

SETTING UP AN R ENVIRONMENT

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INTRODUCTION

Unlike SPSS and many other statistics systems, R has a more complicated setup. While there are challenges, this process it is not unreasonable with some guidance. During the workshop, we will first introduce the setup process and then presenters will be on hand to help with any issues as they arise.

Detailed setup instructions are further down in this document, however getting things working goes more smoothly if we introduce the overall structure of the system first.

Components of R

To use R, you need two components, the main R program (sometimes called the kernel, the R system, or just “R”) and another program to let you connect to or interface with R.

In these notes and throughout the workshop, we will refer to the main R program as the **kernel**, the program used to connect to R as the **interface**, and the combination of these programs as the **R system**.

Due to the (quirky?) history of R development, the most useful interface is not a fixed part of the main R system but usually one of several add-on programs designed by others to work with R. Note that the basic R system does come with a very simple command-line interface, but it is generally considered to be unusable for doing actual statistical analysis work. If you installed R previously and gave up because it was too hard to use, it is likely that you tried to use the default R interface. Don't do that!

Most R users choose the **RStudio** program (from rstudio.com) as their interface to the R system. This is an open-source program made available by a company that makes its income from selling web-based statistics software (based on R) and some consulting services.¹ The simplest version of the RStudio program is available for anyone to use

¹ I am generally distrustful of software that is made by commercial entities or that comes in various pricing “layers” as the free layer is usually problematic. This case appears to be an exception.

without charge. **Once it is installed, you can use it for accessing all R functions;** you should only rarely (if ever) need to start the R kernel directly.

Let me say that again: once both R and RStudio are installed, **you will only need to start RStudio to use R.** The main R program will likely not need to be started when you do day to day statistical work.

There are other interfaces to the R kernel which we will not discuss today, but we list some of them here for your reference:

These include [ESS](#) (Emacs speaks statistics) for users of the Emacs editor (not a graphical interface); [R Commander](#) (by John Fox) which attempts to add a graphical user interface for basic statistics to the R kernel; [JGR](#) (pronounced “jaguar”) a “unified graphical interface for R” which has been recently (2016) updated; [RKWard](#) (for Linux only) which features nice data editing features; and [Rattle](#) (Togaware) an interface to R specifically designed for data mining; among others.

Each of these interfaces connects to the R system in a different way, so no general advice can be given about installation or use.

We will use RStudio exclusively for the workshop today. Unless you have unusual requirements, RStudio is very likely the best choice for most users. Some of the other interfaces listed may be appropriate for teaching first courses in undergraduate statistics for psychology students, especially R Commander.

Administrator Privileges

All installations of R require that either you have what are called administrator rights (or administrative privileges) to your computer, or that you can work around these. Basically, only so-called “administrators” can install programs onto your computer. There are tricks to work around this, but it makes the R system harder to maintain.

We will focus on installing onto computers for which you have administrator rights. In the setup period, the presenters at the workshop will try to help people to work around any problems, if possible. Note that if you own the computer that you are installing R onto, you have the needed administrator rights. If you have a computer provided to you by your employer or school, then you may or may not have these rights depending on your institution’s policies.

Obtaining the Software

The workshop will **not** have internet access, so USB flash drives with the main software installers and some supplemental files will be available to share among attendees. When working in places with internet access, R is much easier to update or modify.

If things are busy, please copy the relevant folders/directories to your computer so that the USB drives can be shared among all the participants today. For best results, you should use a folder/directory with no spaces in the name or the path to the name.² For both Windows and Mac, the user downloads directory – what you get when you click the downloads link in the main file manager window – should meet this requirement, unless your username has spaces in it. For Macs, this folder should be located at:

/Users/[username]/Downloads

For Windows (10), it is:

C:\Users\[username]\Downloads

Where **[username]** is the name of your account (your login name). Unless you used more than one word for your username, this is a good folder to use for saving the files.

Copying to other locations (with spaces in the names of folders) **could** lead to problems. For those of you who are new to working with files and folders at the command line, pay attention to the direction of the slashes (and backslashes). Windows and Macs differ. Most of the files we use will be available during and after the workshop on the workshop's Github account, with the exception of the main software installers available the websites listed below.

Websites

If you happen to have internet access, or are setting up an R system after the workshop, the main software we will be installing today is R (the kernel):

R for Windows: <http://cran.r-project.org/bin/windows/base/>

R for Mac: <http://cran.r-project.org/bin/macosx/>

The links to download the software are on the pages linked above.

² The “path” to a folder or file is list of folders from the main (or root) folder all the way down to the folder of file in question. This can be hidden when using a point-and-click interface, but when using command-line software (like R) you need to be able to type the full path of a file, or cut and paste it into the command window.

The RStudio interface (we use the RStudio Desktop program):

<http://www.rstudio.com/products/rstudio/download/#download>

Links for the free download of the RStudio Desktop program for various platforms are on this page.

The workshop materials will be available online at:

<http://github.com/theEducationalCollective/SEPA2017-R-Workshop>

For people who want to use these materials after the workshop or for colleagues and students. This location is used for development of the materials; simpler links for downloading copies may be provided at the workshop.

Detailed installations for Macs and PCs follow...

PC/WINDOWS SETUP FROM USB COPIES

1. If the workshop is crowded, please copy the needed installation files to your computer, in a directory without spaces in its path if possible. Copy the entire PC-WINDOWS folder.
2. From the location where you copied the folder (or from the USB, if relevant) switch to the INSTALL folder.
3. Double click on the **R-3.3.2-win.exe** file. This will launch the R installer. Generally, the default settings should work for everyone, if there are issues with this please ask for help from the workshop organizers.
4. After the install, launch R (**R i386 3.2.2.exe**)
5. From the menu at the top select “Packages | Install Package(s) from Local Files...”
6. From the pop-up window, navigate to the INSTALL\PACKAGES folder used in step 2, and select **all** of the files with the .zip extension (file type .zip). All the packages can be selected by single clicking on the first file in the list, and then shift-single clicking the last file in the list. Then press the “open” button.
7. Close the R window (or use “File | Exit” to quit R). You will be asked if you want to save a “workspace image” you should say “no” but if you say something else nothing bad will happen
8. Double click on the **RStudio-1.0.136.exe** file to install RStudio. Again the defaults will work for most people, if you have any issues, please ask the workshop organizers.
9. After install is complete, if all goes well, you can either launch RStudio from the newly created icons, or you can double-click any file with the .r extension. The first time you do this, you might have to select RStudio as the default program to open these files.

MAC/OSX SETUP FROM USB COPIES

NOTE: This install is complicated due to the lack of internet at the conference. Installing packages into R (steps 4, 5abcd) are much easier when online! Don't let this sour you to using R!

1. If the workshop is crowded, please copy the needed installation files to your computer, in a directory without spaces in its path if possible. Copy the entire MAC-OSX folder.
2. From the location where you copied the folder (or from the USB, if relevant) switch to the INSTALL folder.
3. Install R:
 - a. If you are running a current OSX, switch to the **MAC10.9_orHigher** folder and run the package file there. Accept the default settings offered by the installer.
 - b. If you have an older Mac, switch to the **MAC10.6-10.8_SnowLeopard** folder and use the package file there. Accept the default settings offered by the installer.
4. Switch to your computer's Applications folder and find the **R (R.app)** icon. Control-click this file (use the **control** key, not the command/cmd key). From the pop-up, click "open." This will launch R and give permission for it to be launched normally in the future.
5. From inside of R, select the "Packages & Data" menu, and select the package installer. This opens a new window.
 - a. In this window at top, select "Local Source Package" from the list.
 - b. Then click the install button and in the new pop-up, navigate to the "packages" directory you copied from the USB.
 - c. Double-click on the first package.
 - d. Repeat steps b and c for each of the package files (the ones ending in .tgz) in the "packages" directory.
6. Close the R window, when given the option select "Don't Save" for the R "image". (If you save it, nothing bad happens, so do not worry!)
7. Navigate to the MAC-OSX/INSTALL folder and double click on the file **RStudio-1.0.136.dmg**.
 - a. Follow the on-screen instructions
 - b. Accept the defaults offered by the installer

8. Again, go to your Mac's Applications folder and control-click on the RStudio icon (See step 4 for more details) and select open. This will open RStudio and give permission for it to open normally in the future.
9. After install is complete, if all goes well, you will be able to launch RStudio from the newly created icons in applications or from the usual program launcher



The materials in this document are released under a **MIT License** (for code examples) and the Creative Commons for text.

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