```

```
rm(objectToBeDeleted)
rm(list = ls())  #Delete nearly everything in memory
```

expand.grid() to create dataframe with every combination of some factors

Check your counterbalancing in your results file. Make a contingency table,

```
table(dataRaw$speed,dataRaw$relPhaseOuterRing)
```

Replace certain value with another

```
thr$thresh[  thr$task=='ident' ] = NA
```

Creating Graphs (usu. ggplot2)

how I Holcombe:fit psychometric functions and bootstrap

See http://openwetware.org/wiki/Holcombe:Plotting

Debugging in R

How to examine and try things with a questionable variable within a function?

```
ee <<- resultsMeans #make global, violating all principles of good coding #DEBUG
STOP
```

After an error, calling traceback() gives you the stack

doing ANOVAs etc

Understanding model formulae (http://ww2.coastal.edu/kingw/statistics/R-tutorials/formulae.html)

ANOVA with repeated measures (http://ww2.coastal.edu/kingw/statistics/R-tutorials/repeated.html) walk-through

some aov (ANOVA) explanation (http://www.personality-project.org/r/r.anova.html)

R will assume factor is regressor if numeric (http://books.google.com.au/books?id=yULf2kZSfeMC&pg=PA303&lpg=PA303&dq=r+linear+model+lm+continuous+and+discrete+factor&source=bl&ots=t82xDTuDaL&sig=EVVrHZ08lC80MGvJUQDNLg948Mc&hl=en&ei=_CO3SdOsG5mktQPZxYjsAQ&sa=X&oi=book_result&resnum=1&ct=result#PPA303,M1)

I think I had too many error terms (http://tolstoy.newcastle.edu.au/R/help/04/08/2136.html) reducing error terms (http://books.google.com.au/books?id=ptbcCBSWvvQC&pg=PA359&lpg=PA359&dq=ANOVA+within-

subjects++pooled+error+term&source=bl&ots=73eFDsaw8l&sig=ReTGWRjNFGnYQ4DF-D6qAE9qJgQ&hl=en&ei=cKu4Sd7CPIr2sAPSw4Q8&sa=X&oi=book_result&resnum=8&ct=result)

Anovas with repeated measures (http://blog.gribblelab.org/2009/03/09/repeated-measures-anova-using-r/) can be complicated in R.

We have some R books in the lab

Dealing with circular data

von Mises vs. wrapped Gaussian,

see Swindale, N. V. (1998). Orientation tuning curves: empirical description and estimation of parameters. Biol Cybern, 78(1), 45-56.

Setting up a proxy in R on a Mac

The easiest way to set up a proxy is simply to create a file called ".Rprofile" (make sure the file does not have a .txt or .rtf extension. Textwrangler will automatically give it an extension, it may be best to create the file using Vi in a terminal - using emacs probably won't work) in your user directory (~ or /Users/username/) with the line:

```
Sys.setenv(http_proxy="http://username:password@tcdproxy.tcd.ie:8080")
```

Then restart R. This information (and more) can be found on Ken Benoit's webpage (http://www.kenbenoit.net/?p=261)

If you're at the Camperdown campus of the University of Sydney, use:

```
Sys.setenv(http_proxy="http://www-cache.usyd.edu.au:8080")
```

Note: The following may not necessarily be true anymore. If the below address does not work, use the same one as for Camperdown above. The Cumberland Campus of the University of Sydney, use:

```
Sys.setenv(http_proxy="web-cache-ext.usyd.edu.au:8080")
```